

Technical Paper

Teaching and Learning International Survey (TALIS) 2024 Conceptual Framework



TALIS

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1 Introduction

This document articulates a conceptual framework for the fourth cycle of the Teaching and Learning International Survey (TALIS) programme, TALIS 2024. It reflects major concepts from research literature as well as policy interests and was developed by researchers in consultation with the OECD, international stakeholders, and participating countries and territories.

A sound knowledge base about the expertise of teachers, as well as their teaching practices, is central to the provision of high-quality education. TALIS, often described as the “voice of teachers”, has been developed to provide comparative perspectives on teachers, teaching and learning across the education systems of OECD member and partner countries/territories. By gathering data from teachers and school leaders, TALIS provides insights on teaching and learning through survey cycles in 2008, 2013 and 2018. TALIS 2024 updates the existing knowledge base on teachers with data from over 50 education systems.

TALIS has focussed on teachers and school leaders in lower secondary schooling (ISCED 2) with options being provided for primary schooling (ISCED 1) and upper secondary schooling (ISCED 3) since 2013. The 2013 and 2018 cycles also applied the TALIS survey in PISA schools in an option labelled the TALIS-PISA link. TALIS 2018 was linked to the first TALIS Starting Strong survey and the current cycle again encompasses optional modules at the level of early childhood and care (ISCED 0). TALIS 2024 includes a new optional module to collect information on teachers’ general pedagogical knowledge. Section 2 of this document provides a detailed description of TALIS as an ongoing survey programme, as well as an outline of current policy issues, educational foresight, and priorities for this survey cycle.

The TALIS surveys focus on instructional and institutional factors that enhance student learning, describing how these vary both within and across countries/territories and over time. The survey results inform policy and practice directed to the provision of high-quality education, which is a major area of government responsibility, including with respect to the Sustainable Development Goals of the United Nations (2015^[1]). The 2024 cycle is designed to address four contemporary issues for education systems and four broad content areas concerned with teaching and learning. The contemporary issues for education systems are:

- diversity and equity
- the educational use of technology
- social and emotional learning
- environmental and sustainability education.

The broad content areas concerned with teaching and learning are:

- teachers’ learning and development
- teachers’ work practices
- occupational perceptions and institutional environments for learning.

Section 3 of this conceptual framework details each of these content areas in terms of their constructs, indicators and analytical possibilities.

Revisiting important issues over time is central to TALIS. It allows countries to understand how concepts (constructs) become visible or evident, how they change over the years, and how they are connected to

one another. Equally important to TALIS is the inclusion of new aspects relevant to emerging educational developments, newly implemented policies, and insights from recent research. It is also important to use the experience of previous cycles to refine indicators used to measure ongoing constructs, where that is necessary. An important challenge in the design of TALIS 2024 is to balance the needs for sustained knowledge, changing policy interests and refined measurement. Section 4 provides an overview of the sampling, instrument and operational design implemented to address these interests and challenges.

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- United Nations (2015), *Transforming our World: the 2030 Agenda for Sustainable Development*, United Nations, New York, NY, <https://digitallibrary.un.org/record/1654217?ln=en&v=pdf>. [1]

2 The role and policy relevance of TALIS as an evolving study programme

Overview of TALIS 2024

The Teaching and Learning International Survey (TALIS) programme is intended to provide information on specified aspects of teaching and learning at the international and national level. It does this through a series of surveys of teachers and school leaders focused on lower secondary education (ISCED 2), with options for primary (ISCED 1) and upper secondary (ISCED 3) education. The first three cycles of TALIS were conducted in 2008, 2013 and 2018; the current cycle, TALIS 2024, represents the fourth iteration of the survey programme.

TALIS was developed as part of the OECD Indicators of Education Systems (INES) project to create a coherent set of indicators that would provide a basis for comparisons across education systems of OECD and partner countries. Its original focus was strongly influenced by the report *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* (OECD, 2005^[1]). Its original conceptual framework was based on five policy issues:

- attracting good teachers to the profession
- developing teachers' expertise
- retaining effective teachers
- implementing school policies that promote effectiveness
- supporting quality teachers and teaching.

