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Teachers' well-being: A framework for data collection and analysis

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TEACHERS' WELL-BEING: A FRAMEWORK FOR DATA COLLECTION AND ANALYSIS

OECD Education Working Paper No. 213

By Carine Viac and Pablo Fraser (OECD)

This working paper has been authorised by Andreas Schleicher, Director of the Directorate for Education and Skills, OECD.

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Abstract

Modern education systems evolve in a context of growing teacher shortages, frequent turnover and a low attractiveness of the profession. In such a context where these challenges interrelate, there is an urgent need to better understand the well-being of teachers and its implications on the teaching and learning nexus.

This working paper proposes a comprehensive conceptual framework to analyse teachers' occupational well-being and its linkages with quality teaching.

The core concept of this framework defines teachers' well-being around four key components: physical and mental well-being, cognitive well-being, subjective well-being and social well-being. The framework then explores how working conditions, at both system and school levels, can impact and shape teachers' well-being, both positively and negatively aspects. It also presents two types of expected outcomes regarding teachers' well-being: inward outcomes for teachers in terms of levels of stress and intentions to leave the profession; and outward outcomes on quality teaching in terms of classroom processes and student' well-being. In an annex, the paper proposes an analytical plan on how to analyse teachers' well-being indicators and cross the results with other OECD instruments. It also presents the field trial items of the new module on teachers' well-being which are included in the Programme for International Student Assessment (PISA) 2021 teacher questionnaire.

Résumé

Les systèmes éducatifs modernes sont confrontés aujourd'hui à une pénurie croissante d'enseignants, des taux de déperdition importants et une faible attractivité de la profession. Dans un tel contexte, où ces défis se conjuguent les uns aux autres, il est urgent de mieux comprendre le bien-être des enseignants et ses implications sur le lien enseignement/apprentissage.

Ce document de travail élabore un cadre conceptuel global visant à analyser le bien-être au travail des enseignants et ses liens avec un enseignement de qualité.

Le concept de base de ce cadre d'analyse définit le bien-être des enseignants autour de quatre composantes clés : le bien-être physique et mental, le bien-être cognitif, le bien-être subjectif et le bien-être social. Ce document de travail s'intéresse également à la manière dont les conditions de travail, tant au niveau du système éducatif que de l'établissement scolaire, peuvent façonner et influencer, négativement et positivement, le bien-être des enseignants. Il examine également deux types d'effets escomptés relatifs au bien-être des enseignants : un effet individuel sur les enseignants en matière de niveaux de stress et des intentions de quitter la profession ; et un effet collectif sur la qualité de l'enseignement relativement à la pratique pédagogique en classe et au bien-être des élèves. En annexe, le document propose un plan analytique pour analyser les indicateurs de bien-être des enseignants et croiser ces résultats avec d'autres instruments de l'OCDE. Le document liste également les questions pour l'essai sur le terrain du nouveau module sur le bien-être des enseignants du questionnaire du Programme international pour le suivi des acquis des élèves (PISA) de 2021 destiné aux enseignants.

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Teachers' well-being for quality teaching: A framework for analysis

Teachers play a crucial role in a student's life. They are the front-line workers responsible for engaging students and promoting their learning. Indeed, empirical evidence has found that teachers are the most important in-school factor contributing to student success, satisfaction and achievement (Darling-Hammond, 2000[1]; Konstantopoulos, 2006[2]; OECD, 2014[3]). Given the crucial importance of teachers in a child's development and learning, educational communities and educational systems have great expectations for their work.

The expectation towards teacher's work and responsibilities are multiple and complex. Teachers are not merely expected to transmit information, they rather need to ensure that all students acquire the knowledge, skills and attitudes that enable them to become successful and competent citizens able to navigate through the challenges brought forward by the 21st century (Guerriero, 2017[4]). Teachers are increasingly expected to perform new tasks such as facilitating the development of students' social and emotional skills, responding to students' individual differences, and working collaboratively with other teachers and parents to ensure the holistic development of their students. They are also expected to adapt to the technological and digital demands of our era and to use information and communication technologies in their classroom to develop high-order skills across students (Schleicher, 2018[5]). The profile of the 21st teachers also consider them to be intellectually curious, capable in collecting and analysing data about their school and classroom, and act upon it.

Along with this rise in expectations, teachers' working conditions and classroom processes are changing. In many educational systems, teachers are working with diverse classroom environments in terms of their students' ability levels, socio-economic backgrounds and demographic composition. In addition, many systems face budget freezes and cuts which limit the amount and quality of support available to teachers to face these new challenges and demands (OECD, 2018[6]). At the same time, schools are becoming increasingly more bureaucratic, teachers report having weak work autonomy in their daily activities and being overloaded with non-teaching activities, especially administrative tasks (Bakker et al., 2007[7]; Collie, Shapka and Perry, 2012[8]; Hakanen, Bakker and Schaufeli, 2006[9]; Klassen and Chiu, 2010[10]).

Working conditions, such as the ones described above, can generate lead to stressful working environment. Research suggests that stressful working environments and challenging working conditions affect teachers' motivation, self-efficacy and job commitment (Collie, Shapka and Perry, 2012[8]; Desrumaux et al., 2015[11]; Klassen et al., 2013[12]). Low levels of teachers' well-being can in turn affect the organisation of educational systems as a whole through frequent turnover, low performance, absenteeism and efficiency costs (Albulescu and Tușer, 2018[13]; Boe and Cook, 2006[14]; Borman and Dowling, 2008[15]; Ingersoll, 2001[16]; Ingersoll, 2003[17]; Ronfeldt, Loeb and Wyckoff, 2013[18]; Weiss, 1999[19]). The quality of teachers' instruction and practice is also at risk, as stressed or burnt-out teachers can hardly operate effectively in the classroom (Albulescu and Tușer, 2018[13]; Betoret, 2009[20]; Skaalvik and Skaalvik, 2018[21]). In this context, it is not a surprise that teachers' well-being has become a prominent issue in policy and public debates (Schleicher, 2018[22]).

Conversely, teachers with high levels of well-being are likely to report higher levels of self-efficacy and job satisfaction. They are also more likely to report stronger motivation at work and increased commitment to stay in the profession. Thus, it is important to acknowledge that improving working conditions can become an asset to retain and even attract teachers to the profession (Bakker et al., 2007[7]; Borman and Dowling, 2008[15]; Cochran-Smith, 2004[23]; Collie and Martin, 2017[24]; Hakanen, Bakker and Schaufeli, 2006[9]) (Mostafa and Pál, 2018[25]).

However, empirical evidence on the definition of teachers' well-being and how to measure it is limited (McCallum et al., 2017[26]). As such, based on the accumulated knowledge and evidence that it has acquired on teacher-related studies, the OECD has taken the task to provide a more comprehensive model on teachers' well-being. Within this framework, the OECD has decided to explore issues linking the relationship between national policies and school contexts with teachers' well-being and the implications that teachers' well-being can have for classroom practices and students' well-being.

The goal of this working paper is to provide a conceptual framework that grounds and guides the analysis of OECD instruments in areas related to teachers' well-being and quality teaching as reported by teachers.

This paper will build from the existing literature to define the different components necessary for a comprehensive understanding of teachers' well-being. It will also explore which working conditions shape teachers' well-being. In addition, it will study the implications of teachers' occupational well-being in terms of levels of stress and future work engagement to stay in the profession. It will also explore the outcomes of teachers' occupational well-being in terms of quality teaching as reported by teachers and in terms of its association with students' well-being. In a separate annex, the document provides a preliminary analytical plan, showcasing some ideas on how to use the indicators listed throughout the report.

This document is structured around six sections. The first section presents some evidence on the current context of the teaching profession, characterised by teachers' shortages, attrition rates and a declining attractiveness of the profession. The second section describes the well-being concept as a crucial component for teacher's development. The third section then introduces the study's conceptual framework. The fourth section defines teachers' well-being and its key components. Next, the fifth section of this paper explores the associations between teachers' well-being and working conditions at both system and school levels. The last and sixth section analyses the consequences of teachers' well-being on teachers, while looking at inward outcomes for teachers in terms of levels of stress and future work engagement, and at outward outcomes in terms of quality teaching, as reported by teachers, and student's well-being.

1. The current context of the teaching profession: high attrition, shortages and low attractiveness

This section provides some evidence on the current context of the teaching profession which is characterised by growing teacher shortages, high attrition rates and difficulties in recruiting new candidates in some countries (OECD, 2014[3]). This tense situation may relate to the perceived low value of the profession on the one hand, and increasingly challenging working conditions on the other hand. Looking at teachers' well-being is an interesting angle to better understand current challenges of the teaching profession.

1.1. Teacher attrition

Teacher attrition is an acknowledged problem at the international level and has been the subject of an intense literature review (Borman and Dowling, 2008[15]; Craig, 2017[27]; McCallum et al., 2017[26]; Carver-Thomas and Darling-Hammond, 2017[28]; McCallum and Price, 2010[29]). International studies bring some evidences on high rates of teacher attrition in many countries such as Australia[1], Canada, the United Kingdom, the United States (Fantilli and McDougall, 2009[30]), Ireland (O'sullivan, 2006[31]) and the Netherlands (den Brok, Wubbels and van Tartwijk, 2017[32]; Stokking et al., 2003[33]). In the United States, about 30% of teachers leave the profession in the first five years after graduation, rising up to 50% in high-poverty areas (Cochran-Smith, 2004[23]; Ingersoll, 2003[17]; McCallum et al., 2017[26]). Levels of attrition rates are quite similar in Australia with 30 to 50% of all teachers leaving the profession within the first five years (den Brok, Wubbels and van Tartwijk, 2017[32]). In the United Kingdom, 2018 figures estimate that over 20% of new teachers leave the profession within their first two years of teaching, and that 33% leave within their first five years (United Kingdom, 2019[34]). The National Association of Schoolmasters / Union of Women Teacher (NASUWT) Big Question survey in England (United Kingdom) is aligned with these figures. The 2018 Survey revealed that 65% of teachers are thinking of quitting the profession altogether (NASUWT, 2018[35]). These figures are high compared to average annual attrition rates of 3-4% that are recorded in some other school systems such as in Finland or Singapore (Carver-Thomas and Darling-Hammond, 2017[28]).

This problem is particularly salient for early career teachers, within the first five years of the profession (McCallum and Price, 2010[29]), and for teachers over 50 who take early retirement (den Brok, Wubbels and van Tartwijk, 2017[32]). These results could be explained by the particular working conditions faced by novice teachers. Indeed, Teaching and Learning International Survey (TALIS) 2018 data has shown that novice teachers tend to often be allocated to more vulnerable schools (i.e. schools with a high proportion of low socio-economic students) than more experienced teachers. Furthermore, novice teachers tend to feel less prepared for the complexity of the job and have lower levels of confidence than their more experienced colleagues (Gallant and Riley, 2014[36]; OECD, 2019[37]). In addition, the problem of teacher retention is often more severe in low socio-economic schools, in urban school (where there are large numbers of poor and minority students), rural and/or remote schools (Cochran-Smith, 2004[38]; Guarino, Santibañez and Daley, 2006[39]).

Some countries already adopted national reforms to cope with high attrition rates. For instance, the United Kingdom has developed a national strategy, the Teacher Recruitment and Retention Strategy, to recruit teachers and retain them in the profession (United Kingdom, 2019[34]). This strategy includes a series of initiatives, including encouraging flexible working hours, introducing early-career retention payments for math teachers and upskilling programmes for science teachers. In addition, this strategy introduces an Early Career Framework, which will underpin an entitlement to a two-year package of structured support for all early-career teachers. The government of the United Kingdom

[1] Caution should be taken when addressing Australia's teacher attrition due to the lack of robust evidence. Work is underway in Australia through the collection of a national teaching workforce dataset to help understand the teacher workforce on a national scale.

also attempts to reduce teacher workload with a series of measures (United Kingdom, 2019[34]).

1.2. Teacher shortage

The lack of qualified teachers is another problem affecting the constitution of a teaching workforce in several systems. The European Commission has identified 13 European countries which are already, or will soon be, facing an overall shortage of qualified teachers (i.e. Austria, Belgium, Denmark, Germany, Italy, Luxembourg, the Netherlands, Norway, Romania, the Slovak Republic, Slovenia, Sweden and Turkey (Carlo et al., n.d.[40]). McCallum also highlights the shared concerns about teacher shortages, especially in certain subjects such as mathematics, science and secondary English, in England (United Kingdom) and the United States (McCallum et al., 2017[26]). In England (United Kingdom), for instance, the overall pupil numbers are expected to continue rising, with the number of secondary school pupils projected to increase by 15% between 2018 and 2025, while the number of teacher recruitments is decreasing (United Kingdom, 2019[34]).

TALIS 2018 results also confirmed the existing prevalence of teacher shortages in developed countries. On average across countries participating in TALIS 2018, 21% of school principals reported a shortage of lower-secondary qualified and/or well-performing teachers. The problem is very salient in Colombia, Saudi Arabia and Viet Nam where more than 50% of principals consider that instruction is hindered by a lack of qualified teaching staff (OECD, 2019[37]).

The ageing teaching workforce provides some useful insights on the breadth of future teacher shortages. On average, lower-secondary teachers across OECD countries are 42.9 years old (OECD, 2018[41]). Across OECD countries, Italy has the oldest teaching population with an average age of 48.9, and teachers are above 45 in Bulgaria, Estonia, Latvia, Portugal, Spain and Sweden. Estonia and Norway have the highest proportions of teachers aged 60 or more (16% and 15%, respectively), while in a number of countries (i.e. Bulgaria, Estonia and Italy), nearly half of them are 50 years or older (OECD, 2018[41]). The large proportion of teachers reaching the retirement age in the next decade is likely to increase the issue of teacher shortages and may put governments under pressure to recruit and train new teachers (OECD, 2018[41]).

By 2030, in developing countries, the problem of teacher shortages will be even more acute where the student population grows faster than the number of teachers. Out of the 69 million new teachers needed in developing countries by 2030, more than 60% of them will be replacing teachers who will have left the workforce by 2030. The remaining additional teachers are needed to expand access to school and reduce class sizes to a maximum of 25 in secondary schools (UIS, 2016[42]). Sub-Saharan Africa and Southern Asia account for over three-quarters of the need for new teachers in developing countries to achieve universal primary and secondary education (UIS, 2016[42]).

The problem of teacher shortages can paradoxically co-exist with teacher oversupply in certain geographical and subject areas (OECD, 2019[43]). For instance, these two phenomena co-exist in Italy, Germany, Greece, Lithuania and Spain. Oversupply can imply difficulties for newly qualified teachers to find placement after graduation, which in turn can negatively affect the view of teaching as a career. This may be partly related to inequities across schools and the effects of a decentralised teacher recruitment process (OECD, 2019[43]).

1.3. Attractiveness of the teaching profession

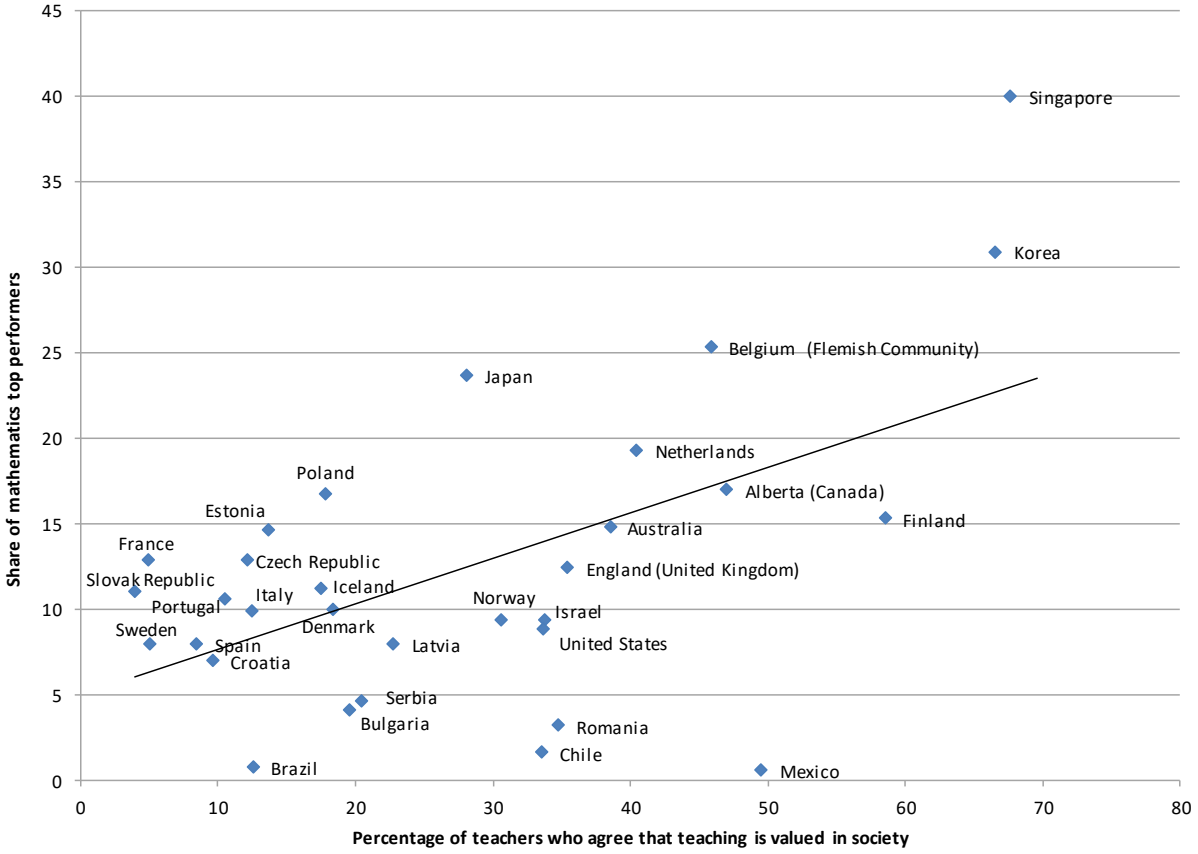
In addition to high teachers' attrition rates and growing teacher shortages, there seems to be a low level of attractiveness of the teaching profession (Schleicher, 2018[5]; OECD, 2014[3]; McCallum and Price, 2010[29]). On average, and across countries participating in TALIS 2018, one out of four teachers believes that teaching is a profession valued in society (OECD, 2019[37])This issue is particularly problematic in Croatia, France, the Slovak Republic, Spain and Sweden, where less than 10% of teachers believe that teaching is valued.

The share of teachers who believe that teaching is a valued profession in their country is a good predictor of the attractiveness of the profession, as the Programme for International Student Assessment (PISA) results highlighted that the most successful education systems were those where society values teachers the most (Figure 1)[2]. In addition, PISA results showed that teachers who wanted to pursue a career in the teaching profession tend to report higher job satisfaction, hence the attractiveness of the profession is important in attracting new candidates and retaining them in their jobs (Mostafa and Pál, 2018[25]).

[2] The results of Figure 1 display a country level correlation between the national share of mathematical performers and the percentage of teachers agreeing that teaching is valued in society. The correlation does not take into account other teacher variables driving this correlation such as teachers' pay. Evidence has shown that teachers' pay is weakly correlated with students' achievement, see for example (Dolton et al., 2018[177]).