TALIS surveys are developed and implemented to generate valid, reliable and comparable data on robust indicators that allow policy-relevant analyses about teachers and school leaders, their development, and their professional and pedagogical work, as well as the environments and conditions in which teaching and learning take place. Sample sizes (typically a minimum of 4 000 teachers from 200 schools per country) are sufficiently large to generate estimates with high precision, and standards are specified to ensure largely unbiased estimates (such as requiring participation rates of 75% of sampled schools and 75% of sampled teachers within each country or territory). Probability samples of schools and simple random samples of teachers within schools are surveyed to obtain data that are representative of the school and teacher populations in each participating country or economy. The TALIS 2024 questionnaires for teachers and for principals each require around 45-60 minutes to complete. They are administered on line (with provision for print-based administration as an option). The questionnaire material in the source versions is adapted and translated to national languages and extensive verification procedures are in place to maximise the comparability of TALIS data across countries. Questionnaire development involves pilot

studies (focus group pre-testing) and field trials before instruments are finalised prior to their administration in final data collections.

The purpose of TALIS is to support participating countries or territories with information on the development of teaching as a profession, the review and development of pedagogical practices, and the comparison of educational policies and approaches across countries. As a cross-sectional survey without teacher data linked to student learning outcomes, TALIS does not investigate teacher and school effects directly. However, it does survey the extent to which teachers use practices that have been established through research as being associated with enhanced learning outcomes, including affective outcomes, so that the study reflects a broad view of the potential effectiveness of teachers and schools.

The overall objective of TALIS is to generate reliable indicators of teachers, school leaders and teaching that provide the basis for valid international comparisons and perspectives on changes or consistencies over time. The analyses of these indicators are linked to educational policies and practices and are primarily oriented to the following groups of stakeholders:

- policy makers, to help them review and develop policies that promote the teaching profession and the best conditions for effective teaching and learning
- teachers, school leaders, and education practitioners to facilitate reflections on, and discussions of, educational practices and how those practices might be enhanced
- researchers, to build upon past research literature on each content area (as identified in a conceptual framework) and provide bases for further research using TALIS and other data.

Each cycle of TALIS produces fully documented data files that provide the bases for:

- national and international analyses of teaching and learning issues
- international reports that map teaching processes cross-nationally
- thematic reports of particular teaching and learning issues
- national reports that focus on issues of policy interest to TALIS participants
- scholarly articles published in international journals.

One example of a finding from TALIS 2018, as well as from TALIS 2013 and TALIS 2008, was evidence that some teachers reported that their initial teacher education did not prepare them sufficiently for their classroom teaching, despite system-level policies mandating professional education for certification (OECD, 2019^[2]; OECD, 2014^[3]; OECD, 2009^[4]). Consequently, teachers reported a desire for more extensive continuing professional learning (OECD, 2019^[2]). Another example is a study based on TALIS data that reviewed why teachers may feel undervalued as professionals and eventually leave the teaching profession (Price and Weatherby, 2018^[5]). This investigation examined the status of the teaching profession in terms of four domains of knowledge-work (professional benchmarks, professional discretion, room for promotion, and workplace conditions) to show that these varied within and between countries.

Prioritising content for TALIS 2024

Each cycle of TALIS has built on previous cycles with a focus on the variation in instructional and institutional conditions enhancing student learning both within and across countries/territories, as well as over time. It is important for countries to measure changes over time to monitor information, perceptions and attitudes. However, each new TALIS cycle also considers recent developments and includes new material to remain relevant in the face of emerging policy interests. Furthermore, it is also crucial to address potential information gaps that have become apparent from the results of previous surveys. Consequently, there is a considerable challenge for TALIS to both sustain a core focus on enduring constructs (thereby

providing a basis for measuring change) while at the same time to incorporate new constructs that are relevant emerging policy interests.

New material can take the form of new content or new aspects of existing content. For example, in TALIS 2018, content concerned with innovation as well as aspects of equity and diversity were introduced. These linked to discussions about the shifting landscape of education from traditional subject matter towards the development of social-emotional and life skills. TALIS 2018 also expanded the topic of job satisfaction to include teachers' well-being through items concerned with workplace stress and retention, and it re-oriented the topic of school leadership to reflect new conceptions of that construct (Ainley and Carstens, 2018^[6]).

It is important that the content selected for inclusion in TALIS 2024 matches the following criteria:

- It should be policy-relevant in terms of international as well as national perspectives.
- It should add value for participating countries.
- It should be possible to derive valid, reliable, comparable, robust and interpretable indicators of conditions for teaching and learning.
- It should include measurable aspects that can be assessed in a timely and cost-effective way.

To achieve the right balance between (a) indicators that allow comparisons with previous cycles, (b) variables that reflect existing areas and constructs that require revision, and (c) new aspects that are concerned with recent developments or issues that were not previously covered, it was decided that each of these three types of item material should constitute about one-third of the TALIS 2024 core questionnaires.

The selection of material from the previous study cycle for retention in TALIS 2024, was informed by reviews of publications that assessed the usefulness of indicators for reporting about teaching and learning. Furthermore, there was feedback from experts and country representatives that helped with selecting trend item material.

It is of further importance that the core instrument includes common material for teachers at the three surveyed ISCED levels (1, 2, and 3), while allowing necessary adaptations to suit the respective contexts. The challenge of developing material that is applicable and appropriate across participating countries and territories has increased with the growing diversity of cultural and institutional settings and broader range of national contexts included in TALIS 2024.

In consultation with the OECD Secretariat, the international project team developed an overarching concept paper that outlined potential content areas for the TALIS core survey of ISCED 2 teachers and the other components of the ISCED 1 and 3 teacher populations. This paper formed the basis for discussions with the TALIS Governing Board, who indicated priorities among proposed content to further inform the prioritisation of content as outlined in this framework.

Extensions of TALIS 2024

TALIS began in 2008 with a focus on teaching and learning in lower secondary schooling (ISCED 2), which remains the core of TALIS. In 2013, TALIS expanded its scope to include the optional collection of data on the primary and upper secondary school years (ISCED levels 1 and 3). This expanded scope recognised the common aspects of teaching and learning, as well as the important differences in educational organisation and approaches to teaching, across these levels as elaborated in the conceptual framework for TALIS 2018 (Ainley and Carstens, 2018^[6]). TALIS 2024 continues to provide optional surveys concerned with teacher populations in primary and upper secondary education.

Interest in early childhood education and care led to the establishment of the TALIS Starting Strong Survey. This was conducted separately, yet in close co-operation with TALIS in 2018 and more firmly integrated into the TALIS programme for the 2024 cycle under a concurrent timeline. TALIS 2018 provided important conceptual links – such as motivating, attracting, developing and retaining staff – to this survey of early childhood staff and leaders. The conceptual links to the TALIS primary school surveys are re-considered and strategically determined for the 2024 cycle.

TALIS 2024 further includes the TALIS Teacher Knowledge Survey (TKS) as an optional component parallel to and augmenting the ISCED 2 data collection. Its samples are drawn from the same schools as TALIS, and some items from the TALIS survey are included in the TKS.

Both the Starting Strong staff survey and the Teacher Knowledge Survey have their own conceptual frameworks, although they are conceptually linked to the TALIS teacher and leader surveys in schools.

TALIS surveys of primary and upper secondary education (ISCED level 1/3)

Primary and secondary teachers experience different teaching and working conditions, teach specialist learning areas and have a different balance between pedagogical training and education in specialist content areas (OECD, 2018^[7]). The TALIS 2018 thematic report that compares primary, lower secondary and upper secondary levels also highlights differences across the different levels of education (OECD, 2021^[8]). For instance, at the primary level, a high share of teachers reports not feeling prepared for classroom management and teaching students with special needs. Compared to teachers in lower secondary education, those at the upper secondary level tend to engage less in professional collaboration and their training is less likely to encompass content and pedagogy of their subject. In addition, the report also shows that teachers in vocational education and training (VET) more often engage in cognitively stimulating practices than their non-VET colleagues.

There are some variations in the optional forms developed for the TALIS 2024 survey of teachers and school leaders in the primary school years (ISCED 1) that focus on pedagogy and links with pre-school education. However, as in TALIS 2018, the questionnaire for ISCED 3 (upper secondary) teachers is very similar to that for ISCED 2 (lower secondary) teachers. This provides a good basis for comparisons on key content themes across these levels of schooling.