Figure 1. Relationship between the value of the teaching profession and the share of top mathematic performers

Relationship between lower secondary education teachers' view on the value of their profession in society and the share of top mathematics performers in PISA 2012



Source: Schleicher (2018), *Valuing our Teachers and Raising their Status: How Communities Can Help.*

1.4. Consequences and policy responses

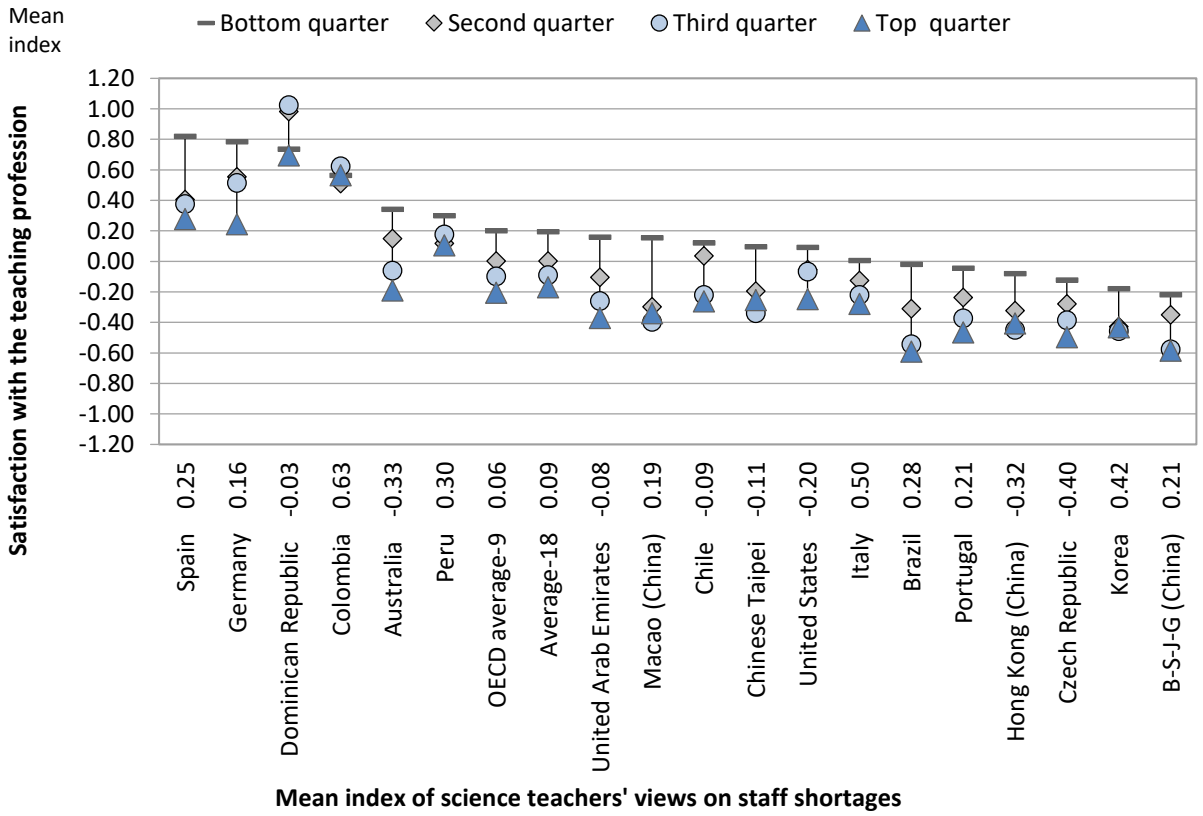
Some of the policy responses in terms of teacher shortages and attrition rates impact the quality of the school systems. School systems respond to teacher shortages in the short term by some combination of lowering qualification requirements for entry into the profession; assigning teachers to teach in subject areas in which they are not fully qualified; increasing the number of classes allocated to teachers; or increasing class sizes. Such responses raise concerns about the sustainability of the quality of teaching and learning (OECD, 2005[44]). Furthermore, if these policy responses only address the outcomes of shortages and attritions in the short term, they do not take measures to prevent this situation.

In addition, the availability of human resources is important for teachers' well-being. For instance, shortages usually come along with additional workload for the teachers who are currently working. The perceived lack of human resources could cause teacher dissatisfaction. Moreover, even though resources do not generate satisfaction by themselves, a lack of resources could cause dissatisfaction (Mostafa and Pál, 2018[25]).

Figure 2 shows that teachers who perceive staff shortages tend to be less satisfied with their profession. Across most countries and economies, perceptions of lack of resources are associated with less satisfaction with the teaching profession. On average, an increase of 1 point on the index of staff shortages is associated with a decrease of 0.17 points on satisfaction with the teaching profession. The effects are stronger in Australia and Chile and weaker in Colombia and Italy.

Figure 2. Views on staff shortage and satisfaction

Satisfaction, by quarter of the index of science teachers' views on staff shortage



Note: Countries and economies are ranked in descending order of satisfaction with the teaching profession at the bottom quarter of the index of science teachers' views on staff shortage. The x-axis represents the Mean index of science teachers' views on shortage of educational material, per country.
B-S-J-G (China) refers to the four PISA-participating Chinese provinces of Beijing, Shanghai, Jiangsu and Guangdong.
"Average – 18" represents the average for the 18 countries participating in this PISA survey; "Average-9" represent average of the 9 OECD countries participating in this PISA Survey.
Source: Mostafa and Pál (2018), *Science teachers' satisfaction: Evidence from the PISA 2015 teacher survey*.

What is behind these high attrition rates, elevated figures of teachers' shortages and a perceived low value of the teaching profession? An important starting point is looking at teacher's working conditions. For example, a study in the United States showed that teachers shortages are not a product of an insufficient supply, but rather it was related to the large number of teachers departing their job for reasons other than retirement (Ingersoll, 2001[16])

What aspects of the working conditions are driving teachers to depart their schools and/or their jobs? Excessive workload for teachers is often identified as a major driver of teachers' well-being (Government of United Kingdom - Department for Education, 2018[45]; Carver-Thomas and Darling-Hammond, 2017[28]). For instance, in 2018, workload was a key concern for 86% of teachers in England (United Kingdom) (NASUWT, 2018[35]; Government of United Kingdom - Department for Education, 2018[45]). The other most frequently cited reasons are related to dissatisfactions with testing and accountability pressures, lack of administrative support, dissatisfaction with the teaching career, including lack of opportunities for advancement, and dissatisfaction with working conditions (Carver-Thomas and Darling-Hammond, 2017[28]).

In this context, occupation well-being is becoming a growing issue (Schleicher, 2018[5]). In Sweden, one in four teachers reports feeling stressed out at school and has seriously considered changing profession and/or workplace. In the United Kingdom, one in five teachers feels stressed about their job most or all of the time in 2018, compared to 13% of similar professionals (Worth and Van Den Brande, 2019[46]).

Stressful working environments affect teachers' motivation, self-efficacy and job commitment, which can in turn affect the educational system as a whole and students' learning outcomes. In the United States, a recent study showed that teacher stress is linked to high turnover, which can result in lower achievement for students and higher costs for school districts (Greenberg, 2016[47]).

Inversely, teachers who are motivated and confident about their work tend to perform better. OECD research has shown that teachers' self-efficacy and job satisfaction tend to be associated with higher frequency of implementation of effective practices and participation in effective forms of in-service training such as school-embedded professional development (Opfer, 2016[48]) and peer collaboration (OECD, 2016[49]). Interestingly, collaboration has been found to be the main teacher characteristic associated with student learning in science in the most recent PISA study (OECD, 2016[50]). As such, avoiding low level of teachers' well-being, but also aiming to build a confident and motivating teacher workforce is crucial for the development and stability of quality educational systems.

However, the discussions on teachers' well-being have not remained exclusively at the level of academic research. OECD countries have acknowledged the importance of knowing more about the nexus between teachers' working condition, teachers' well-being and quality teaching conditions. A good reflection of this situation is that one of the main topics in the 2018 *International Summit of the Teaching Profession*[3] was teachers' well-

[3] The *International Summit on the Teaching Profession* (ISTP) is a unique education policy forum. It brings together the ministers of education and teacher unions from highly successful and rapidly improving education systems, and provides an annual stage for sharing best practices, identifying common challenges and discussing the best ways to improve education for these high-performing systems and beyond. Since 2011 it has been conducted on annual basis having its last iteration in Helsinki, Finland. The Summit is a joint effort supported by the OECD, Education International (EI - the global federation of teachers' unions) and

being, confidence and efficacy. The debate highlighted that these issues are high on the political agenda of many high achieving educational systems.

According to the voice of representatives from various ministries of education and representatives of the teacher workforce the causes for the lack of well-being are multiple. A few of the causes suggested in the discussions were excessive workload, constant reforms imposed on the teaching profession that change with each new government, accountability and evaluation systems that are punitive and confusing, lack of support for schools with unmanageable student misbehaviour issues, class sizes, government interference in curriculum and teaching methods, excessive regulation, the challenges of more diverse and inclusive classrooms, perceived lack of respect for the profession, and, in some countries, inadequate or unequal funding (Asia Society, 2018, p. 29[51]).

Representatives of the ministries of education and of teachers advocated to transcend the negative framework often used to speak about teachers' well-being to a more positive and empowering notion. Indeed, research has concurred that teachers' well-being, while associated with demanding process within the school, is also linked to positive motivational components (Hakanen, Bakker and Schaufeli, 2006[9]) The Summit concluded by trying to identify those motivational aspects that could improve teachers' well-being: empowering teachers to play a leadership role in decision making in their school; strengthening teachers' capacity to deal with student misbehaviour; developing a meaningful teacher evaluation that supports teacher practice; and providing time within the school day for professional collaboration between teachers, were the preferred ones (Asia Society, 2018, p. 31[51]). What these recommendations have in common is an inward look to what teachers are actually experiencing in the schools and in their classrooms.

As a response to these inquiries, the OECD developed a conceptual framework, which will guide the collection of evidence at an international level to better understand the relation between working conditions, teachers' well-being and the quality of their instruction as reported by teachers.What is teachers' occupational well-being?

This section highlights the growing recognition of the concept of individuals' well-being. It presents the framework the OECD has developed to measure well-being which includes a series of both economic and non-economic dimensions that matter for everyone's life. The second part of this section shows how the concept of well-being can be adapted to teachers' occupational well-being and what this concept entails in terms of key components.

1.5. A growing consensus around the importance of well-being

Well-being is a concept that has gained increasing interest in the development of public policy worldwide since the beginning of the 2000s. The importance of putting well-being at the centre reached its summit following the launch of the "*Beyond GDP initiative*"[4] in

volunteering host country that each year rotates to organise the event. For more information please visit https://asiasociety.org/global-cities-education-network/international-summit-teaching-profession.

[4] The beyond GDP Initiative was carried on by the European Commission, the European Parliament, the Club of Rome, OECD, the United Nations Development Programme and the World Bank, along with central governments (United Kingdom) and regional governments (Wallonia and Wales), parliaments (Belgian and German), national statistics institutes (Australian Bureau of Statistics, INSEE in France), civil society representatives (community indicators in the United States, New Economics Foundation in the United Kingdom or the Global Footprint Network at international level) and academics. It was officially presented

2007. One of the main objective of this initiative is to develop indicators that are more inclusive of environmental and social aspects of progress. Indeed, an economic indicator such as the Gross Domestic Product (GDP) is *only* a measure of the volume of goods and services produced within a country over a given period of time. GDP does not include some of the global challenges of the 21st century such as inequality, climate change, resource depletion and health, it does not "*measure*" values such as social cohesion, or the quality of the educational systems, and it does not take into account subjective aspects of people's life. Actually, whereas incomes and material living standards have been rising in the developed world in the past 50 years, subjective well-being has remained relatively stagnant. In addition, GDP does not capture a series of non-economic activities such as volunteering activities or parental care (Fioramonti, 2015[52]; OECD, 2015[53]). All of these aspects are key indicators of people's quality of life in the 21st century.

Within this context, a significant number of academic works have been published to promote the idea of progress and incorporate concepts such as quality of life and well-being. Some academic papers highlight the proliferation of academic research papers on well-being in the recent decades (McCallum et al., 2017[26]; Selwyn, J., & Wood, 2015[54]; Dodge et al., 2012[55]).

The definitions of well-being differ across the literature (Dodge et al., 2012[55]; McCallum et al., 2017[26]). More recently, McCallum and Price came up with a holistic approach of well-being. They highlighted that well-being "e*ncompasses intertwined individual, collective and environmental elements which continually interact across lifespan. Well-being is something we all aim for, underpinned by positive notions, yet is unique to each of us and provides us with a sense of who we are which needs to be respected"* (McCallum and Price, 2015[56])

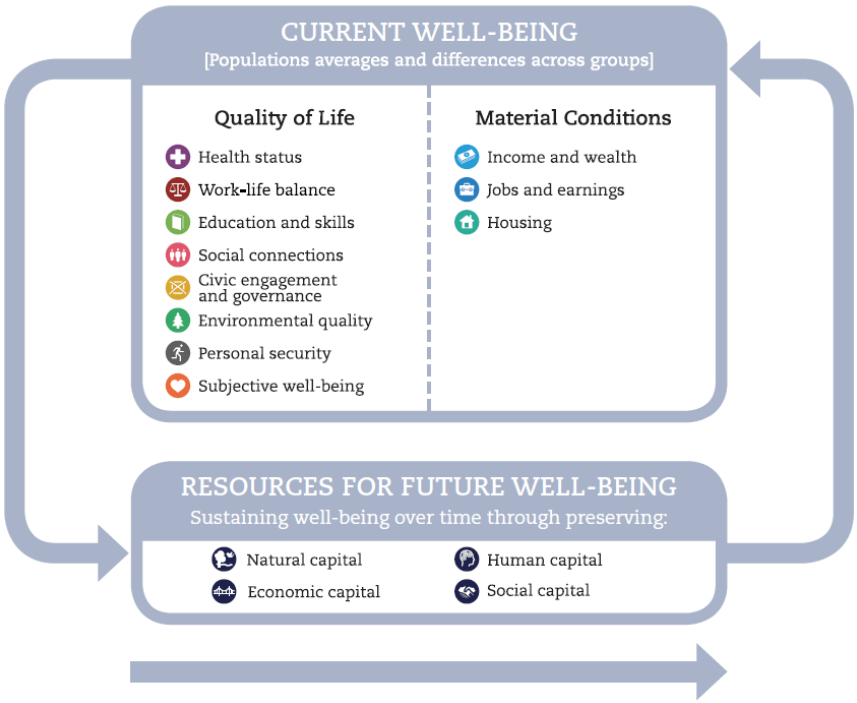
All the definitions of well-being highlight the multidimensionality aspects of the concept and the need to embrace a series of components (Keyes and Ryff, 1995[57]; McCallum et al., 2017[26]; McCallum and Price, 2010[29]). For example, (Keyes and Ryff, 1995[57]) identified six aspects that constitute well-being: 1) *self-acceptance* (a positive evaluation of oneself and one's past life); 2) *environmental mastery (*the capacity to effectively manage one's life and the surrounding world); 3) *autonomy (*a sense of self-determination and the ability to resist social pressures to think and act in certain ways); 4) *Positive relations with others (*expressed, for instance, by a genuine concern about others' welfare); 5) *Personal growth* (the sense of continued growth and development as a person as well as openness to new experiences); and 6) *Purpose in life (*the belief that one's life is purposefulness and meaningful and that one has something to live for) (Van Horn et al., 2010[58]). Another example is the "five dimensions" model by McCallum and Price: 1) social; 2) emotional; 3) cognitive; 4) physical and 5) spiritual dimensions (McCallum and Price, 2010[29]).

Building on existing research, the OECD developed a framework for measuring individual well-being. This framework was first introduced in the *How's Life?* 2011 report. This framework includes eleven dimensions that are important for well-being today, grouped under two broad headings: material conditions (income and wealth, jobs and earnings and housing) and quality of life (health status, work-life balance; education

during the Initial Conference in 2007 and was followed by a series of policy documents. Based on this documentation, the EU adopted a 2009 roadmap on measuring progress beyond GDP (European Commission, 2019[178]).

and skills, social connections, civic engagement and governance, environmental quality, personal security and subjective well-being) Figure 3 – (OECD, 2015[53]).

Figure 3. The OECD framework for measuring well-being



Source: OECD (2017), *How's Life? 2017: Measuring Well-being*

The OECD framework for measuring well-being covers both objective and subjective indicators (OECD, 2015[53]). Under this framework, objective indicators measure conditions in which people live and which can be observable by a third party. For instance, it is the case for earnings, employment rate or life expectancy. Conversely, subjective indicators refer to those where only the concerned people can report on their inner feelings and states. This applies, for instance, to indicators related to self-reported levels of life satisfaction. Both objective and subjective indicators matter to understand teachers' well-being: objective evidence about people's life circumstances can be usefully complemented by information about how people experience their lives.

The OECD well-being framework measures averages to assess individual well-being, but it also includes differences between men and women, younger and older people, high and low income groups and between people having different levels of education. This framework can also be adapted to various types of individuals or countries. For instance, the OECD has carried out some work to tailor the well-being framework to countries at various stages of development (Boarini, Kolev and Mcgregor, 2014[59]).

1.6. Towards a definition of teachers' occupational well-being

Similarly to existing studies on well-being, most of the academic work focused on the dimensions of teachers' well-being, rather than on defining teachers' well-being (McCallum et al., 2017[26]).

A few academic papers propose analytical frameworks to measure teachers' well-being. Van Horn et. al distinguish five analytical dimensions on teachers' occupational well-being: 1) affective well-being; 2) social well-being; 3) professional well-being; 4) cognitive well-being and 5) psychosomatic well-being (Van Horn et al., 2010[58]). Also, Collie et al. suggest assessing teachers' work-related to well-being around three dimensions: 1) workload well-being, 2) organisational well-being and 3) student interaction well-being (2015[60]). In this model, workload well-being relates to issues concerning workload and associated pressure. Organisational well-being relates to teachers' perceptions of the school as an organisation, including perception of school leadership and the culture towards teachers and teaching. Student interaction well-being relates to teachers' interactions with students (Collie et al., 2015[60]). Although both the Van Horn and the Collie et al. model distinguish multiple dimensions, it is important to highlight that each of them are intertwined with each other.

Furthermore, teachers' well-being can be understood in relation to a wide array of factors. Day et al. (2007[61]) identify three groups of factors shaping teachers' well-being: situated, professional and personal. Situated factors consist of those elements related to a specific context (e.g. school and/or classrooms) while professional factors relate to expectations and standards shaping the teaching profession. Personal factors address those elements involving the life of teachers outside of work, such as family life or other social roles that could affect teachers' well-being.

For the purposes of the OECD exploration on teachers' well-being, the main focus will be on situated factors, while also addressing some elements of professional factors. These are the main areas where targeted policy intervention can act upon and produce a change in the level of teachers' well-being. Personal factors, although relevant, are beyond the scope of influence of educational policy.

As such, the concept of well-being used in this study is a work-related concept that targets specific categories of professionals. This corresponds to the concept of ***occupational*** well-being which refers to the meaning and satisfaction that individuals get from their work (Doble and Santha, 2008[62]). Using a similar definition, Collie explains that work-related well-being refers to individuals' positive evaluations and healthy functioning in their work environment (Collie et al., 2015[60]).