TALIS Starting Strong Survey

The TALIS Starting Strong survey gathers data from staff working primarily with children aged three to five years (ISCED level 02) and staff working with children under the age of three. It has conceptual links with the TALIS school surveys in its collection of data among educators of a younger age group. Data from the TALIS Starting Strong survey of staff inform an understanding of development from early education and care to the early stages of school education by referencing similar content areas to those in the TALIS teacher and school leader surveys in schools.

TALIS Starting Strong was developed around themes that formed a conceptual model of environments for children's development, well-being and learning (OECD, 2019^[9]). The survey in 2018 covered content regarding the characteristics of Early Childhood Education and Care (ECEC) staff and centre leaders (background and initial preparation, professional development, professional beliefs about children's development, well-being and learning, staff self-efficacy, well-being), education and care processes (process quality of staff-child interaction, monitoring of children's development, well-being and learning), and institutional characteristics (structural quality, pedagogical and administrative leadership, stakeholder relations, climate).

Although comparisons between early childhood educators and primary school teachers from TALIS 2018 and TALIS Starting Strong have not been published, other studies have found some differences between

early childhood staff and primary school teachers, as well as variations in the learning environments in which they work (Einarsdottir, 2006^[10]). The integration of the ECEC level of education in TALIS expands the research and analytical potential of TALIS across (often vastly different) populations of institutions and staff and allows the studying of aspects of early years education that are often shaped by similar societal issues and trends as later stages of education.

The conceptual links between the TALIS Starting Strong and TALIS surveys in 2024 are supported organisationally by having the chairs of each survey's Questionnaire Expert Group (QEG) participate in the other group's meetings.

TALIS Teacher Knowledge Survey

The Teacher Knowledge Survey (TKS) complements data from TALIS 2024 with insights on teacher's general pedagogical knowledge (GPK), a key component of teachers' professional competence involving the "principles and strategies of classroom management and organisation that are cross-curricular" (Guerriero, 2017^[11]; Shulman, 1986^[12]). The TKS includes an assessment of teachers' GPK, building on an international study previously conducted by the Centre for Educational Research and Innovation (CERI) (Guerriero and Révai, 2017^[13]; König, 2014^[14]). Therefore, this module provides more objective data on GPK than would be possible in the core survey, which is only based on self-reports.

In addition, the TKS includes questions about teachers' background and contexts, providing opportunities for analyses exploring how these factors are associated with GPK. Most of these are questions that are also included in the TALIS 2024 teacher survey. Furthermore, the TKS is directed at teachers from the same schools participating in the TALIS lower secondary surveys. Therefore, there will be analytical possibilities to combine information collected by the TKS with data from the TALIS lower secondary principal survey.

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3 Content of TALIS 2024

Overview of content

TALIS 2024 addresses enduring and contemporary issues and contexts that have an impact on schools, teachers and their work. Since the first cycle of TALIS, there have been many policy-relevant developments with considerable influence on the social, institutional, and professional environments in which education operates. Some of these developments led to speculations about future interactions between educational institutions, students, and teachers with considerable implications for educational policy (OECD, 2020^[1]).

Enduring features of teachers, teaching, and learning that have been investigated over previous cycles of TALIS, include teachers' initial training professional learning throughout their careers and the climate of their schools. TALIS 2024 focuses on teachers' learning and development, teachers' work practices, occupational perceptions, and institutional environments for learning.

The contemporary issues that are investigated in TALIS 2024 are diversity and equity, the educational use of technology, social and emotional learning of students, and environmental sustainability education. These issues affect teachers' responsibilities and expectations as well as the work of education systems. Decisions about the contemporary issues included in this section were informed by dialogue with educational experts and organisations.¹

TALIS cross-examines contemporary issues that have an impact on teachers, teaching, and learning from the perspective of enduring features of teachers, teaching, and learning. For example, what is the impact of greater diversity on initial teacher education? How does school climate interact with the use of technology? TALIS data allow comparisons of relationships such as these between countries and territories, as well as within each country.

Conceptual mapping and relationships

The following section discusses the issues and features included in TALIS 2024. Each enduring feature is further disaggregated into domains, as set out in Table 3.1. Table 3.2 highlights the most prominent areas of intersection between features and issues.

Table 3.1. Content for TALIS 2024

| | Issue/feature | Domain |
|--|--|--------|
| Contemporary Issues that have an impact on teachers, teaching and learning | Diversity and equity | - |
| | Educational use of technology | - |
| | Social and emotional learning | - |
| | Environmental sustainability education | - |

| | Issue/feature | Domain |
|--|--|---|
| Enduring features of teachers, teaching and learning | Teachers' learning and development | Initial teacher education |
| | | Continuing professional learning |
| | Teachers' work practices | Teaching practices |
| | | Professional practices |
| | Occupational perceptions | Job satisfaction, occupational well-being and perceived value of teaching |
| | | Teacher self-efficacy |
| | Institutional environments for teaching | School leadership |
| | | School climate |
| | Teacher, leader and school characteristics | Teacher characteristics |
| | | School and school leader characteristics |

Note: Teaching practices refer to the work that teachers do through pedagogical interactions with students in classrooms and other environments. Professional practices refer to teachers' work beyond those duties such as collaborating with colleagues, developing resources, and communicating with parents.

Table 3.2. Summary of relationship between contemporary issues having an impact on, and enduring features of, teachers, teaching and learning

| Enduring features | Contemporary issues having an impact on teachers, teaching and learning | | | |
|----------------------------------|---|--|---|--|
| | Diversity and equity | Educational use of technology | Socio- and emotional learning | Environmental and sustainability education |
| Initial teacher education (ITE) | Training to meet cultural and language diversity plus special education needs | Using technology to improve content knowledge (CK), pedagogical content knowledge (PCK), and general pedagogical knowledge (GPK). Inclusion of pedagogical aspects of information and communications technology (ICT) in initial teacher education (ITE) | Initial emphasis in training to assess and address the socio-emotional learning needs of children | Formal opportunities to learn about environmental sustainability and climate change in initial teacher education |
| Continuing professional learning | Training to meet cultural and language diversity plus special education needs | Training in technologies to facilitate teaching and learning, including use of technology for online professional learning and networking | Developing children's learning mindset and social health central to academic learning | Experience of professional learning about sustainability and climate change |
| Teaching practices | Practicing differentiated inclusion, learner-centred pedagogies, and culturally responsive teaching | Instructing, assessing and communicating with technology in various modalities of face-to-face, hybrid, and distance | Knowledge about social and emotional learning of children form part of initial and continuing teacher development | Teaching about environmental sustainability through formal and informal methods |

| Contemporary issues having an impact on teachers, teaching and learning | | | | |
|---|--|--|--|---|
| Enduring features | Diversity and equity | Educational use of technology | Socio- and emotional learning | Environmental and sustainability education |
| | | learning. Perceptions of utility of technology for teaching and barriers to its use | | |
| Professional practices | Following guidelines for inclusion practices | Communities of networked teachers across schools | Teachers' engagement in extra-curricular activities with students | Ways that teachers integrate environmental sustainability education in the curricula they follow |
| Occupational perceptions of teachers' job satisfaction, well-being, valuing of profession and self-efficacy | Feelings of work satisfaction and stress regarding adequacy of resources to support diverse student learning needs. Perceptions of efficacy in teaching in culturally and linguistically diverse environments | Perceptions of efficacy and value in Technological Pedagogical and Content Knowledge (TPACK) | Feelings of work satisfaction and well-being linked to teachers' agency and ability to care for children's needs and developmental aspects of the work Perceptions that others value nurturing social and emotional development of children | Feelings of work satisfaction and stress regarding adequacy of training and resources to address learning needs related to environmental sustainability education. Perceptions that others value sustainability in education |
| School leadership | Supporting inclusive education, such as mirroring diversity of students in the school staff and equitable work conditions | Roles of principals in setting school culture when the classrooms convert to a virtual environment, including allocating resources to technology maintenance | Shaping the school's shared vision and mission to include the social development of children | Extent of support from senior colleagues and school leadership to integrate sustainability practices |
| School climate | Upholding a school climate sensitive to demographic context of the students; respect for diverse viewpoints in the school | Changes in aspects of learning climates associated with the use of educational technologies | Moderating social and emotional learning through the school climate | Integration of sustainable practices throughout the school functions, including collaboration between school staff |