Taking into account the dimensions identified as core components of teachers' well-being, this study defines teachers' occupational well-being as "*teachers' responses to the cognitive, emotional, health and social conditions pertaining to their work and their profession*".

The concept of teachers' occupation well-being is also informed by the multidimensional approach of the OECD framework to measure well-being (OECD, 2013[63]). Under the pillar of material conditions, job security, personal earnings and unemployment are important elements to assess teachers' occupational well-being. Under the pillar of quality of life, a good work-life/balance and social connections matter for teachers in their daily work.

However, since the teachers' occupational well-being study will mainly rely on a self-reported instrument (PISA 2021 teacher questionnaire) the distinction between an objective indicator (observed by third party) and a subjective indicator (reported by the individual asked) used by the OECD framework on well-being does not hold. Instead the study will use the distinction between low inference and high inference indicators. On the one hand, low inference indicators are defined as being mainly descriptive and non-judgemental such as participation in a given activity, highest educational degree obtained, number of years working in the same school, etc. On the other hand, high inference indicators are defined in the study as those based on the perception, assessment or opinion of the individual such as the feelings towards the workplace, the evaluation of the quality of a given programme, the opinion on the use of resources in schools, among others.

The OECD work on students' well-being also provides a rich source of inspiration for understanding teachers' occupational well-being. The OECD has adopted a multidimensional approach to students' well-being that is well aligned with the one used in the OECD framework for measuring well-being and that brings together students' academic performance with what they think about the quality of their lives both in and outside school (Borgonovi and Pál, 2016[64]). The framework for measuring students' well-being in PISA is structured around five dimensions: 1) cognitive well-being; 2) psychological well-being; 3) physical well-being; 4) social well-being and 5) material well-being (Borgonovi and Pál, 2016[64]).

Therefore, this working paper builds on existing well-being studies from OECD work and various academic research papers to propose an innovative and comprehensive conceptual framework to understand and measure teachers' occupational well-being. First, it keeps the distinction between material conditions and quality of life that forges the OECD framework for measuring well-being (OECD, 2015[53]). Second, this paper applies a conceptualisation to teachers' occupational well-being similar to the one developed in the framework for measuring the PISA students' well-being (Borgonovi and Pál, 2016[64]). Third, this paper takes stock of existing academic work on teachers' occupational well-being (McCallum et al., 2017[26]) (Van Horn et al., 2010[58]).

2. Conceptual framework of teachers' occupational well-being

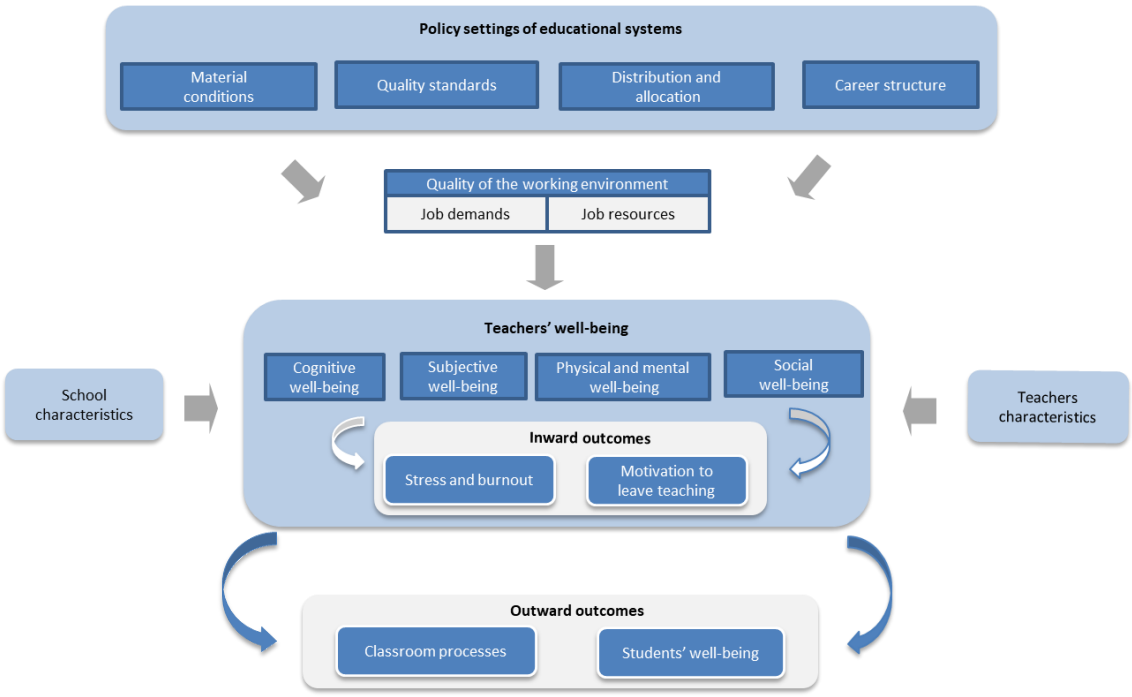
Figure 4 provides a comprehensive conceptual framework summarising the various aspects involved in teachers' occupational well-being and the ways in which these interconnect. The framework will guide the answers to the following analytical questions:

1. **What are the core components of teachers' occupational well-being? -** The framework defines teachers' occupational well-being around four key dimensions: cognitive well-being, subjective well-being, physical and mental well-being; social well-being.
2. **Which working conditions shape teachers' occupational well-being? -** Working conditions represent the series of factors that impact and shape these four dimensions of teachers' occupational well-being. The impact of working conditions takes place both at system and school levels. At a system level, the institutional settings that regulate the teaching profession frame the quality of working conditions for teachers, especially in terms of working hours, job stability, earnings, the recruitment process to enter the profession, and professional development opportunities. At a school level, the quality of the

working environments also has significant impacts on teachers' occupational well-being. For instance, the quality of the relationships with the school staff, the physical learning environment, the classroom composition and the degree of work autonomy teachers have are some working conditions that may improve – or hinder – the levels of teachers' occupational well-being.

3. **What are the expected outcomes of teachers' occupational well-being? -** These dimensions of teachers' occupational well-being have two immediate inward outcomes for teachers: an outcome that is related to teachers' work engagement and their willingness to stay in the profession; and an outcome that is related to teachers' levels of stress. Teachers' occupational well-being also has outward outcomes in terms of the quality of learning environments. These environments are measured both by classroom processes and by direct outcomes on students' well-being.

Figure 4. Conceptual framework for teachers' occupational well-being



This conceptual framework (Figure 4) constitutes a comprehensive guide to analyse teachers' occupational well-being. It looks at how a broad range of working conditions impacts and shape each dimension of teachers' occupational well-being. It also looks at the inward outcomes of these four dimensions in terms of their levels of stress and their intentions to stay or leave the profession. Finally, it also considers the outward outcomes in terms of classroom processes and students' well-being.

The design of this framework is based on key findings from the literature, including from OECD studies and existing OECD frameworks. It is based on some of the dimensions that has been previously covered in the Teaching and Learning International (TALIS) study.

It also relies on existing PISA 2021 instruments to maximise the range of potential relationships to consider. Therefore, on top of the results from the PISA 2021 Teacher Questionnaire, the study will use the results from other PISA 2021 surveys administered to teachers, principals and students to explore relationships between variables and test their significance.

Box 1. The Teachers' occupational well-being with the TALIS and PISA study

The Teaching and Learning International Survey (TALIS)

The Teaching and Learning International Survey (TALIS), established in 2008, is the first major international survey on teachers and school leaders' working conditions and learning environments in the schools. It is designed to help countries face diverse challenges, learn from each other and advance policy. TALIS 2018 has continued to focus on lower secondary education while covering close to 50 countries around the world.

The TALIS framework for the 2018 cycle is organised under 11 themes that address both emerging issues in teaching and learning, and enduring issues from the 2008 and 2013 cycles. The enduring themes are: teachers' background and initial teacher education, human resources, instructional practices, teachers' professional practices, teacher feedback and development, teacher self-efficacy, job satisfaction, school leadership, and school climate. The new themes introduced in TALIS 2018 are innovation, and equity and diversity, which are viewed as cutting across the other themes.

Throughout its cycles TALIS has provided useful information to understand the working conditions of teachers such as data on their contractual arrangements, the periodicity of appraisal and feedback, the opportunities for in-service training, and the characteristics of peer collaboration, among others. As such, relevant TALIS indicators have been considered for developing the teachers' well-being framework. However, the current teachers' well-being framework expands beyond the TALIS indicators by exploring more in-depth issues related to teachers' affects at work, their psychosomatic symptoms, their cognitive responses to the work and their levels of collaboration.

Programme for International Student Assessment (PISA)

PISA is an ongoing programme that offers insights for education policy and practice, and helps monitor trends in students' acquisition of knowledge and skills across countries and in different demographic subgroups within countries. Its findings allow policy makers around the world to compare the knowledge and skills of students in their own countries with those of other countries, set policy targets against measurable goals achieved by other education systems, and learn from policies and practices applied elsewhere.

The PISA 2021 will focus on mathematics, with reading, science and creative thinking as a minor areas of assessment. PISA 2021 will also include a background questionnaire for students. For additional information, some countries and economies decided to take part in a questionnaire to teachers.

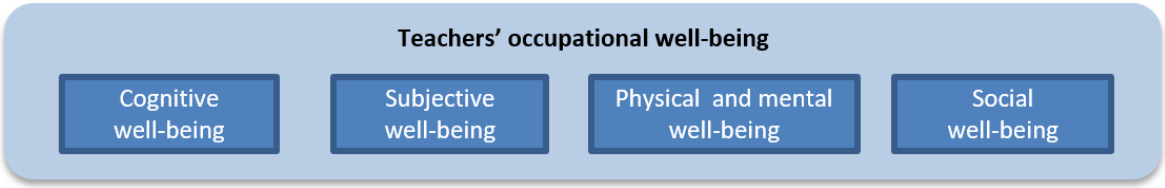
A teachers' occupational well-being module will be included in the PISA 2021 teacher questionnaire. Through the use of PISA surveys administered to teachers, principals and students, information will be collected from different sources in order to describe and explore the relationships between the school learning environments, classroom processes and teachers' practices. The data collected from the PISA students and school questionnaires could then be linked to and analysed with the teachers' occupational well-being and quality teaching information collected as part of this study.

3. What are the core components of teachers' occupational well-being?

Following the conception that well-being is a multidimensional concept as illustrated in Figure 5, teachers' occupational well-being is defined around four key dimensions of well-being: cognitive; subjective; physical and mental; and social. These dimensions are closely related but also distinct as they each encompass a particular set of indicators related to the well-being of teachers at work. Each dimension can be considered both as an outcome and as an enabling condition with respect to other dimensions and ultimately with teachers' overall levels of stress and future work engagement.

Annex B will include the PISA 2021 Teacher Questionnaire (TQ) field trial indicators that will be used to capture information on these dimensions.

Figure 5. The core dimensions of teachers' occupational well-being



3.1. The cognitive dimension of teachers' occupational well-being

Cognition refers to the mental action or process of acquiring factual knowledge and understanding. It encompasses processes such as attention, the formation of knowledge, judgement and evaluation, problem solving and decision making. Cognitive well-being refers to the set of skills and abilities teachers need to work effectively (Van Horn et al., 2010[58]).

The concept of cognitive well-being is equivalent to the concept of cognitive weariness developed by Van Horn (2010[58]). It reflects employees' cognitive functioning and especially the degree to which teachers are able to take up new information and able to concentrate on their work.

Cognitive well-being also relates to teachers' self-efficacy which represents teachers' beliefs in their abilities to perform (Schleicher, 2018[5]). Over the past years, many studies have focused on teachers' self-efficacy (Tschannen-Moran, Hoy and Hoy, 1998[65]). Tschannen and colleagues follow Bandura's social cognitive theory to define self-efficacy as a cognitive process in which people construct beliefs about their capacity to perform at a given level of attainment. These beliefs influence how much effort people put forth, how long they will persist in the face of obstacles, how resilient they are in dealing with failures, and how much stress or depression they experience in coping with demanding situations.

Several studies highlight that teachers' sense of self-efficacy has a positive relationship with higher student achievement, motivation and sense of efficacy (Schleicher, 2018[5]; Tschannen-Moran, Hoy and Hoy, 1998[65]; OECD, 2014[3]; Mostafa and Pál, 2018[25]). There is also growing evidence that self-efficacy impacts teachers' instructional practices, job satisfaction, enthusiasm and commitment (Schleicher, 2018[5]; Tschannen-Moran and Gareis, 2015[66]). Teachers with a strong sense of efficacy are also open to new ideas and

more willing to experiment with new methods to better meet the needs of their students, and they also tend to demonstrate greater levels of planning and organisation (Tschannen-Moran and Gareis, 2015[66]).

Aligned with other OECD instruments (i.e. PISA and TALIS), the dimension of teacher self-efficacy is defined according to three scales: efficacy in classroom management; efficacy in instruction; and efficacy in student engagement.

For the purpose of this study, two indicators will measure cognitive well-being within the PISA 2021 TQ, capturing the ability of teachers to concentrate on their work and teacher self-efficacy (Annex B – Table 1). The *Capacity to concentrate at work* question is loosely based on the Cognitive Weariness Scale of the Shirom-Melamed Burnout Questionnaire (Lundgren-Nilsson et al., 2012[67]). The *self-efficacy* indicator is measured through a 12-item question to assess to what extent teachers report self-efficacy on the three types of scales mentioned earlier.

3.2. The subjective dimension of teachers' occupational well-being

Subjective well-being traditionally covers a range of several dimensions. Based on Diener's works (2006[68]), the OECD defines subjective well-being as a "*Good mental states, including all of the various evaluations, positive and negative, that people make of their lives and the affective reactions of people to their experiences*" (OECD, 2013[69]).

This definition of subjective well-being encompasses three elements: 1) Life evaluation – a reflective assessment on a person's life or some specific aspect of it; 2) Affect – particular feelings or emotional states; and 3) Eudemonia – a sense of meaning and purpose in life, or good psychological functioning (OECD, 2013[69]). This paper relies on this definition and builds largely on these three elements. However, as the paper focuses on teachers' occupational well-being, it also includes job evaluation and relies on dedicated academic research on subjective well-being for teachers.

Affect is the term psychologists use to describe a person's feelings and is commonly used in educational psychology research literature. Affective well-being refers to particular feelings or emotional states, and they are typically measured with reference to a particular point in time (OECD, 2013[69]). Emotions and moods consist of several different major classes of affective experiences that can be either positive or negative. A positive affect, on the one hand, captures positive emotions such as the experience of happiness, joy and contentment. A negative affect, on the other hand, comprises the experience of unpleasant emotional states such as sadness, anger, fear and anxiety. Life evaluations, or life satisfaction, captures a reflective assessment on a person's life or some specific aspect of it (OECD, 2013[69]). In addition to global judgements of life as a whole, the framework also includes an indicator to assess job satisfaction. This approach is important to assess whether the job domain satisfaction has a meaningful relationship with life satisfaction. Job satisfaction is the sense of fulfilment and gratification that teachers get from working (Collie, Shapka and Perry, 2012[70]; OECD, 2014[3]; Mostafa and Pál, 2018[25]).

In general, teachers' job satisfaction is positively associated with teachers' self-efficacy (OECD, 2014[3]), motivation, well-being and commitment to teaching (Collie, Shapka and Perry, 2012[70]). This enhanced commitment to teaching leads, in turns, to better job performance (OECD, 2014[3]). Moreover, job satisfaction plays a key role in teachers' attitudes and efforts in their daily work with children (Caprara et al., 2003[71]) whereas job dissatisfaction causes stress and burnout for teachers (Tehseen and Ul Hadi, 2015[72]). Ultimately, improving job satisfaction can help in reducing costs associated with high

levels of teacher stress that lead to teacher absenteeism and teacher illness (Collie, Shapka and Perry, 2012[70]).

Teachers are generally satisfied with the aspects of their job that relate to their teaching work (e.g. work tasks, professional growth) but dissatisfied with the aspects that surround the performance of their job (e.g. working conditions, interpersonal relations, salary) (Collie, Shapka and Perry, 2012[70]; OECD, 2014[3]). In addition, some characteristics can have a strong impact on teachers' job satisfaction. PISA results show that, in general, the goal of becoming a teacher, working in a co-operative environment, the availability of adequate human and physical resources, and of professional development opportunities, and students' achievements and attitudes are strongly related to teachers' satisfaction. In contrast, teachers' socio-demographic background, the school's student composition, and even the type of contract under which teachers work, are not associated with teachers' satisfaction (Mostafa and Pál, 2018[25]).

The OECD uses two indices of teacher satisfaction in its instrument surveys (i.e. PISA and TALIS): one focusing on satisfaction with the current job, and the other focusing on satisfaction with the teaching profession. This is also the case for the PISA 2021 Teacher Questionnaire. If these two indices are expected to be correlated, they might also diverge. Indeed, teaching is a profession driven by ethical values and personal motivation. In this sense, teachers could well be satisfied with the teaching profession because it fulfils their personal goals but, at the same time, they could be dissatisfied with their current job and working conditions (Mostafa and Pál, 2018[25]).

Finally, the subjective dimension on teachers' occupational well-being also includes an indicator on *Eudemonia* which is defined as a sense of meaning and purpose in life, or good psychological functioning (OECD, 2013[69]). This indicator is close to *Purposefulness*. Purpose in life can be defined as the belief that one's life is purposeful and meaningful and that one has something to live for (Van Horn et al., 2010[58]; Keyes and Ryff, 1995[57]). Keyes and Ryff define a high level of purpose in life when an individual has goals in life and a sense of directedness, feels there is meaning to present and past life, holds beliefs that give a purpose in life, and has aims and objectives for living (Keyes and Ryff, 1995[57]). More recently, a Korean study showed that teachers' mindfulness, which can be related to purposefulness, is effective in managing their job stress and preventing burnout (Kim, 2018[73]).

As previously mentioned, this study focuses on the work-related concept of well-being. It is also likely that emotional and affective elements of teachers' lives outside work could have an influence on the well-being of teachers at work (Day C. et al., 2007[61]). Indeed, the feelings that teachers have in the society at large or in their own personal lives can also influence their emotional response to their work and to their profession. As such, the PISA 2021 teacher questionnaire will include an indicator on the teachers' life evaluation as a mediator for the teachers' occupational well-being influence on the working conditions.

The PISA 2021 TQ will measure subjective well-being by encapsulating the level of pleasure-displeasure embedded in teachers' work (Van Horn et al., 2010[58]) through a series of questions (see details in Annex B – Table 2). Teachers will be asked to evaluate their levels of satisfaction with the current job and with the teaching profession. They will also have to report the frequency of moods and emotions they feel with regards to their job activities. The indicator of *Purposefulness* will allow teachers to assess the levels of commitment and interest they have with their job. Finally, with the *Life evaluation*

indicator, teachers will have to assess their levels of life satisfaction as a whole on a scale from 0 to 10.

3.3. The physical and mental dimension of teachers' occupational well-being

Good health is one of the most important things to people. It may also bring many other benefits, including enhanced access to education and the job market, an increase in productivity and wealth, reduced health care costs, good social relations and of course, a longer life. Difficult working conditions and high levels of stress can alter good health.