In addition to these relationships, other interactions exist. For example, there may be the following interaction of diversity and equity with enduring features:

- Continuing professional learning and initial teacher education may play a role in preparing educators to teach in diverse environments.
- Regarding teachers and teaching, there are questions regarding the distribution of qualified teachers across schools in an equitable manner. Teaching practices related to inclusive practices of differentiation, learner-centred pedagogies, and culturally responsive teaching may contribute toward equity.
- Organisational conditions, including leadership and school climate, are critical at establishing school cultures that promote diversity and inclusion for all students as well as strengthen the relational dimension of school climate.

Technology plays a key role in many contexts and educational use of technology relates to other content areas as described in the following examples:

- Continuing professional learning in the use of technology facilitates today's teaching and learning as well as the type of professional learning activities teachers participate in and how they connect with peers about professional practices.
- Teachers' learning and development now includes a technology dimension in addition to the traditional knowledge domains, operationalised in the Technological Pedagogical and Content

Knowledge (TPACK) framework. Occupational perceptions can now also be assessed in relation to technological self-efficacy.

- Initial teacher education frames the opportunities teachers have to develop skills to use technology to improve content knowledge (CK), pedagogical content knowledge (PCK), and general pedagogical knowledge (GPK).

Social and emotional learning exists within classroom and school practices, as shown in the following examples:

- Continuing professional learning emphasises the importance of developing children’s learning mindset as well as their social health in view of the settled research consensus about the primary relevance of these needs for academic learning.
- Occupational perceptions of job satisfaction often tie in with teachers’ beliefs that they are fulfilling their goals to care for the students in their classrooms and provide emotional support.
- Leadership shapes the shared vision and mission of the learning in the school, such as the attention to the social development of children and the degree of support for their well-being and health. Institutional climate can moderate social and emotional learning (McCormick et al., 2015^[2]; Weissberg et al., 2015^[3]).

Environmental and sustainability education relates to teachers’ learning and development as well as classroom and school practice as evident in the following examples:

- Initial and continued professional learning may include opportunities about environmental sustainability and climate change education as well as learning about students’ learning needs related to sustainability and climate change.
- Teaching practices may involve integrating environmental sustainability in curricula and teaching about environmental sustainability through formal and informal methods.
- Leadership and institutional support from senior colleagues and school leadership to integrate sustainability practices in school operations, including collaboration between school staff and access to natural spaces for learning.

Some contemporary issues having an impact on teachers, teaching, and learning intersect with each other as shown by the following examples:

- The “digital divide” discussed in the content area about educational use of technology is intertwined with aspects of equity in education. Economic gaps between communities are linked to technology resource differences between schools. These widen opportunity gaps for students’ learning and teachers’ teaching.
- Social and emotional development of children regarding socialisation approaches to learning, and how to interact and work with children from diverse cultural, gender, or cognitive, mental, and emotional intelligences, varies across and within countries depending on the current education policies regarding inclusion and differentiation in schools and classrooms.
- Supports for environmental and sustainability education can be amplified with digital resources for teaching. Understanding impacts of climate change intersects with equity issues of income, and classroom compositions can diversify because of migration in response to climate change.

Contemporary issues having an impact on teachers, teaching and learning

Diversity and equity, technology in education, and social development of students have always been in the lexicon of education research. However, global changes have heightened the immediacy and

importance of these issues since TALIS 2018, as well as quickening interest in the importance of environmental and sustainability education.

Diversity and equity

Diversity in relation to migration, ethnic groups, national minorities and Indigenous peoples, socio-economic status, geographical location, gender identity and sexual orientation, special education needs and giftedness, as well as their intersectionality, pose important challenges and opportunities for educational and social inclusion of all students (Smale-Jacobse et al., 2019^[4]). The extent and sources of diversity differ greatly across education systems and schools and can also change over time. Currently, in many countries, issues such as migration and refugee settlement are compelling education systems to respond to increasingly diverse populations. These developments and globalisation are also affecting teachers' experiences. Further, countries and schools also vary in terms of the strategies used to manage student diversity and the equality of educational opportunities offered across student groups (Blossfeld, Blossfeld and Blossfeld, 2016^[5]; Dupriez, Dumay and Vause, 2008^[6]; Van de Werfhorst and Mijs, 2010^[7]). Education policies and practices can play a central role in promoting equity and social cohesion by providing high-quality learning opportunities, and fostering well-being and educational attainment for all students, and by addressing their different educational needs through diversity-related approaches to teaching and learning (Alegre and Ferrer, 2010^[8]; Banks et al., 2005^[9]; Borman and Dowling, 2010^[10]; OECD, 2018^[11]; Woessmann, 2016^[12]).