The stress that teachers experience may result in psychosomatic symptoms and complaints. A good or bad physical well-being for teachers can be measured through the presence or absence of *psychosomatic complaints, such as headaches and pains* (Van Horn et al., 2010[58]). As highlighted by Van Horn, psychosomatic complaints can often be traced to unfavourable work circumstances such as long working hours (Van Horn et al., 2010[58]), or high job demands and/or low job control (de Lange et al., 2003[74]). Based on a study on 365 American teachers, (Seidman and Zager[75]) also showed that many physical and psychological problems (i.e. stomach-aches and depression) were related to teacher stress and burnout factors (1991[75]).

Stress-related psychosomatic symptoms can take the form of various emotional and physical disorders. They include effects on several systems of the body: the nervous system (i.e. release of adrenaline and cortisol), the musculoskeletal system (i.e. migraines, headache and tensions in the muscles), respiratory system (i.e. rapid breathing or hyperventilation); cardiovascular system (i.e. elevations in blood pressure and heart rate) and gastrointestinal system (i.e. self-reported symptoms such as stomach pains for instance). Concretely, the American Institute of Stress has identified 50 common signs and symptoms of stress that can create physical and emotional disorders. Among others, they include frequent headaches, back pain/muscle spasms, insomnia, feelings of loneliness, excess anxiety, increased anger or frustration, increased or decreased appetite, fatigue or social withdrawal (The American Institute of Stress[76]). In the Van Horn study conducted on Dutch teachers, this dimension was assessed using a 23-item scale tapping psychosomatic health complaints to measure the presence of a variety of health complaints, such as headaches, symptoms of possible cardiovascular problems and stomach-aches (Van Horn et al., 2010[58]).

Teachers suffer more psychosomatic disorders than other occupational groups (Scheuch, Haufe and Seibt, 2015[77]). Scheuch and colleagues showed that teachers were more likely to suffer sleep disorders, forgetfulness, pain and irritability. Furthermore, teachers obtain more frequently certification as being ill or unfit for work as a result of psychological health problems than the general population. Conversely, teachers have healthier cardiovascular systems than the general population: they are more physically active, less likely to be obese and less likely to smoke (Scheuch, Haufe and Seibt, 2015[77]). Another study highlighted that Chinese teachers have a lower health status than the general population. Teachers have a higher prevalence of anxiety, hypertension, headaches, psychosomatic disorders and cardiovascular diseases compared with other workers. A lower quality of life and a shorter life expectancy for teachers have also been reported, and this has been attributed to their higher occupational stress (Yang et al., 2009[78]).

The PISA 2021 TQ will measure teachers' physical and mental well-being by asking two dedicated questions. Teachers will be asked to report on the frequency of a series of nine psychosomatic symptoms they could have felt during the school year as it pertain to their

work. They will also be asked to report on the number of days of school they have missed because of these symptoms (see details of the question in Annex B – Table 3).

3.4. The social dimension of teachers' occupational well-being

Teaching is not an individual job, it is part of a whole integrated system in which teachers interact, work and collaborate with others. Teachers relate to: children/young people in their classrooms and within the school; their parents; professionals including colleagues, peers, principals, support staff, consultants and specialised staff like psychologists; the local community in which the school is situated and where teachers may live. The frequency of contacts with others and the quality of these relationships can have positive and/or negative influences on teachers' well-being (Wang, Haertel and Walberg, 1997[79]).

Social well-being refers to the quality and depth of the social interactions with these various stakeholders. Social well-being is close to the relational factors that can impact teachers' occupational well-being. They include student misbehaviour, issues with parents, support or lack of support from management and leadership, and challenging situations that arise with students (McCallum et al., 2017[26]).

Whereas many studies have examined the importance of teacher-student relationships for the development of students (Wang, Haertel and Walberg, 1997[79]), there is limited research on how teachers-students relationships are associated with teachers' occupational well-being. Existing studies highlight the positive relationship between good teachers-students relationships and teachers' well-being (Spilt, Koomen and Thijs, 2011[80]; Collie et al., 2015[60]). Teachers benefit from close relationships with students and experience negative affects when relationships are characterised as being disrespectful, conflictual or distant.

Teachers' relationships with colleagues, support staff and school leaders also have a positive association with teachers' well-being. For example, a study on teachers' well-being in the Flemish Community of Belgium showed the importance of a supportive school culture (Aelterman et al., 2007[81]). Teachers who feel supported by their colleagues and principals usually have a higher sense of general professional well-being, they experience greater self-efficacy, less pressure at work and have a more pupil-centred orientation. They are also usually better equipped to deal with external pressures (Aelterman et al., 2007[81]).

Teachers' relationships with others form the basis of what is called teachers' social capital. Social capital has been identified as one of the key pillars shaping teachers' professionalism (Hargreaves and Fullan, 2012[82]). Pil and Leana conducted a study on American teachers in multiple grade-level teams and found that teachers' social capital has a positive relationship on student performance (Pil and Leana, 2009[83]). Results from another study, conducted on Latin American Primary Schools, also showed that social capital among teachers in a school, between teacher and students, and among the students in a classroom, contributes significantly to learning achievement (Anderson, 2008[84]). Social capital has also an aggregated effect as a study in New York City elementary schools showed that teachers with low human capital (i.e. knowledge and skills) in school with high social capital have better outcomes than teachers in schools with low social capital (Leana, 2011[85]).

In addition, the feeling of trust between teachers and principals, but also between teachers and colleagues, is crucial for teachers' occupational well-being. Bryk and Schneider say that school staff with relational trust are more likely to take risks and make changes than

help to raise student achievements (Bryk and Schneider, 2003[86]). Tschannen-Moran and Gareis highlight the importance for principals to build trust with teachers, arguing that these levels of trust are positively correlated with school climate and student achievement (Tschannen-Moran and Gareis, 2015[66]).

For the purpose of this study, the PISA 2021 TQ includes three distinct questions to measure social function in relationships with principals, colleagues and students. In addition, it also includes a *Feeling of Trust* indicator to assess whether the school community, including colleagues and principal, values teachers (see details of the questions in Annex B – Table 4).

4. Which working conditions shape teachers' occupational well-being?

The quality of the working environment is shaped by system-level factors, which take the form of national policies and institutional arrangements. At a lower level, school factors and school policies also play a key role in modelling working conditions around teachers.

The OECD designed an *OECD Job Quality Framework* (Figure 6) to understand what makes a good job (Cazes, Hijzen and Saint-Martin, 2015[87]). The approach taken to job quality is explicitly multidimensional and defines job quality in terms of three key dimensions: earnings, labour market security and quality of the working environment. These dimensions are broad enough to encompass the most significant aspects of job quality that shape workers' well-being.

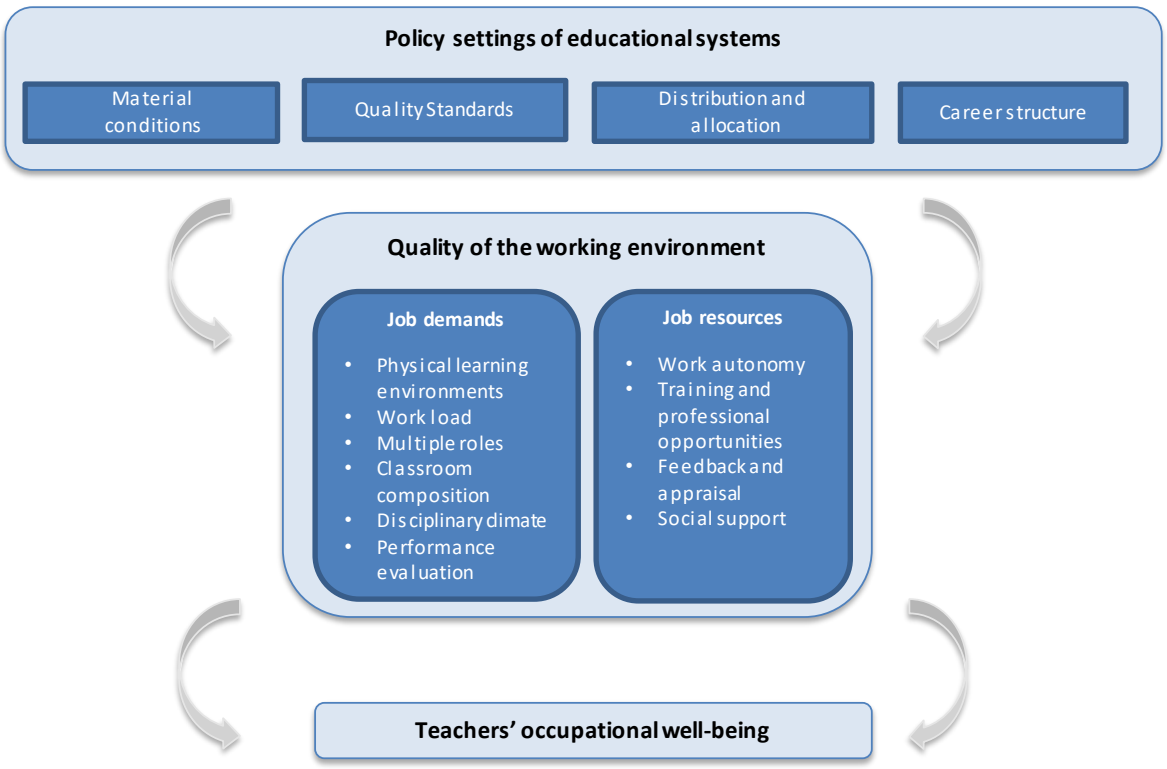
Figure 6. The OECD Job Quality Framework



Source: Adapted from Cazes, et al. (2015), *Measuring and Assessing Job Quality: The OECD Job Quality Framework.*

This paper builds partly on this existing Job Quality Framework to discuss how working conditions at system and school levels matter for teachers and how they may impact their well-being.

Figure 7. Types of working conditions associated with teachers' occupational well-being



4.1. Working conditions at a system level

Intuitively, the relations between teachers' working conditions, teachers' occupational well-being and quality teaching conditions may seem to be defined at the school level. Indeed, the pressures that teachers experience in their schools and how they condition their ability to deliver quality instruction may depend on particular school features or organisational attributes. However, the organisational arrangements and concrete professional interactions observed in a given school may also reflect larger institutional arrangements at the system level which regulate the teaching profession.

Differences in educational contexts and culture influence the way educational policies are shaped and prioritised in each country. To better understand the system-level context shaping teacher policies, this study also proposes to undertake a qualitative assessment of policies at national level. Indeed, questionnaires to teachers and schools leaders can offer valuable but often school-specific views on the main issues regarding their working arrangements. To overcome this limitation, a comprehensive study on teachers' occupational well-being needs to incorporate a broader vision of how national policies frame the working conditions of teachers. Below is the list of potential themes that are considered to be better assessed at a national level as opposed to school-specific level: 1) material conditions; 2) quality standards; 3) distribution and allocation; 4) career structure.

4.1.1. Material conditions

Material conditions of teachers, such as earnings or market security (i.e. unemployment insurance), consist of elements of teachers' occupational well-being that can help explain the attractiveness of the profession and turnover rates.

Low earning conditions are one of the major factors that explain high attrition rates and teachers shortages (Imazeki, 2005[88]). Some studies show that increases in teacher salaries are directly correlated to an increase in the average aptitude of students entering the profession (Leigh, 2012[89]), the hiring of more experienced teachers (Hendricks, 2015[90]) and to a reduction in teacher turnover, primarily among the less experienced (Hendricks, 2014[91]). Other studies also found a positive relationship between higher wages for experienced teachers and school productivity and performance (Britton and Propper, 2016[92]) and student achievements (Akiba et al., 2012[93]; Hendricks, 2014[91]).

In addition, labour market security, and in particular job security, appears to be a major determinant of individual well-being (Cazes, Hijzen and Saint-Martin, 2015[87]). For example, (Helliwell and Huang, 2011[94]) found that the risk of unemployment among the employed has a strong negative effect on well-being and life satisfaction, and interestingly, this effect is even higher than for the unemployed.

Even if institutional arrangements vary across countries, the teaching profession is usually qualified with job stability. This is especially the case for teachers recruited as public servants with permanent contracts. However, more and more governments are recruiting teachers with fixed-term contractual arrangements to answer punctual teacher shortages or address economic considerations. In addition, some schools, mainly private schools, can recruit teachers with fixed-term contracts that do not provide teachers with the same working conditions. Existing research on teachers shows that job insecurity, measured with the share of teachers holding temporary contracts, is positively correlated with occupational stress (Forcella et al., 2009[95]). Forcella and colleagues analysed job stress and insecurity of people with stable or temporary employment in schools in Italy (Forcella et al., 2009[95]). Taking a larger perimeter than the teaching profession, temporary contracts have a negative influence on job satisfaction and the well-being of employees (Letourneux, 1998[96]; Waaijer et al., 2016[97]). For instance, looking at working conditions of employees in European member countries, Letourneux found that temporary employees are less satisfied with their jobs, compared to permanent workers (Letourneux, 1998[96]).

Earnings and job security are therefore important elements to consider when looking at teachers' occupational well-being. However, material conditions affect all professions, and not only teaching. Furthermore, in many educational systems, the main motivation to become a teacher does not relate to salaries or other compensation mechanisms, but rather to the opportunities to grow professionally, to transmit knowledge or to care about children. Therefore, it is also necessary to explore how the material conditions of teaching compare to other similar professions and how the teaching profession itself is responding to changes to these conditions.

Quality standards

Standards can be defined as general imprints of teachers' competences that describe what teachers should know and what they should be able to do (Guerriero, 2017[4]). National standards are an important step towards defining what the key responsibilities of a teacher are and what type of performance should be valued and appraised.

Standards can play a crucial role in defining the knowledge and skills required by teacher trainees to become certified teachers as well as those to be further developed through in-service training (OECD, 2019[43]). The definition of standards has played an essential role in shaping teacher education in high achieving countries such as Australia, Estonia and Singapore (Révai, 2018[98]). The link between well-being and mastering a basic set of knowledge and skills cannot be overlooked since evidence from the TALIS survey has shown a strong correlation between teachers' feeling of preparedness and their sense of self-efficacy (i.e. cognitive well-being, see previous section) (OECD, 2019[37]).

Furthermore, by defining quality thresholds, standards affect the level of autonomy teachers may have in their work. Systems where teachers are able to have higher levels of autonomy are systems with strict standards for entry into the profession (Sahlberg, 2011[99]). System-level policies targeting the autonomy of teachers seek to develop standards that move away from prescriptive frameworks of teacher development and move towards a profile of teachers that encourages their creativity and flexibility while working in the classroom.

However, autonomy by itself does not lead automatically to greater educational quality. PISA 2015 results showed that autonomy seems to be most effective when accompanied by strong accountability measures, making schools and teachers responsible for student outcomes and also being accountable to parents, local communities and education authorities (OECD, 2016[50]). Accountability actions can be understood as "*a number of actions (accreditation, standards development, curricular change, high stakes testing, credentials, career ladders, etc.) directed at identifying and enforcing best practices in teacher education, development and teaching*" (Tatto, 2006, p. 213[100])

Accountability can be a useful tool for monitoring the implementation and effectiveness of defined standards. Often accountability takes the form of external standardised evaluation of teachers and/or students to assess their level of performance. The results of these evaluations can be used, not only to get a sense of the quality level of the educational systems, but also to identify what are the aspects that teachers need to improve (OECD, 2013[101]).

Nevertheless, accountability can also have unintentional impacts on teachers' work and autonomy. Poorly designed accountability can lead to circumstances in which classroom lessons are transformed into training sessions to give the correct answer to a test ("*teaching to the test*") which can severely diminish teachers' autonomy and creativity (Koretz, 2009[102]). High-stake testing and excessive control on teachers' work can lead to increased teacher demoralisation, high teacher turn over or can even discourage teachers to join the profession in the first place (Ball, 2003[103]; Hargreaves, 2003[104]). As a response, educational systems need to develop an approach of "*intelligent accountability"*. Sahlberg (2008[105]) defined intelligent accountability as a result of three interlocked processes: 1) building trust and collective responsibility; 2) matching the schools accountability criteria to the needs of the educational system; and 3) taking into account the collaborative nature of the teachers work (OECD, 2017[106]).

Under this dimension of quality standards, the qualitative policy review will examine how national policies set standards and how they relate to the knowledge and skills of teachers, their level of autonomy and the accountability programmes being displayed in a specific national context.

Distribution and allocation

Finding a suitable balance between work and daily life is an important challenge that all workers face, including teachers. As mentioned previously, the inadequate balance between job demands and capacity to respond to them can be the cause of stress and burnout.

Teacher allocation is one of the main factors to consider in planning teachers' working arrangements. The OECD research has found that, in many systems, less qualified and less experienced teachers tend to be concentrated in the most disadvantaged schools (OECD, 2018[107]). Teachers working in disadvantaged schools face more challenges than colleagues in non-disadvantaged schools, since these schools serve students coming from low socio-economic backgrounds, who may have special learning needs and/or be low achievers. Thus, if teachers do not have the necessary experience or qualifications to deal with these challenges, their motivation and commitment to the profession may be affected. This is particularly challenging for novice teachers as they can find themselves in a situation where their first teaching assignment is the hardest in their professional career. As such, exploring the teacher allocation mechanisms across educational systems is crucial to better understand teachers' working conditions and their levels of satisfaction.

By successfully allocating more experienced and better trained teachers in more challenging schools, the staffing policies within a country can play an important role in reducing socio-economic, geographic and residential inequalities across a country.

Therefore, the study will look closely at the national institutional arrangements regarding the distribution of teachers across countries. The management of the teaching workforce varies a lot across countries according to the degree of centralisation of the school systems (OECD, 2018[41]). In centralised school systems, the allocation of teachers is managed at the central or state levels, either exclusively or in consultation with school leaders. This is the case for instance in Australia, Austria, France, Luxembourg, Mexico, Spain and Turkey. In contrast, other countries have adopted a more decentralised school-system where local and school leaders have more decision making power regarding the allocation of teachers. This is, for instance, the case in Canada, Chile, the Czech Republic, Denmark, England (United Kingdom), Estonia, Finland, Hungary, Iceland, Ireland, the Netherlands, Norway, Poland, Scotland, the Slovak Republic, Slovenia, Sweden and the United States (OECD, 2018[41]). In recent years, there has been a trend to provide schools with more autonomy in terms of decision-making power, including decisions regarding teachers. Greater school responsibility in the recruitment of teachers seems to be associated with improvements in student achievement (OECD, 2018[107]).

Career structure

Career progression is essential to sustain teacher motivation as it articulates the possibilities for professional growth. The career structure should take into account not only the desire for moving vertically (i.e. from a classroom teacher to taking on board principal tasks) but also horizontally (i.e. allowing teachers to stay in the classroom but giving them the opportunity to acquire different responsibilities and status).

A system level review of national policies on career progression should focus on the range of different career structures for teachers and opportunities for career progression. The OECD has explored the issue of career structure using the typology of career-based structure (i.e. stable trajectory paths usually under a tenure system which rewards teacher experience and age) and position-based system (i.e. flexible trajectories emphasising the

performance evaluation system) (OECD, 2005[44]). Although it is possible to find performing educational systems employing any of these career structure categories, their effect on teacher motivation may vary. For example, since career-based structure systems overemphasise the stability brought by age and experience alone, they do not provide incentives for teachers to engage in developmental and professional growth. Regarding position-based systems, the greater mobility that these systems usually exhibit makes it hard for schools to retain a core group of experienced teachers (OECD, 2018[108]).

Thus, it is important to review the career structures that are in place for teachers in each educational system and assess the potential impact they could have on teachers' well-being.

4.2. The quality of the working environment at school level

The quality of the working environment captures non-economic aspects of employment. It considers factors which make the working environment conducive to personal accomplishment, such as the nature and content of the work performed, working-time arrangements, workplace relationships, as well as opportunities for training (Cazes, Hijzen and Saint-Martin, 2015[87]). The quality of the working environment is an important driver of individual well-being (Cazes, Hijzen and Saint-Martin, 2015[87]). It is also an important predictor of teachers' job satisfaction (Susan Moore Johnson, 2012[109]) and of their levels of stress (Klassen et al., 2009[110]; Collie et al., 2015[60]).

This section studies the relationship between the quality of the working environment and the different dimensions of teachers' well-being through the jobs demand and resources model (JD-R model) (Bakker and Demerouti, 2007[111]). The JD-R model provides a powerful framework for exploring the relationships between the characteristics of the work environment and employees' well-being. In this model, work engagement and burnout are distinctive and negatively associated constructs (Upadyaya, Vartiainen and Salmela-Aro, 2016[112])

The JD-R model is a dual process model that includes two parallel processes: job demands and job resources (Bakker and Demerouti, 2007[111]). Job demands are the physical, social or organisational aspects of the job that require sustained physical efforts on the part of the employee and are associated with certain psychological and/or physiological costs (Skaalvik and Skaalvik, 2018[21]). Conversely, job resources are the physical, psychological, social or organisational aspects of the job that stimulate personal growth, learning and development, are functional in achieving work goals, and reduce job demands (Bakker et al., 2007[7]; Skaalvik and Skaalvik, 2018[21]). The JD-R model allows for an analysis of the characteristics of a school system that are associated with teachers' occupational well-being. By comparing the impact of job demands and job resources, the framework will allow for insights into how the lack or the availability of resources impacts teachers.

A relatively large number of studies have already investigated the relationships between the JD-R model and teachers' well-being (Bermejo-Toro, Prieto-Ursúa and Hernández, 2015[113]; Simbula, 2010[114]; Hakanen, Bakker and Schaufeli, 2006[9]) (Bermejo, Hernández-Franco and Prieto-Ursúa, 2013[115]). Hakanen, Bakker and Schaufeli shows evidence of the relevance of the two processes in explaining teachers' work engagement and burnout (Hakanen, Bakker and Schaufeli, 2006[9]). Bakker, Demerouti and Euwema shows that job resources buffer the impact of job demands (Bakker, Demerouti and Euwema, 2005[116]), and diminish the negative relationship between pupil misbehaviour

and work engagement (Bakker and Demerouti, 2007[111]). Rational coping behaviours are resources which help teachers overcome work-related stressors and burnout and achieve their valued outcomes with students, while avoiding and coping with predicted high level of stress and burnout (Antoniou, Ploumpi and Ntalla, 2013[117]).

4.2.1. Job demands indicators

The types of key variables that entail physical and/or psychological costs (i.e. job demands) differ across existing publications, depending notably on data constraints and countries' features. In its work around the *OECD Job Quality Framework*, Cazes, Hijzen and Saint-Martin consider two types of job demands: 1) time pressure which encompasses long working hours, high work intensity and working time inflexibility; 2) physical health risk factors, such as dangerous work (e.g. being exposed to noise, vibrations, and high and low temperatures) and hard work (e.g. carrying and moving heavy loads, painful and tiring positions) (Cazes, Hijzen and Saint-Martin, 2015[87]). Hakanen, Bakker and Schaufeli identify three job demands as major causes of psychological strain among teachers: 1) disruptive pupil behaviours; 2) work overload; and 3) poor physical work environment (Hakanen, Bakker and Schaufeli, 2006[9]). Bermejo-Toro, Prieto-Ursúa and Hernández use "role conflict and ambiguity" rather than "physical work environment" as a third job demand indicator (Bermejo-Toro, Prieto-Ursúa and Hernández, 2015[113]).

Based on the existing literature, this paper suggests six indicators of job demands that are particularly relevant for teachers: 1) physical learning environment; 2) workload; 3) multiple roles; 4) classroom composition; 5) disciplinary climate; and 6) performance evaluation.

- **Physical learning environment**. This indicator refers to how physical space influences school organisational structures and learning. For the purposes of the study, this indicator aims at measuring to what extent a disagreeable physical work environment is associated with teachers' occupational well-being. A disagreeable physical learning environment encompasses poor thermal comfort, poor lighting, high noise exposure, dirty and inoperable windows, dirty restrooms, lack of cleanliness, and lack of availability of specialised facilities among others. Evidence has shown that a disagreeable physical environment has a strong association with teacher burnout (Hakanen, Bakker and Schaufeli, 2006[9]). Some school facilities are more conducive to teachers' well-being, such as the ability to control classroom temperature and having appropriate lighting (Buckley, 2004[118]; Earthman and Lemasters, 2009[119]). Similarly, high noise exposure for teachers is associated with low job satisfaction, lack of energy after work, and increased interest in leaving the job (Kristiansen et al., 2011[120]).

  The PISA 2021 TQ includes one question to assess which are the traditional settings in which teachers are teaching in their schools (see details of the question in Annex B – Table 5).

- **Workload**. Many studies have shown that work overload is a natural job demands indicator (Cazes, Hijzen and Saint-Martin, 2015[87]), including for teachers (Kinnunen and Salo, 1994[121]; Bakker and Demerouti, 2007[111]; Hakanen, Bakker and Schaufeli, 2006[9]). This indicator aims at measuring to which extent teachers work long hours dedicated to teaching but also to other tasks beyond teaching, such as planning lessons, marking, collaborating with other teachers, participating in staff meetings, etc. Existing studies show that excessive workload is negatively correlated with teachers' work-life balance (OECD, 2013[63]), teachers' well-

being (Boyle et al., 1995[122]; Bermejo, Hernández-Franco and Prieto-Ursúa, 2013[115]) and positively correlated with stress and burnout (Albulescu and Tușer, 2018[13]; Bakker, Demerouti and Euwema, 2005[116]). The number of working hours is usually a common indicator to measure workload, with working 50 hours a week, or more, being an indicator of very long working hours and excessive workload (OECD, 2013[63]). However, a more precise indicator of workload is the number of hours that teachers spent on certain activities, specifically administrative tasks (Skaalvik and Skaalvik, 2018[21]). Studies conducted in the United States showed that teachers spent significant time in non-teaching tasks, such as administrative issues, which could be dealt with by non-professionals or automatised. This time spent on administrative tasks may lead to early attrition (Tye and O'Brien, 2002[123]).

The PISA 2021 TQ assesses excessive workload through three questions. The first question asks for the number of hours worked over a calendar week; the second question asks for the breakdown of activities over the total number of hours worked; and the third question asks teachers to report on their perception of their workload (see the questions in Annex B – Table 5).

- **Multiple roles**. Closely related to excessive workload, multiple roles refer to extra roles teachers hold in schools (Rosenblatt, 2001[124]). Teachers are indeed expected to handle different tasks that go beyond teaching activities, such as engaging in school management, communicating and co-operating with parents, and providing counsel to students (Wasburn-Moses, 2005[125]). These additional tasks can create extra work-pressure on teachers and negatively impact teachers' sense of professional well-being (Valli and Buese, 2007[126]).

  The PISA 2021 TQ includes a new question which assesses the range of activities teachers have to perform during their work (see details of the question in Annex B – Table 5). This question is adapted from the TALIS Teacher Questionnaire.

- **Classroom composition**. Whereas the class size may have limited effect on teachers' job satisfaction, class composition does impact teachers' levels of job satisfaction (OECD, 2014[3]). TALIS 2013 results also showed the negative relation between a teacher's job satisfaction and the share of students who are low academic achievers or have behavioural problems (OECD, 2014[3]). In addition, the share of students with special needs can have negative effects on teachers' levels of job satisfaction and well-being. Special needs students usually are defined as those students for whom a special learning need has been formally identified because they are mentally, physically or emotionally disadvantaged. The share of students coming from socio-economically disadvantaged homes may also negatively impact teachers' occupational well-being.

  The PISA 2021 TQ includes two new questions on classroom composition: one is related to the share of students with special characteristics over the entire classroom; and the other is related to class size (see details of the questions in Annex B – Table 5).

- **Disciplinary climate**. Disruptive pupil behaviours are considered a major cause of psychological strain for teachers (Hakanen, Bakker and Schaufeli, 2006[9]) and have been identified as key sources of teachers' stress and burnout (Albulescu and Tușer, 2018[13]; Evers, Tomic and Brouwers, 2004[127]; Boyle et al., 1995[122];

Spilt, Koomen and Thijs, 2011[80]). Results from TALIS 2013 showed that job satisfaction and self-efficacy diminished as the proportion of students with behavioural problems increased (OECD, 2014[3]). TALIS 2018 updated these results by showing that the more time teachers spent in classroom disciplines the less confident they felt in their ability to deliver quality instruction (OECD, 2019[37]).

The PISA 2021 TQ includes one question on disciplinary climate asking teachers how often a series of disruptive behaviours are taking place in their classrooms (see details of the question in Annex B – Table 5).

- **Performance evaluation**. Efforts to improve teacher quality through performance evaluation have increased considerably across countries (Hallinger, Heck and Murphy, 2014[128]). These evaluations can be undertaken internally or externally to evaluate schools, determine teachers' effectiveness and assess student performance. These types of evaluations are aimed at ensuring quality assurance and stimulating instructional improvement among teachers at large. However, a high number of performance evaluations can be a source of stress, burnout and ill-health for teachers. Evaluations which are controlled by an external body and where the school does not have a say in the areas in which they are judged puts a particular pressure on teachers. External standardised evaluation has been considered by some policy reviews as being an inherent danger for both school and teachers' autonomy (Ball, 2003[103]; Hargreaves, 2003[104]; Sahlberg, 2008[105]; Tatto, 2006[100]). Research showed that high-stakes accountability policies are positively correlated with teachers' stress and with lower job satisfaction (von der Embse et al., 2016[129]; Klassen and Chiu, 2010[10]).

  The measurement of this indicator is covered within the PISA School Questionnaire. Principals are asked whether "external evaluations" take place in their schools and whether these are initiatives agreed by the school or by another external agency (see details of the questions in Annex B – Table 5).

Job resources indicators

Similar to job demands indicators, the types of key variables that may help to reduce job demands (i.e. job resources) vary across the existing literature. (Hakanen, Bakker and Schaufeli, 2006[9]) included five job resources that have been identified either as major motivators that increase commitment or engagement, or that – when lacking – act as factors that increase teachers' burnout: 1) job control; 2) access to information; 3) supervisory support; 4) innovative school climate; and 5) social climate (Hakanen, Bakker and Schaufeli, 2006[9]). Later, Bakker built on these job resources to add a new indicator ("*appreciation*") and to replace "*social climate*" with "*organisational climate*" (Bakker et al., 2007[7]). More recent studies propose: 1) autonomy; 2) social support; 3) performance feedback; 4) supervisory coaching; and 5) learning opportunities as major job resources (Bakker and Bal, 2010[130]), whereas (Bermejo-Toro, Prieto-Ursúa and Hernández, 2015[113]) Bermejo-Toro and colleagues narrowed down the number of job resources to: 1) school administration support; 2) colleagues' support; and 3) feedback.

Aligned with these studies, the *OECD Job Quality Framework* considers two types of job resources, namely: 1) Work autonomy and learning opportunities, which include workers' freedom to choose and change their work tasks and methods, as well as formal (i.e. training) and informal learning opportunities at work; and 2) Social support at work,

that measures the extent to which workers receive social support from colleagues and supervisors (Cazes, Hijzen and Saint-Martin, 2015[87]).

Building on these existing works, this paper uses four major professional and job resources for teachers: 1) work autonomy; 2) training and professional opportunities; 3) appraisal and feedback; and 4) social support.

- **Work autonomy**. Work autonomy is considered as a basic psychological need and as a major job resource across the existing literature (Bakker and Bal, 2010[130]; Hakanen, Bakker and Schaufeli, 2006[9]) (Skaalvik and Skaalvik, 2009[131]). Indeed, teachers should be given sufficient autonomy to make decisions about their tasks and methods. Teachers' work autonomy is related to the choice of teaching methods, educational strategies and content within the limit set by the national curriculum (Skaalvik and Skaalvik, 2009[131]). The literature shows that the degree of perceived work autonomy is indicative of teachers' well-being (Bermejo-Toro, Prieto-Ursúa and Hernández, 2015[113]) and has a direct link to job satisfaction (Simbula, 2010[114]; Skaalvik and Skaalvik, 2009[131]). TALIS 2013 results also showed that teachers' ability to participate in decision making at school is significantly related to their job satisfaction across all countries (OECD, 2014[3]). Research highlighted the strong relationship between supervisory support and teachers feeling of autonomy (Crocco and Costigan, 2007[132]; Skaalvik and Skaalvik, 2009[131]).

  The PISA 2021 TQ has added a new question in the well-being module to assess the degree of work autonomy teachers have in their school (see Annexe B – Table 6).

- **Training and professional opportunities**. Teacher education is a continuous process, starting with initial teacher training and continuing with professional learning opportunities during the full duration of a teacher's career. It is well acknowledged that a qualified teaching workforce helps to effectively develop students' learning. The certification, the type of qualification, and the knowledge and skills teachers have matter for student learning. The levels of teachers' competence also matter for teachers' well-being and how they feel equipped to teach effectively and with competence (Pillay, Goddard and Wilss, 2005[133]; OECD, 2019[43]). In that sense, initial training education can be considered as a job resource.

  In addition, opportunities to learn at work are often considered as a major job resource (OECD, 2013[63]; Bakker and Bal, 2010[130]; Cazes, Hijzen and Saint-Martin, 2015[87]). The OECD defines professional development activities as those that are designed to develop an individual's skills, knowledge and expertise as a teacher. There are different types of professional development opportunities (e.g. induction programmes, mentoring programmes, classroom observation visits, workshops and conferences) and they can be organised formally or informally (OECD, 2014[3]). Teachers' participation in these activities provide them with the knowledge and skills needed for effective work responding to the needs of their school. TALIS 2018 results show that teachers' participation in mentoring programmes and/or in informal induction activities can relate to an increase in teachers' job satisfaction (OECD, 2019[37]).

  The PISA 2021 TQ includes a series of four questions to measure the quality and the breadth of training and professional opportunities for teachers. These

questions were already included in previous cycles of the PISA TQ and are not new questions of the well-being module (see details of the questions in Annex B – Table 6).

- **Appraisal and feedback**. A formal performance appraisal aims to provide clear, performance-based feedback to employees (Jawahar, 2006[134]). Teacher appraisal and feedback can be used to recognise and celebrate teachers' strengths while simultaneously challenging teachers to address weaknesses in their pedagogical practices (OECD, 2014[3]). The terms "appraisal" and "feedback" are commonly used in TALIS. Feedback is broadly defined as including any communication teachers receive about their teaching, based on some form of interaction with their work (e.g. observations of teaching, discussions about curriculum design, and discussions about student results). Appraisal is a narrower concept and refers to activities or processes undertaken by the principal, an external inspector or colleagues to review a teacher's work.

  Research showed that appraisal and feedback work as an important job resource to help teachers cope with job demands (Bakker et al., 2007[7]). The teacher appraisal and feedback systems have a positive effect on teachers' levels of job satisfaction (Michaelowa, n.d.[135]; Vanhoof et al., 2014[136]; OECD, 2014[3]) and on occupational teachers' well-being (Bermejo, Hernández-Franco and Prieto-Ursúa, 2013[115]; Bermejo-Toro, Prieto-Ursúa and Hernández, 2015[113]). The fairness and the clarity of the appraisal system are important characteristics to ensure higher levels of job satisfaction and motivation, and more co-operativeness among teachers (Ong Kelly et al., 2008[137]). In Malaysia, a study showed that teachers who received appropriate explanation and supervision of their performance, despite low performance-appraisal results, reported high levels of job satisfaction and professional commitment (Rahman, 2006[138]).

  The PISA 2021 TQ will measure this indicator through two new questions: one question to assess whether teachers have received feedback over the last 12 months and another question to assess whether this feedbacks has had a positive impact on his/her teaching practice (see details of the question in Annex B – Table 6).

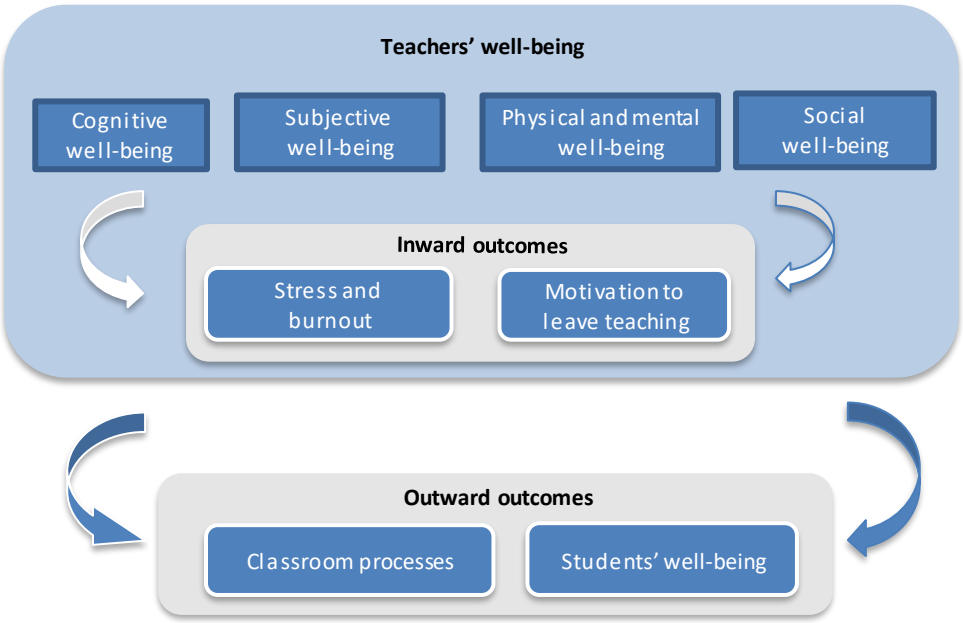
- **Social support**. This term includes social support from principals and management team (Bakker and Bal, 2010[130]; Hakanen, Bakker and Schaufeli, 2006[9]), social support from colleagues and social support from the school administration team (Bermejo, Hernández-Franco and Prieto-Ursúa, 2013[115]; Bermejo-Toro, Prieto-Ursúa and Hernández, 2015[113]). Social support is considered a major job resource in the *OECD Job Quality Framework* (Cazes, Hijzen and Saint-Martin, 2015[87]). Existing literature shows that social support has a direct effect on teachers' well-being (Bermejo, Hernández-Franco and Prieto-Ursúa, 2013[115]), on job satisfaction (OECD, 2014[3]; Skaalvik and Skaalvik, 2009[131]) and that it is also negatively correlated to burnout (Skaalvik and Skaalvik, 2009[131]). Among the various aspects of social support, principal support may be regarded as the variable having the biggest impact in increasing job satisfaction and reducing the risk of experiencing burnout (Bakker and Bal, 2010[130]; Hakanen, Bakker and Schaufeli, 2006[9]). Indeed, principals leadership has proved to have a significant influence on teachers' motivation and engagement (Bird et al., 2009[139]; Finnigan, 2010[140])

The PISA 2021 TQ includes two new questions to better understand the quality and the breadth of social support that teachers can get from supervisors and from colleagues (see details of the questions in Annex B – Table 6).

5. What are the expected outcomes of teachers' occupational well-being?

This section explores the implications of teachers' occupational well-being on two types of expected outcomes. First, it looks at the inward outcomes of teachers' occupational well-being in terms of overall levels of stress and in terms of future work engagement. Second, it looks at the outward outcomes in terms of quality teaching conditions. Levels of teachers' occupational well-being have implications on both classroom processes and on students' well-being. Figure 8displays the portion of the conceptual framework this section focuses on.

Figure 8. Expected outcomes of teachers' occupational well-being



5.1. Inward outcomes of teachers' occupational well-being

This paper considers two main inward outcomes of teachers' occupational well-being: 1) stress and burnout; and 2) motivation to leave teaching. These two expected outcomes rely largely on the JD-R model which states that the dual process of job demands and job resources explain teachers' levels of stress and work engagement. For example, (Hakanen, Bakker and Schaufeli, 2006[9]) use the JD-R model to examine teachers' perceptions of stress, burnout, work engagement and intentions to leave their job. They found that burnout was negatively associated with work engagement and that it positively predicts the intention to leave.

5.1.1. Stress and burnout

The World Health Organisation (WHO) defines work-related stress as an imbalance between working demands and environmental or personal resources at work. Workers can experience stress when the work demands placed on them do not match their knowledge, skills or ability to cope at work (Houtman, Jettinghoff and Cedillo, 2007[141]). Teachers' occupational stress is the negative reaction people have when presented with work stimuli (demands and pressures) that are not matched to their knowledge and abilities. These responses manifest themselves in emotional or social problems, and/or physical health issues (Kyriacou, 1987[142]). This definition is restricted to stress reactions related to the workplace and occupation and does not include general anxiety or stressful life-events.

Teaching is often considered as one of the most stressful professions in the world (McCallum et al., 2017[26]; Yang et al., 2009[78]; Montgomery and Rupp, 2005[143]) According to cross-country studies, one-third of teachers report being stressed or extremely stressed (Collie, Shapka and Perry, 2012[70]) but an international study to accurately measure the stress levels of teachers' is needed.

Curry and O'Brien have identified some common educational stressors faced by teachers (Curry and O'Brien, 2012[144]). These stressors are both work-related and institutional stress factors. They include schools and schools systems becoming more and more bureaucratic; expectations on teachers to manage difficult student behaviour; greater service delivery demands with fewer resources; a lack of planning time; an increased emphasis on accountability measures; and the exclusion of teachers from policy-making procedures (McCallum et al., 2017[26]; McCallum and Price, 2010[29]).

High levels of stress are associated with lower self-efficacy for teaching, lower job satisfaction and lower commitment (Klassen and Chiu, 2011[145]; Collie, Shapka and Perry, 2012[70]). In addition, teachers reporting high levels of stress tend to report higher depressive symptoms as a result (Collie, Shapka and Perry, 2012[70]).

Furthermore, high levels of stress can lead to burnout, a multidimensional construct composed of three characteristics: emotional exhaustion, depersonalisation and a reduced personal accomplishment (Schaufeli, Leiter and Maslach, 2009[146]).

The literature is replete with evidence of the negative effects of burnout on teachers (Burke, Greenglass and Schwarzer, 1996[147]; Wolpin, Burke and Greenglass, 1991[148]; Schaufeli and Bakker, 2004[149]). In a longitudinal study, (Wolpin, Burke and Greenglass, 1991[148]) found that perceived burnout resulted in decreased job satisfaction over time among teachers. In addition, teacher burnout also affects the school system as a whole in terms of school performance, organisational commitment, high turnover and absenteeism (Albulescu and Tușer, 2018[13]). It is also associated with higher costs and financial losses because of teachers' absenteeism and the decreased quality and quantity of work (Albulescu and Tușer, 2018[13]). Teacher burnout also has consequences on student well-being and achievements (see section on *Outward outcomes*).

In order to measure this outcome, the PISA 2021 TQ includes one question asking teachers the degree to which they experience stress in their school. Other questions are included as well to assess whether the job leaves enough time for personal life and if it negatively impacts mental and physical health.

Additionally, the PISA 2021 teacher questionnaire asks teachers about what they perceive as the causes for their levels of stress. Potential causes range from the amount of time spent on administrative work concerning teacher/parent relations. Although this is not an

indicator of stress *per se*, it does provide an interesting variable to correlate against the indicator of teachers' levels of stress (see details of the questions in Annex B – Table 7).

Motivation to leave teaching

As explored in previous sections, teacher attrition is a significant problem for many countries. Although the causes for a teacher to leave the profession are multiple, teachers' working conditions and their experiences in the school certainly have a crucial role (Day et al., 2016[150]). The study will not examine teacher attrition directly since it will not have access to teachers who have actually left the profession. Instead, it will use an indicator of teachers' intentions to leave the profession. Research has shown that motivation and actual attrition are highly correlated (Weiss, 1999[19])

Furthermore, teachers who report greater stress tend to be less satisfied with teaching, less motivated (Collie, Shapka and Perry, 2012[70]) and report greater frequency of absences and a greater total number of days of absence. These teachers are more likely to leave teaching (career intention), and less likely to remain committed to teaching (career commitment) (Borg and Riding, 1991[151]; Collie, Shapka and Perry, 2012[70]). The intentions of leaving the teaching profession have a negative impact on teacher self-efficacy and motivation, and ultimately on student outcomes as well (Tehseen and Ul Hadi, 2015[72]).

In order to measure this outcome, the PISA 2021 TQ includes three questions. One is related to the number of expected years teachers will continue working in the teaching profession. Then, teachers are asked about their intention to leave the teaching profession, and what would be their motivations to do so (see details of the questions in Annex – Table 8).

5.2. Outward outcomes on quality teaching

As previously mentioned, teachers are the most important school-related factor impacting student learning. Teachers are expected to teach students with academic skills but also to teach skills that encompass social, emotional and ethical behaviours (Collie, Shapka and Perry, 2012[70]). They are also expected to encourage students' engagement and responsibility, to respond to students from different backgrounds with different needs, and to ensure that students feel valued and included, to give a few examples (OECD, 2019[43]). Finally, teachers are also expected to teach subjects and areas for which they have not always been trained.

Levels of teachers' occupational well-being may influence the effectiveness of teachers to perform in these various roles. Existing research has found a possible association between teachers' well-being and school effectiveness (Bajorek, Gulliford and Taskila, 2014[152]) but is still limited.

As an attempt to bridge this gap, this study will explore the link between teachers' occupational well-being and the ability of teachers to be effective in the workplace and influence student learning. For the purpose of this study, quality teaching is, therefore, conceptualised with two topics: *classroom processes* and *students' well-being.*

Current literature on the relation between teachers' characteristics and attributes with student outcomes suggest adopting a subject-specific approach to obtain clearer results for policy (Rivkin, Hanushek and Kain, 2005[153]; Rowan, Correnti and Miller, 2002[154]; Seidel and Shavelson, 2007[155]). Therefore, for this component of the study, the focus of

the analysis will be domain-specific teachers only (i.e. mathematics teachers) since mathematics will be the core domain in PISA 2021.

5.2.1. Classroom processes

Classroom processes refer to factors associated with the classroom environment and teaching. They investigate teachers' ability to teach, manage classrooms and collaborate with other teachers. Classroom processes refer to all teacher practices taking place in the classroom that may lead to sustaining or improving student learning. Over the past decade, research has consistently showed that the classroom level can explain more of the variance in pupil outcomes than the school level (Muijs et al., 2014[156]). Within the classroom, a large proportion of this classroom-level variance can be explained by what teachers do in the classroom (Muijs et al., 2014[156]). As a result, classroom processes have become an important element of educational effectiveness.

The Classroom Assessment Scoring System [CLASS – (Pianta and Hamre, 2009[157])] is a standardised observation measure of global classroom quality that assesses three domains of quality teaching – Emotional Supports, Classroom Organisation, and Instructional Supports. This instrument anchors the fact that the structure and nature of teacher-child interactions are likely to contribute positively to students' development as a consequence of experience in the classroom. A series of studies have been developed to explore the relationships between these three domains. Even if the focus has been mainly on pre-kindergarten settings (Pianta and Hamre, 2009[157]), this framework is well aligned with the classroom processes that this study focuses on.

PISA is already investigating the ways in which students learn. Exploring in details the associations between classroom processes and teacher well-being will allow for a better understanding of when and how teachers choose their teaching strategies and whether their well-being impacts the classroom learning environment. It would provide a better understanding of how different levels of teachers' occupational well-being impact their ability to be a teacher and to create an effective learning environment.

Based on the literature review but also on existing PISA questionnaires, this paper identifies four types of classroom processes that matter for sustaining or improving students' learning: 1) teachers active support towards students; 2) feedback; 3) classroom social climate; and 4) teacher co-operation.

- **Teachers' active support towards students**. Engagement refers to the behavioural intensity and emotional quality of a person's active involvement during a task (Reeve et al., 2004[158]). In school settings, students' engagement predict students' learning and achievement and it reveals students' underlying motivation (Reeve et al., 2004[158]). Teachers play a key role in developing students' active engagement. Explaining clearly to the students, monitoring their learning and assisting in their development are ways of increasing students' active engagement. In addition, teachers using autonomy-supportive strategies tend to facilitate students' active engagement and motivation (Reeve et al., 2004[158]).

  The PISA 2021 TQ includes one question to assess teachers' active support towards students through a series of teacher experiences, such as providing individual help for students or changing teaching practices to meet students' needs (see details of the question in Annex B – Table 9).

- **Feedback**. Feedback is one of the most powerful tools to influence learning and achievement for students, but the type of feedback and the way it is given can be

differentially effective (Hattie and Timperley, 2007[159]). Strongly related with active engagement, timely and meaningful feedback is one of the most crucial teaching practices for predicting student outcomes. From a series of meta-analyses, feedback ranks in the top five to ten highest influences on achievements (Hattie, 1999[160]). Feedback is efficient when it manages to reduce discrepancies between current understandings/performance and the desired understanding/performance (Hattie and Timperley, 2007[159]). Hattie and colleagues showed that effective feedback should answer three questions, (i.e. *where am I going, How am I going, Where to next?*) and can be made at four levels (i.e. feedback about the task; about the processing of the task; about self-regulation; and about the self as a person). It is worth noting that feedback about the self as a person, such as praising a student, is commonly used in classroom situations but is unlikely to be effective as it provides little information on answers to the three listed questions (Hattie and Timperley, 2007[159]).

The PISA 2021 TQ includes one question regarding the type of methods teachers use for assessing student learning (see details of the question in Annex B – Table 9).

- **Classroom social climate**. The classroom climate is defined as the feelings and attitudes that are elicited by a classroom environment. It is a multidimensional construct that includes physical, social and academic aspects. This indicator focuses specifically on the social component of classroom climate. The quality of social and emotional interactions in the classroom – between and among students and teachers (e.g. teacher and peer support, student autonomy) – creates the classroom emotional climate, which is expected to influence learning outcomes for students (Reyes et al., 2012[161]; Stuhlman and Pianta, 2009[162]). Based on the *Teaching through interaction framework*, research has identified some key features that foster a positive classroom climate (Hamre et al., 2013[163]; Reyes et al., 2012[161]). Positive classroom climate is cultivated when 1) teachers are sensitive to students' needs; 2) teacher-student relationships are warm, caring, nurturing and congenial; 3) teachers take their students' perspectives into account; and 4) teachers refrain from using sarcasm and harsh disciplinary practices (Reyes et al., 2012[161]). These features encourage the development of a safe, respectful and supportive environment that facilitates student motivation and learning.

  The PISA 2021 TQ includes one new question to measure the classroom social climate, with a focus on the quality of the relationship between students and teachers (see details of the question in Annex B – Table 9).

- **Teacher co-operation**. Many studies have examined the relevance of productive teacher co-operation on teaching and learning (OECD, 2014[3]). For instance, OECD studies have consistently shown that teacher co-operation is one of the crucial practices to help improve student learning and to acquire effective practices (Barrera-Pedemonte, 2016[164]; Le Donné, Fraser and Bousquet, 2016[165]). Teacher professional practices to assess and measure co-operation between teachers can take different forms. TALIS considers four types of activities to measure teacher co-operation: 1) exchange teaching material with colleagues; 2) engage in discussions about the learning development of specific students; 3) work with other teachers in the school to ensure common standards in evaluations for assessing student progress; and 4) attend team conferences (OECD, 2014[3]).

The PISA 2021 TQ includes two questions regarding teacher co-operation. One question is similar to TALIS and measures the different forms of co-operation between teachers, and the other refers to co-operation between teachers on a specific subject, namely mathematics (see details of the questions in Annex B – Table 9).

Students' well-being

Students' well-being forms the other half of quality teaching. It reflects the quality and the outcomes of the instruction. Although, just like teachers' well-being, student's well-being is shaped by a myriad of factors, it is still heavily shaped by the quality and the outcomes of the instruction. As mentioned earlier, students' well-being includes students' performance in academic areas, but also students' levels of development in non-cognitive indicators, such as motivation, confidence and life satisfaction. The OECD defines students' well-being as the psychological, cognitive, social and physical qualities that students need to live a happy and fulfilling life (OECD, 2017[166]).

Teachers can play a particularly important role in creating the conditions for student well-being at school. PISA results showed that students in "happy" schools (schools where life satisfaction is above the average in the country) reported a higher level of support from their teachers than students in "unhappy" schools (schools where life satisfaction is below the average in the country). Furthermore, student anxiety in science class is considerably reduced when they feel that they are supported by their teachers (OECD, 2017[166]).

Building strong and supportive relationships with teachers allows students to feel safer and more secure in the school setting, feel more competent, make more positive connections with peers, and have greater academic gains. In contrast, conflict with teachers may place students on a trajectory of school failure in which they are unable to connect to the academic and social resources offered within classrooms and schools (Pianta and Hamre, 2009[157]).

Based on existing literature and on existing PISA items, this paper has identified four areas of particular importance for measuring and assessing the quality of teaching conditions and students' subjective well-being: 1) student achievement; 2) student motivation and attitude towards learning; 3) students' self-efficacy; and 4) students' subjective well-being.

These dimensions are covered in other PISA questionnaires (i.e. PISA mathematics achievement test and PISA 2018 Student questionnaire) and will allow to cross results with the PISA 2021 TQ. For this section, the main unit of analysis will be students themselves. Thus, the main dependent variable will be students' self-reports on quality outcomes.

- **Student achievement**. Traditionally, the expected outcome of a school system is that students acquire a proficient skill level in particular subjects (e.g. language, math, science, etc.). Student achievement, or student performance, covers student test scores as well as other student learning outcomes. A significant number of studies focus on how teachers, and teaching practices, affect students' achievement and what is the estimated contribution of teachers to student outcomes (often referred to as "*teacher effects*"). Existing studies acknowledge that highly-qualified teachers matter for student learning and are positively correlated with student achievements. Certification, the type of qualifications, degrees earned, teacher participation in professional development or years of

experience are all variables that contribute to measuring highly-qualified teachers (Hill, Rowan and Ball, 2005[167]; OECD, 2019[43]; Suk Yoon et al., 2007[168]; Borgonovi and Pál, 2016[64]) (Darling-Hammond, 2000[1]).

- In addition to structural features of teacher education on teaching quality, other research shows that teacher self-efficacy beliefs affect students' academic achievements in several ways (Caprara et al., 2006[169]; Zee and Koomen, 2016[170]; Collie, Shapka and Perry, 2012[70]). Indeed, teachers with high self-efficacy beliefs are more willing to implement innovative pedagogical methods in the classroom, use adequate teaching methods that encourage students' autonomy, take responsibility for students with special learning needs, manage classroom problems, and keep students on task (Caprara et al., 2006[169]).

  However, student learning is multidimensional, and factors such as students' socio-demographic background, attitudes and behaviours (Blazar and Kraft, 2016[171]), as well as school composition or the classroom climate (Collie, Shapka and Perry, 2012[70]), may also affect student achievement. As a result, it is important to be cautious and statistically control for these additional factors when exploring variables.

- **Student motivation and attitude towards learning:** Having a positive view towards life and school is directly linked with the motivation and attitudes that students have towards their schools (OECD, 2017[166]). The development of non-cognitive skills, such as student motivation to learn and the attitudes towards learning, are important skills to develop in the 21st century. The motivation to achieve was highly associated with student performance in most of the countries that took part in PISA 2015 (OECD, 2017[166]). Some recent studies attempt to document the magnitude of the *teacher effects* on non-tested outcomes. Evidence is mixed as to whether this *teacher effect* is larger on student achievements or on social and behavioural outcomes. Some studies highlight that teacher effects on non-cognitive outcomes are consistently smaller than the ones on cognitive outcomes (Muijs et al., 2014[156]). Other studies found that within-school teacher effects on social and behavioural outcomes are larger than effects on a student's academic achievements (Blazar and Kraft, 2016[171]). In addition, teachers who are effective at improving test scores are often not equally effective at improving a student's attitudes and behaviours (Blazar and Kraft, 2016[171]) so it is an additional argument for not focusing only on student achievements.

  The measurement of this indicator is captured in the PISA 2021 Student Questionnaire. This questionnaire includes several question stems which are related to student motivation and attitude towards learning. Two of them are particularly relevant. One question is related to the level of qualifications students expect to achieve while the other assesses whether students attend school all day (see details of the questions in Annex B – Table 10).

- **Students' self-efficacy**. As it was the case for teachers' occupational well-being, students' well-being has a psychological-cognitive dimension which includes their self-efficacy (Borgonovi and Pál, 2016[64]). Student self-efficacy refers to the degree of confidence that students have about their learning. An increase in the sense of well-being is directly linked with an increase in self-efficacy (OECD, 2017[166]). PISA 2015 results (OECD, 2016[49]) showed that students with high levels of confidence in resolving mathematical problems tend to achieve higher levels of achievement than students with lower levels of confidence. Teachers and

teaching practices can have substantive impacts on students' self-efficacy. Even if research is still limited, empirical evidence shows that teacher effects on students' self-efficacy in mathematics is of similar magnitude to the variation of teacher effects on students on mathematics scores (Blazar and Kraft, 2016[171]). More specifically, teachers' emotional support for students is positively related to students' self-efficacy (Blazar and Kraft, 2016[171]; Pianta and Hamre, 2009[157]).

The PISA 2021 Student Questionnaire includes one specific question regarding students' self-efficacy. It aims at measuring the degree of agreement of students with some statements related to self-efficacy and resilience (see details of the questions in Annex B – Table 10).

- **Students' subjective well-being**. Over the past decade, there has been growing interest in students' well-being to assess how well education systems promote students' overall development and quality of life. Research showed that high levels of subjective well-being among students are associated with positive and fulfilling life-experiences (Pollard and Lee, 2003[172]). To explore this area, the OECD developed a conceptual framework, in 2015, to measure students' well-being (Borgonovi and Pál, 2016[64]), with a dedicated module to capture students' well-being. PISA measures student well-being around four subjective dimensions (i.e. cognitive, psychological, physical and social well-being) and one objective dimension (i.e. material well-being).

  Since PISA 2018, a lot of question items have been included in the PISA Student Questionnaire on students' subjective well-being with a dedicated module. Table 9 in Annex B displays a series of five questions aiming at measuring students' attitudes, feelings and behaviours (see details of the questions in Annex B – Table 10).

6. Conclusion

This working paper presented a comprehensive conceptual framework for analysing teachers' occupational well-being around three main objectives. The first objective was to define teachers' occupational well-being and identify which dimensions this concept encompasses. The framework illustrated the four key dimensions of teachers' occupational well-being and the instruments available in the PISA 2021 TQ to measure them. The second objective was to identify the type of working conditions, at system and school levels, which have an impact on teachers' occupational well-being. The third objective was to explore the expected outcomes on teachers' occupational well-being. Levels of well-being have two immediate inward outcomes for teachers in terms of 1) stress and burnout; and of 2) motivation to leave the profession. Teachers' occupational well-being also has outward outcomes on quality teaching in terms of both classroom processes and students' well-being.

Next steps will deal with data collection and the production of a PISA thematic report. After data collection in 2021 for participating countries, data will be analysed and will culminate in the production of a PISA quantitative report on teachers' occupational well-being that will be published in 2023. This well-being module in the PISA TQ will be administered every three years with each PISA cycle.

Even though this conceptual framework aims to be as exhaustive and comprehensive as possible, its scope is bound on two sides. First, the number of new well-being items in the

PISA 2021 TQ is restricted to make sure that the burden on teachers is time-limited. Therefore, the questionnaire focuses only on key well-being indicators and dimensions. Within a more extensive timeframe, it could have been relevant to add more item questions on teachers' working conditions. For instance, the type of qualifications or professional developments teachers have had over the last 12 months and what would be their needs, the available teachers' support for learning and development, the available material resources for teachers or the type of physical learning environments teachers are surrounded with, are examples of other indicators to be added in the questionnaire to have a more complete picture of teachers' working conditions in participating countries.

Second, one major advantage of this study is the possibility of exploring relationships between the PISA 2021 TQ and other PISA instruments. The available set of questions in other PISA instruments represents a rich source of additional data to explore, but they do not cover all the potential existing relationships. For instance, the number of job demands and job resources included in the study is, to a certain extent, limited by this constraint.

In addition, by its nature, teachers' occupational well-being is highly context-sensitive. Subjective well-being indicators vary considerably across countries depending on cultural values or norms. Moreover, teacher well-being can also be influenced by contextual characteristics – gender, level of schooling, career stage and subject specialisation. As well, (McCallum et al., 2017[26]) takes stock of the number of studies on teachers' well-being related to contextual and socio-demographic characteristics. For instance, female teachers tend to report higher levels of stress whereas older and more experimented teachers tend to report higher levels of well-being (Gloria, Faulk and Steinhardt, 2012[173]).

The quality of the working environment is shaped by national and school policies, and the association between teachers' occupational well-being and quality outcomes can be influenced by system-level factors, school-level factors and teacher-related factors. As such, it is important that, in the process of examining these relationships, context indicators are taken into consideration. For more information see Annex B.

Findings from this first wave of results will also provide very useful insights to decide on which questions or indicators could be dropped for future waves of the PISA TQ and to identify other types of relationships to explore.

This study will also provide useful insights to the TALIS project. This new well-being module can guide the drafting of some relevant indicators that may be added in the TALIS Main Questionnaire in the future. In addition, new evidence from this study will also inform forthcoming TALIS reports, mainly in providing directions on how improving teachers' working conditions and supporting their professional growth in order to attract and retain them in the profession. Finally, results from this study will allow exploring new research areas for understanding quality teaching.

Annex A. Analytical plan

This annex aims to delineate potential areas of analysis using the teachers' occupational well-being indicators displayed throughout this working paper. It presents proposals for descriptive and inferential analyses that will maximise the policy value of collected data. The conceptual framework, with its three levels of analysis along with each dimension and indicators, will be the structure to guide this analytical proposal.

Before in-depth analysis of the suggestions, this annex starts by addressing some of the analytical limitations regarding the cross-national comparisons of scales. It will then explain the relevance of context variables around teachers' occupational well-being indicators (Figure 5). Potential ways of analysis concerning the four dimensions of well-being (i.e. cognitive, psychological, physical and social) will then be addressed. The section on quality working conditions will emphasise the possible relations that the job demands and resources may have with each dimension of well-being. Finally, the last section will propose analytical ways to address the relation between well-being dimensions with the inward outcomes (stress and commitment) and outward outcomes (classroom process and students' well-being).

Scale construction and measurement invariance

Since cross-national comparisons from PISA data are used for policy-making, assuring the validity of these comparisons is a crucial aspect of the study. The PISA 2021 teacher questionnaire survey, as well as other PISA and TALIS questionnaires, provide analyses based on the data collected by single-item measures. Individual items measuring a similar construct (e.g. indicators measuring cognitive well-being) are likely to be grouped together to build scales. Scales present some advantages of using single-item measures. A scale can condense, in one single measure, a greater degree of information on a specific construct of interest than a single-item measure. A scale, by capturing different aspects of a construct, presents higher levels of reliability and validity than a single item (He and Kubacka, 2015[174]).

However, despite the analytical advantages of relying on scales, its use also may contain important limitations regarding their cross-national comparison. Cross-national analyses need to assess whether the meaning of the construct remains constant (i.e. invariant) over a wide variety of school systems. If analyses are not able to demonstrate that the scales are measurement invariant, scale comparisons across countries are at best ambiguous and, at worst, erroneous (He and Kubacka, 2015[174]).

Analyses conducted with the TALIS data have shown that the scales of teachers do not reach the level of comparability that allows error-free comparisons. Nevertheless, some criticism has arisen stating that the methods used to assess measurement invariance are not completely suitable given the characteristics of studies such as PISA and TALIS, and new methodological approaches should be explored (Van de Vijver et al., 2019[175]).

As such, data users should be aware that cross-national comparisons of scales are dependent on whether they meet measurement invariance. If the scales developed by the well-being study are unable to meet the level of comparability needed, there are two possible alternatives:

- Conduct country-cluster analyses: Previous TALIS research has shown that the likelihood of meeting measurement invariance increases when the scales are developed from a select group of countries sharing common features (e.g. Asian countries, West-European countries) or if countries with a high concentration of "out-layer" responses are not taken into account (He and Kubacka, 2015[174]; Zieger, Sims and Jerrim, 2019[176]).
- Emphasise within-country analyses: If scale comparisons are not suitable for cross-country comparisons, then analyses should emphasise how indicators vary according to national characteristics within their own country. Indeed, it is possible that for a topic such as teachers' occupational well-being, the added value of exploring how the levels of well-being vary across school types or teacher characteristics would be greater than the information provided by international mean comparisons.

The role of contextual variables

The relationships established between the quality of working conditions and environments, teachers' occupational well-being and quality processes and outcomes do not occur in a vacuum. The quality of the working environment is shaped by national and school policies, and the association between teachers' occupational well-being and quality outcomes can be influenced by system-level factors, school-level factors and teacher-related factors. Context variables will ensure a robust analysis and a better understanding of variations within countries. These will allow for a range of country comparisons, including within-country comparisons, and an understanding of whether teachers' occupational well-being differs across these variables.

As such, it is important that, in the process of examining these relationships, context indicators are taken into consideration. Context indicators can operate as moderators by influencing the strength of the relationships between working conditions, teachers' occupational well-being and quality teaching. Also, context indicators can be mediators by explaining the relationship between the aforementioned concepts.

This paper proposes to consider two major types of contextual indicators to better understand the relationship between working conditions and teachers' occupational well-being: school characteristics and teacher characteristics.

- *School characteristics*: School features, such as socio-demographic composition and administrative characteristics, contribute to create the working conditions in which teachers operate.
- *Teacher characteristics:* Well-being may also differ according to a teacher's professional experience, educational attainment/credentials or other individual attributes. Additionally, these factors may also help analyse whether well-being is associated with teaching.

The four dimensions of teachers' occupational well-being

System-wide estimations

As revealed by the conclusions of the International Summit on the Teaching Profession, countries are eager to have more evidence on the concrete levels of well-being of their

teaching workforce. As such, one of the most salient results of the study should be the system-wide estimates of each of the dimensions of teachers' occupational well-being.

For the cognitive dimensions, national means can be estimated for the indicator on self-efficacy and the capacity to concentrate on work; for psychological well-being indicators means can be estimated for job satisfaction, affects and purposefulness; for physical well-being indicators, the means for the presence and frequency of each psychosomatic symptom could be presented; finally the study can present means for each item on the social relation with principals, colleagues and teachers along with their feeling of trust. However, the international comparison of these means will ultimately depend on whether the scales developed from these indicators can meet measurement invariance.

By means of a latent class analysis, indicators of each teachers' occupational well-being could be selected in order to identify a profile or different class of teacher well-being. Each class of teacher well-being will differ based on the response patterns on the selected indicators.

Variance and breakdown analyses

Comparing the means of each dimension across participating countries will probably not report as much valuable information for policy design as understanding how the well-being levels vary within each system. Indeed, in order to effectively design policies to improve teachers' occupational well-being, policy makers and stakeholders need to understand how well spread these levels of well-being are within their own system, to what extent they vary across their school and teacher profiles and, ultimately, the sources of these observed variations.

The study can explore how the variation of each dimension of well-being is split among between-school variance and within-school variance. If a substantive proportion of variance of the well-being indicators is contained between-school (e.g. above 10%), it signals that the well-being of teachers may be strongly associated with concrete school characteristics. On the contrary, if a high proportion of the variance is contained within-school, teacher well-being may be strongly associated with teacher profiles. The distribution of the variance between and within-schools can also differ from country to country.

In order to better understand the variance distribution, it may be useful to deepen these analyses with a breakdown of the results by school type and teacher characteristics (i.e. the contextual variables). Per each country, the means and variance of each indicator of the teachers' well-being could be displayed by:

- School type (e.g. private, public)
- School location (e.g. rural, urban)
- School performance (e.g. define " school groups" based on their PISA results)
- School size (e.g. define "school groups" based on the number of students the school serves and the number of staff)
- School socio-demographic composition (e.g. low socio-economic schools, middle socio-economic schools and high socio-economic schools)

A similar breakdown analysis could be conducted using teacher variables such as:

- Teacher experience (e.g. teachers with more than 5 years' experience, teachers with less than 5 years' experience)

- Teacher age (e.g. teachers under 50 years old, teachers over 50 years old)
- Teacher gender
- Teacher education (e.g. teachers with ISCED[5] level 6 or beyond, teachers with less than ISCED level 6)

T-tests could be conducted to assess whether the differences between the means of well-being indicators across different school characteristics and teacher profiles are significant.

These breakdown analyses can be helpful to signal to stakeholders and policy makers which type of schools and teachers are associated with lower levels of teachers' occupational well-being and, as such, warrant particular attention and intervention. It also offers a cost-effective possibility for policy intervention since, instead of providing guidelines for a system-wide intervention, it can shed light on the particular area that requires a local and more focused action.

Correlations and factor analyses

The strength of the relationship between indicators of each dimension of teachers' occupational well-being can shed relevant information. Previous research shows that indicators of these dimensions are strongly correlated. But the strength of the relationship between these dimensions may vary. For example, indicators for cognitive well-being may have a stronger relationship with indicators of physical well-being than with psychological or social well-being.

The well-being dimensions and its indicators defined in the conceptual framework have been established according to a sound literature review. However, data might reveal that the indicators from one dimension are more closely linked with indicators from another one. Conducting a confirmatory factor analysis (CFA) will identify groups (i.e. factors) across the indicators of these dimensions. Understanding links between these indicators will provide information on how the well-being of teachers takes form and help school policies to develop comprehensive programmes to address the correct areas to help teachers with their jobs and their profession.

Working conditions shaping teachers' occupational well-being

System-level measures

Gathering information about the key aspects of teachers' working conditions is as vital for policy development as knowing the levels and dimensions of teachers' occupational well-being. The study can provide key tendency measures such as system-level means or dispersion statistics on the areas of job demands (e.g. workload, classroom composition, multiple roles and performance evaluation) and job resources (e.g. work autonomy,

[5] The International Standard Classification of Education (ISCED) is an instrument for compiling statistics on education internationally maintained by the United Nations Educational, Scientific and Cultural Organization (UNESCO). The most updated iteration, ISCED-2011, has the following categories: level 0 (early childhood education), level 1 (primary education), level 2 (lower secondary education), level 3 (upper secondary education), level 4 (post-secondary non-tertiary education), level 5 (short cycle tertiary education), level 6 (bachelor's or equivalent level), level 7 (master's or equivalent level) and level 8 (doctoral or equivalent level).

professional development opportunities, appraisal and feedback, and professional collaboration).

It will also be interesting to compare the means of each of these indicators cross-nationally, as some systems may have a larger share of teachers reporting on the presence or frequency of certain phenomena (e.g. workload or performance evaluation) than others. The discrepancies on the system-wide means of teachers may be due to national configurations of the school system or the teaching profession.

Furthermore, it is relevant to explore how some of these indicators behave once they are aggregated at the school level. In other words, analyses could try to resolve the question on whether the perception of teachers on these indicators are also shared by colleagues in their schools. These school-level aggregated results could provide useful hints on aspects around school organisation and school climate.

Regarding job demands indicators, it may be particularly relevant to look at teachers' workload and performance evaluation at the school level. Regarding job resources, the most relevant indicators to observe at a school level are feedback frequency and professional collaboration. All results on these indicators could be reflecting into concrete school policies. As such, it would also be relevant to look at how these school aggregates vary according to the school type.

Regression analyses

One of the main added-values of this study is to present evidence on the association of teachers' working conditions (as reported by them) and teachers' levels of well-being. Thus, the study will regress key indicators of each well-being dimension to the indicators of job demands and job resources. It should be expected that job resource indicators have a positive association with the teachers' occupational well-being dimensions. At the same time, a negative association between the job demand indicators and the teachers' occupational well-being dimensions will possibly be observed. However, what is useful for the development of policy, is to understand whether each well-being dimension reacts in the same way to the working conditions indicators. For example, it could be the case that workload has a stronger association with cognitive and physical well-being than with other well-being dimensions, or that work autonomy has a stronger relationship with psychological well-being than the other well-being dimensions.

Since organisational aspects of the school can certainly affect teachers' occupational well-being, it is also relevant to regress the well-being of teachers on school aggregates of the quality of working conditions indicators, such as working load and the frequency of feedback.

All regression models must be controlled by the pertinent school and teacher variables.

National context

The teachers' occupational well-being study also includes a qualitative review of national policies. This qualitative review looks at teachers' material conditions, allocation and planning policies, accountability and appraisal, and career trajectories. Although there is no plan to translate this qualitative analysis into a quantitative one, the qualitative review can provide a useful framework to better interpret country results and inform policy makers.

Expected outcomes of teachers' occupational well-being

Inward outcomes, stress and commitment to the profession

System level

Stress and commitment to the profession are relevant teacher outcomes. As such, it is important to estimate the national means of the indicators corresponding to each of these dimensions. Similar to the analysis of the teachers' occupational well-being dimensions, it also makes sense to observe how stress and commitment to the profession vary across schools and teachers' characteristics.

Regression analyses

Stress and commitment to the profession will be regressed to each indicator of the teachers' occupational well-being dimensions. By examining the coefficient of these relationships the results of these analyses will shed light on which aspects of teachers' occupational well-being are more strongly associated with stress and commitment to the teaching profession.

Furthermore, it would also be interesting to explore how the working conditions (i.e. job demands and resources) are directly linked and associated with teachers' occupational well-being and commitment to the profession. Path model analysis could be conducted to assess which group of variables, working conditions or teachers' well-being have a stronger impact on stress and commitment. The path model analysis could also explore whether the teachers' occupational well-being variable could be mediating or moderating an indirect association of the working conditions of teachers on their level of stress and commitment.

Outward outcomes, classroom practices and students' well-being

System level

Although the indicators of classroom practices and students' well-being by themselves are not the main focus of the study, it is nevertheless relevant to know the national means of these indicators and how they vary according to the school and teacher characteristics.

Regression analyses

The most relevant analysis for policy is understanding the relationship between classroom practices and students' well-being with teachers' occupational well-being. These relationships will be able to provide some insight on what might be the consequences of having teachers with high/low levels of well-being in the school and classrooms.

Current literature on teachers' characteristics and attributes with student outcomes suggests adopting a subject-specific approach to obtain clearer results for policy (Rivkin, Hanushek and Kain, 2005[153]; Rowan, Correnti and Miller, 2002[154]; Seidel and Shavelson, 2007[155]). Therefore, for this area of the study, the focus of the analysis will be domain-specific teachers only (i.e. mathematics teachers), since mathematics will be the core domain in PISA 2021. In other words, unlike inward outcomes, outward outcomes will only focus on mathematics teachers.

No direct connection is made between teachers and students, since the samples of teachers are drawn irrespective of which students were selected in the sample. Thus, any association between teacher and student data will have to be done at the school level, thereby ruling out the risk that linking teacher data to PISA performance data could be

used as an evaluation tool for teachers, which some stakeholders have expressed as a concern.

For the first dimension of outward outcomes, classroom processes, the unit of analysis will be mathematics teachers, as they will be the ones reporting on their classroom processes[6]. The main predictors will be the four dimensions of teachers' occupational well-being described. For the second dimension, since there are no indicators in the teachers' questionnaire about the well-being of students, the main unit of analysis will be students themselves. Thus, the main dependent variable will be students' self-reports on quality outcomes. The main predictor at this stage will be a measure of at the school level of the teachers' occupational well-being (i.e. teachers' occupational well-being data aggregated at the school level).[7]

Additional analyses are required to better understand the nature of these relationships. For instance, it is also necessary to correlate the classroom practices with students' well-being and, if the relationship holds, observe whether the indicator from the teachers' occupational well-being dimensions could have any mediating or moderating effects. Policy could also benefit from understanding how the inward outcomes (i.e. stress and commitment) mediate or moderate the relationships between teachers' well-being and classroom practices and students' well-being. As such, a path model design could once again be helpful to understand how these three different sets of variables intertwine with each other. For example, job satisfaction (i.e. subjective well-being) can be specified as a mediator between working conditions and commitment.

[6] PISA questionnaires allow for using the students as a source of classroom practices. However, given the sampling design of the PISA study, it is not possible to link students with their teachers at the classroom level; the design only allows for linking teachers who are eligible to teach 15-year-olds with the students in each school. As such, to explore the relationships between teachers' well-being and students' descriptions of classroom processes, teacher characteristics would have to be aggregated at the school level, meaning the loss of considerable variation in the well-being variables of interest and affecting the association with students' variables. Thus, the study opted to use teachers as a source of classroom processes, since there would not be a need to aggregate the data.

[7] To account for the loss of variation when aggregating teachers' data on well-being at the school level, the study could use both the school average of each well-being measure and its standard deviation at the school level as predictors. In that sense, the analysis could "account" for the variation that might be lost by aggregating data.

Annex B. PISA 2021 indicators and questions related to teachers' occupational well-being

Note: The following tables present the list of label questions and item responses that will be used to analyse teachers' occupational well-being. Most of them are part of the well-being module of the PISA 2021 Teacher Questionnaire, and some are from the PISA 2021 Student Questionnaire and the PISA 2021 School Questionnaire. All these questions are subject to potential changes after the field trial exercise.

Questions related to the core dimensions of teachers' occupational well-being

Table 1. The cognitive dimension of teachers' occupational well-being

Indicators, label questions and items

Indicators	Question	Items	Answer scale
Capacity to concentrate at work	In the past two weeks, how often have you experienced the following during the school day?	- I was not thinking as clearly as usual. - It was hard for me to think about complicated things. - I was thinking slower than usual. - I was distracted. - It was easy for me to concentrate. - I felt focused.	- Never - Seldom - Often - Always
Self-efficacy	In your teaching, to what extent can you do the following?	**Efficacy in classroom management** - Control disruptive behaviour in the classroom - Make my expectations about student behaviour clear - Get students to follow classroom rules - Calm a student who is disruptive or noisy **Efficacy in instruction** - Craft good questions for my students - Use a variety of assessment strategies - Provide an alternative explanation for example when students are confused - Implement alternative instructional strategies in my classroom **Efficacy in student engagement** - Get students to believe they can do well in school work - Help my students value learning - Motivate students who show low interest in school work - Help students think critically	- Not at all - To some extent - Quite a bit - A lot

Source: PISA 2021 Teacher Questionnaire, field trial version

Table 2. The subjective dimension of teachers' occupational well-being

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scale
Job satisfaction	We would like to know how you generally feel about your job. How strongly do you agree or disagree with the following statements?	**Job satisfaction with the profession** - The advantages of being a teacher clearly outweigh the disadvantages. - If I could decide again, I would still choose to work as a teacher. - I regret that I decided to become a teacher. - I wonder whether it would have been better to choose another profession. - I think that the teaching profession is valued in society. - All in all, I am satisfied with my job. **Job satisfaction with the current working environment** - I would like to change to another school if that were possible. - I enjoy working at this school. - I would recommend my school as a good place to work. - I am satisfied with my performance in this school.	– Strongly disagree – Disagree – Agree – Strongly agree
Job satisfaction	Overall, how satisfied are you with your job as a whole these days?	The following question asks how satisfied you feel about your job, on a scale from "0" to "10". Zero means you feel 'not at all satisfied' and "10" means 'completely satisfied'.	Slider from 0 to 10
Life satisfaction	Overall, how satisfied are you with your life as a whole these days?	The following question asks how satisfied you feel about your life, on a scale from "0" to "10". Zero means you feel 'not at all satisfied' and "10" means 'completely satisfied'.	Slider from 0 to 10
Affects	In the past two weeks, how often have you felt the following way during the school day?	- I felt cheerful and in good spirits. - I felt calm and relaxed. - I felt active and vigorous. - I started the school day feeling fresh and rested. - I was interested and engaged in my daily activities.	- Never - Seldom - Often - Always
Purposefulness	To what extent do you agree or disagree with the following statements about your professional work?	- I have a sense of direction and purpose in my work. - My daily activities often seem trivial and unimportant to me. - I enjoy making work plans for my future. - I sometimes feel as if I've done all there is to do at my work. - I sometimes feel my job is useless.	- Strongly disagree - Disagree - Agree - Strongly agree

Source: PISA 2021 Teacher Questionnaire, field trial version

Table 3. The physical and mental dimension of teachers' occupational well-being

Indicators, label questions, items and answer scales

Indicators	Question	Items	Answer scale
Psychosomatic symptoms	This school year, how often have you had the following during the school day?	- Headache - Stomach pain - Back pain - Feeling down - Irritability - Feeling nervous - Fatigue - Feeling dizzy - Feeling anxious - Sleep deprivation	- Never or almost never - About once or twice a year - About once or twice a month - About once or twice a week - Every day or almost every day
Frequency of psychosomatic symptoms	This school year, how many days have you missed work because of any of the previously listed symptoms?	Please type a number of days	n/a

Source: PISA 2021 Teacher Questionnaire, field trial version

Table 4. The social dimension of teachers' occupational well-being

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scales
Social function in relationships (colleagues)	This school year, to what extent do you agree or disagree with the following statements?	- I feel like I was left out of things at my school. - I get along well with my colleagues. - I feel awkward and out of place in my school. - My colleagues seem to like me. - I feel comfortable talking to my colleagues about my life outside of school.	- Strongly disagree - Disagree - Agree - Strongly agree
Social function in relationships (principal)	This school year, to what extent do you agree or disagree with the following statements?	- My principal shows appreciation for my work. - My principal is interested in how I am doing. - My principal makes me feel welcome at my school. - My principal is aware of my needs. - My principal treats teaching staff as professionals.	- Strongly disagree - Disagree - Agree - Strongly agree
Teacher-student relations	To what extent do you agree or disagree with the following statements?	- I am genuinely interested in how my students are doing. - If my students walked into my classes upset, I would be concerned about them. - I enjoy teaching the students at my school. - The students at my school are respectful towards me. - I would be excited to have my students in my class again in the future.	- Strongly disagree - Disagree - Agree - Strongly agree
Feeling of trust	Thinking about the general climate in this school, to what extent do you agree or disagree with the following statements about what happens in this school?	- Teachers can rely on the school's management for professional support. - The principal has confidence in the expertise of the teachers. - Even in difficult situations, my colleagues know they can trust me. - Teachers can rely on each other. - I feel that I can trust my colleagues.	- Strongly disagree - Disagree - Agree - Strongly agree

Source: PISA 2021 Teacher Questionnaire, field trial version

Questions related to the quality of the working environments: Job demands and Job resources

Table 5. Quality of the working environments – Job demands

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scales
Physical learning environment	Thinking of the last full week of school, approximately how often did you teach in the following settings within your school?	– A traditional classroom with no access to break out spaces – A collaborative teaching area where multiple teachers share a variety of connected learning spaces – A space in a corridor outside the classroom – A non-traditional classroom (i.e. library, canteen, auditorium, gym) – Outside of school building	– Never or almost never – Some lessons – About half of the lessons – Most lessons – Every lesson
Work overload	During your most recent complete calendar week, approximately how many 60-minute hours did you spend in total on tasks related to your job at this school?	– Hours:	– n/a
Work overload	To what extent do you agree or disagree with the following statements in reference to your job at this school?	– I am given enough time to do what is expected of me at work. – I have too much work for one person to do. – There are times when I cannot meet everyone's expectations. – I have time for breaks during the workday. – My job prevents me from giving the time I want to my personal life. – My non-teaching tasks (e.g. counselling students, communicating with parents, administrative work) negatively affect my ability to teach.	– Strongly disagree – Disagree – Agree – Strongly agree
Multiple roles	How many 60-minute hours did you spend on the following tasks during your most recent complete calendar week at this school?	– Teaching – Individual planning or preparation of lessons either at school or out of school – Team work and dialogue with colleagues within this school – Marking/correcting of student work – Counselling students (including student supervision, mentoring, virtual counselling, career guidance and behaviour guidance) – General administrative work (including communication, paperwork and other clerical duties) – Communication and co-operation with parents or guardians –Engaging in extracurricular activities (e.g. sports and cultural activities after school)	– Number of hours

Indicator	Question	Items	Answer scale
Classroom composition	We would like to know the composition of your target <national modal grade for 15-year-olds> class. Please estimate the percentage of your students who have the following characteristics.	– Students whose <heritage language> is different from the <test language > – Low academic achievers – Students with special needs – Students with behavioural problems – Students from <socio-economically disadvantaged homes> – Academically gifted students	– None – 1% to 10% – 11% to 30% – 31% to 60% – More than 60%
Classroom composition	What is the size of your target <national modal grade for 15-year-olds> class?	– - Number of students	– Number of students
Disciplinary climate	How often do these things happen in your mathematics lessons?	– Many students don't listen to what I say. – There is noise and disorder. – I have to wait a long time for students to quiet down. – Students cannot work well. – Students don't start working for a long time after the lesson begins. – Students get distracted by using <digital resources>. – Students get distracted by other students who were using <digital resources>.	– Every lesson – Most lessons – Some lessons – Never or almost never
Performance evaluation	Do the following arrangements aimed at quality assurance and improvements exist in your school and where do they come from?	– Internal evaluation/Self-evaluation – External evaluation – Written specification of the school's curricular profile and educational goals – Written specification of student performance standards – Systematic recording of data such as teacher or student attendance and professional development – Systematic recording of student test results and graduation rates – Seeking written feedback from students (e.g. regarding lessons, teachers or resources) – Teacher mentoring – Regular consultation aimed at school improvement with one or more experts over a period of at least six months – Implementation of a standardised policy for mathematics subjects (i.e. school curriculum with shared instructional materials accompanied by staff development and training)	– Yes, this is mandatory, e.g. based on district or ministry policies – Yes, based on school initiative – No

Source: PISA 2021 Teacher Questionnaire, PISA 2021 School Questionnaire, field trial versions

Table 6. Quality of the working environments – Job resources

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scale
Work autonomy	How much control do you have in the following areas at your current school?	- Determining course content - Selecting teaching methods - Assessing students' learning - Disciplining students - Determining the amount of homework to be assigned - Turning down non-teaching tasks (e.g. counselling students, communicating with parents, administrative work) - Choosing teaching materials such as the textbooks	- No control - Some control - A lot of control - Full control
Training and professional opportunities	Did you complete a teacher education or training programme?	- Yes, a programme of 1 year or less - Yes, a programme longer than 1 year - No	- n/a
Training and professional opportunities	How did you receive your initial teaching qualifications?	- I attended a standard teacher education or training programme at an <educational institute which is eligible to educate or train teachers>. - I attended an in-service teacher education or training programme. - I attended a work-based teacher education or training programme. - I attended training in another pedagogical profession. - Other	- n/a
Training and professional opportunities	During the last 12 months, did you participate in any of the following activities?	– Qualification programme (e.g. a <degree programme>) – Participation in a network of teachers formed specifically for the professional development of teachers – Individual or collaborative research on a topic of interest to you professionally – Mentoring and/or peer observation and coaching, as part of a formal school arrangement – Reading professional literature (e.g. journals, evidence-based papers, thesis papers) – Engaging in informal dialogue with your colleagues on how to improve your teaching – Attending a course, workshop or conference on teaching methods – Attending a course, workshop or conference relevant to your subject-matter field – Observation visits to other schools – Attending training courses in private companies or other organisations – Listening to or watching recorded seminars or online courses (e.g. <MOOCs>) about the use of digital resources for teaching – Attending a course, workshop or conference about the use of digital resources for teaching – Receiving in-service training courses about the use of digital resources for teaching – Learning new pedagogical or instructional approaches with digital resources	– Yes / No
Training and professional opportunities	Are you required to take part in professional development activities?		– Yes / No

Indicator	Question	Items	Answer scale
Training and professional opportunities	As part of your formal education and/or training, to what extent did you study the following areas?	– Mathematics – Pedagogy/teaching mathematics – Educational psychology – Remedial mathematics – Special education – Assessment methods in mathematics comprehension	– n/a
Training and professional opportunities	During the last 12 months, what proportion of your professional development activities was dedicated to each of the following areas?	– Mathematics knowledge and skills related to <mathematics literacy> domain – Pedagogy of mathematics: knowledge and methodology of<mathematics literacy>, instructional skills (evidence-based strategies, model-based approach, guided discussion) – General pedagogical knowledge: e.g. teacher-student interaction, classroom management, school evaluation, special education	– Enter an approximate percentage (%)
Appraisal and feedback	In the past 12 months at this school, how often have you received feedback from the following sources?	- External individuals or bodies - School principal or member(s) of the <school management team> - Other colleagues within the school (not a part of the <school management team> - Parents or guardians	- Never - About once or twice a year - About once or twice a month - About once or twice a week - Every day or almost every day
Appraisal and feedback	Thinking of all of the feedback that you have received during the last 12 months at this school, did any of these have a positive impact on your teaching practice?	-	- Yes / No
Social support	This school year, to what extent do you agree or disagree with the following statements?	– I feel like I was left out of things at my school. – I get along well with my colleagues. – I feel awkward and out of place in my school. – My colleagues seem to like me. – I feel comfortable talking to my colleagues about my life outside of school.	– Strongly disagree – Disagree – Agree – Strongly agree
Social support	This school year, to what extent do you agree or disagree with the following statements?	– My principal shows appreciation for my work. – My principal is interested in how I am doing. – My principal makes me feel welcome at my school. – My principal is aware of my needs. – My principal treats teaching staff as professionals.	– Strongly disagree – Disagree – Agree – Strongly agree

Source: PISA 2021 Teacher Questionnaire, field trial version

Questions related to the expected outcomes on teachers well-being: inward and outward outcomes

Questions related to the inward outcomes: stress and burnout, and motivation to leave teaching

Table 7. Stress and burnout

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scale
Stress report	In your experience as a teacher at this school, to what extent do the following occur?	- I experience stress in my work	- Not at all - To some extent - Quite a bit - A lot
Sources of stress	Thinking about your job at this school, to what extent are the following sources of stress in your work?	- Having too little time for lesson preparation - Having too many lessons to teach - Having too much <marking> - Having too much administrative work to do - Being held responsible for students' achievement - Maintaining classroom discipline - Being intimidated or verbally abused by students - Addressing parent or guardian concerns - Modifying lessons for students with special needs	- Not at all - To some extent - Quite a bit - A lot

Source: PISA 2021 Teacher Questionnaire, field trial version

Table 8. Motivation to leave teaching

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scale
Expected years of teaching	For how many more years do you want to continue to work as a teacher?	- Number of years	- *n/a*
Plan to leave teaching	This school year, have you seriously considered leaving classroom teaching?	- Yes - No	- n/a
Reasons to leave teaching	How likely are each of the following factors to be a cause for you to leave classroom teaching?	- To be promoted to a school leader/principal - To pursue further education towards a degree in education - To pursue further education towards a degree outside of the field of education - To take a job outside of education - To attend to family responsibilities - To take a break from work - I will reach the retirement age as a teacher	- Not at all likely - Not very likely - Likely - Very likely

Source: PISA 2021 Teacher Questionnaire, field trial version

Questions related to the outward outcomes on teachers well-being: classroom processes and students' well-being

Table 9. Classroom processes

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scale
Teachers active support towards students	How often do these situations occur in your lessons?	- I tailor my teaching to meet the needs of my students. - I provide individual help when a student has difficulties understanding a topic or task. - I change the structure of my lesson on a topic that most students find difficult to understand. - I provide individual support for advanced students. - I tell students how they are performing in my course. - I give students feedback on their strengths in my course. - I tell students in which areas they can still improve. - I tell students how they can improve their performance. - I advise students on how to reach their learning goals.	- Never or almost never - Some lessons - Many lessons - Every lesson or almost every lesson
Feedback	How often do you use the following methods of assessing student learning?	- I develop and administer my own assessment. - I administer a <standardised test>. - I have individual students answer questions in front of the class. - I provide written feedback on student work in addition to a <mark, i.e. numeric score or letter grade>. - I let students judge their own progress. - I observe students when working on particular tasks and provide immediate feedback. - I collect data from classroom assignments or home work.	- Never or almost never - Some lessons - Many lessons - Every lesson or almost every lesson
Classroom social climate	To what extent do you agree or disagree with the following statements?	- I am genuinely interested in how my students are doing. - If my students walked into my classes upset, I would be concerned about them. - I enjoy teaching the students at my school. - The students at my school are respectful towards me. - I would be excited to have my students in my class again in the future.	- Strongly disagree - Disagree - Agree - Strongly agree
Teacher co-operation	To what extent do you agree with the following statements about regular co-operation among your fellow teachers of mathematics and yourself?	- We discuss the achievement requirements for mathematics when setting tests. - We discuss the criteria we use to grade mathematics quizzes or tests. - We exchange tasks for lessons and homework that cover a range of different levels of difficulty. - I prepare a selection of teaching units with my fellow teachers of mathematics. - We discuss ways to teach learning strategies and techniques to our students. - My fellow teachers of mathematics benefit from my specific skills and interests. - We discuss ways to better identify students' individual strengths and weaknesses.	- Strongly disagree - Disagree - Agree - Strongly agree
Teacher co-operation	On average, how often do you do the following in this school?	- Exchange teaching materials with colleagues - Engage in discussions about the learning development of specific students - Work with other teachers in my school to ensure common standards in evaluations for assessing student progress - Attend team conferences	- Never - Once a year or less - 2-4 times a year - 5-10 times a year - 1-3 times a month - Once a week or more

Source: PISA 2021 Teacher Questionnaire, field trial version

Table 10. Students' well-being

Indicators, label questions, items and answer scales

Indicator	Question	Items	Answer scale
Student motivation and attitude towards learning	Which of the following qualifications do you expect to complete?	– <ISCED level 2> – <ISCED level 3.3> – <ISCED level 3.4> – <ISCED level 4> – <ISCED level 5> – <ISCED level 6> – <ISCED level 7> – <ISCED level 8>	- n/a
Student motivation and attitude towards learning	In the last two full weeks of school, how often did the following things occur?	– I <skipped> a whole school day. – I <skipped> some classes. – I arrived late for school	– Never – One or two times – Three or four times – Five or more times
Students' self-efficacy	To what extent do you agree or disagree with the following statements?	– With enough effort everyone can increase their intelligence. – Your intelligence is something about you that you can't change very much. – With enough effort everyone can get good <marks> in mathematics. – Some people are just not good at mathematics, no matter how hard they study. – With enough effort everyone can get good <marks> in <test language>. – Some people are just not good in <test language>, no matter how hard they study. – Everyone can learn to be creative if they try hard enough. – Your creativity is something about you that you can't change very much. – With enough effort everyone can increase their social skills. – Some people are just not good in interacting with others, no matter how hard they try.	- Strongly disagree - Disagree - Agree - Strongly agree

Note: There is no indicator for measuring student achievement – this is based on students' results in the PISA mathematics achievement test.

Source: PISA 2021 Student Questionnaire, field trial version

Indicator	Question	Items	Answer scale
Student subjective well-being	To what extent do you agree or disagree with the following statements?	– I feel like an outsider (or left out of things) at school. – I make friends easily at school. – I feel like I belong at school. – I feel awkward and out of place in my school. – Other students seem to like me. – I feel lonely at school.	– Strongly disagree – Disagree – Agree – Strongly agree
Student subjective well-being	This school year, how often have you felt the following ways while at school?	– Anxious – Confident – Bored – Excited – Tired – Motivated – Upset – Interested – Angry – Happy	– Never or almost never – Less than half of the time – About half of the time – More than half of the time – All or almost all of the time
Student subjective well-being	During a typical school week, on how many days do you do each of the following before going to school?	– Eat breakfast – Study for school or homework – Work in the household or take care of family members – Work for pay – Exercise or practise a sport (e.g. running, cycling, aerobics, soccer, skating, <country-specific>)	– 0 days – 1 day – 2 days – 3 days – 4 days – 5 days – 6 days
Student subjective well-being	To what extent do you agree or disagree with the following statements?	– I often worry that it will be difficult for me in mathematics classes. – I get very tense when I have to do mathematics homework. – I get very nervous doing mathematics problems. – I feel helpless when doing a mathematics problem. – I worry that I will get poor <marks> in mathematics.	– Strongly disagree – Disagree – Agree – Strongly agree

Note: There is no indicator for measuring student achievement – this is based on students' results in the PISA mathematics achievement test.

Source: PISA 2021 Student Questionnaire, field trial version

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