Definition and scope

Equity in education means that all students are equally likely to succeed in education regardless of their background and social and economic circumstances. This relies on students having equitable access to resources, i.e. support that takes their needs into account. Aspects of policy that are critical to achieving equity in education systems are equitable access to highly qualified and effective teachers, to high-quality learning opportunities, to a diverse group of peers, and to appropriate learning resources and technology, across the student population (Dupriez and Dumay, 2006^[13]; Montt, 2016^[14]; Van Langen, Bosker and Dekkers, 2006^[15]; OECD, 2018^[11]). To ensure equitable access to effective teachers, education systems must also consider whether teachers themselves have equitable access to support in their work.

In TALIS, diversity refers to the recognition of and appreciation for differences in the backgrounds of individuals. In the context of TALIS, it refers to students and staff. In the case of cultural diversity, it refers most notably to variations in cultural or ethnic backgrounds. Accounting for diversity is a key component of equity in education, through national or school policies that emphasise the avoidance of discrimination and the fair treatment of all students. A diverse teaching and leadership workforce that reflects the diversity in the student population can also have positive impacts on the educational experiences of students and on educators' careers (Dekkers, Bosker and Driessen, 2000^[16]; Van de Werfhorst and Mijs, 2010^[7]).

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Pandemic-related disruptions to educational processes, and policy and school responses to them, have varied substantially both across and within systems (OECD, 2021^[17]; Center for Comparative Education Policies, Universidad Diego Portales, 2020^[18]). This has reinforced existing educational and socio-emotional gaps, as children come to school with more diverse outside school experiences (Dorn et al., 2020^[19]; Maldonado and De Witte, 2020^[20]). In these dynamic contexts, schools need to ensure that they are engaging with their changing communities in effective ways.

Theoretical background

Addressing and accounting for diversity in all its facets, as well as their intersections, are key issues for education systems. In this regard, an important move from integration to inclusion has been promoted, which involves moving from targeting groups and schools under a deficit-centred approach to embracing, and adapting to the needs of, diverse learners. Thus, inclusive education is seen as a process by which educational communities overcome barriers that limit the presence, participation, and achievement of all students (Ainscow, 2005^[21]; UNESCO, 2017^[22]). Supporting and welcoming diversity amongst all learners involves promoting inclusive cultures, policies, and practices (Booth and Ainscow, 2002^[23]). Also, it should be recognised that views about diversity and equity in education may differ considerably across national contexts.

Some of the main factors related to inclusive educational processes and equitable learning opportunities are teachers' mindsets, stereotypes, attitudes towards diversity, expectations towards different student groups, preparation to teach in diverse environments, and engagement and self-efficacy in implementing inclusive practices that acknowledge and value diversity (Crozier, 2009^[24]; De Boer, Pijl and Minnaert, 2011^[25]; Good, Sterzinger and Lavigne, 2018^[26]; Savolainen et al., 2012^[27]; Tenenbaum and Ruck, 2007^[28]). Indeed, educators can play a particularly important role in building resilience and raising aspirations of at-risk students through high expectations and positive teacher-student interactions (Sanders, Munford and Liebenberg, 2016^[29]). Relatedly, teachers' growth mindset (the belief that intelligence is malleable) can improve students' academic achievement, particularly for students at risk of falling behind (Bostwick et al., 2020^[30]; Claro et al., 2021^[31]; Dweck, 2000^[32]; 2010^[33]; Farrington et al., 2012^[34]).

Teachers' learning and development and occupational perceptions

Knowledge and understanding of diversity issues are key competencies for teachers working in diverse contexts (Cooc, 2018^[35]; Forghani-Arani, Cerna and Bannon, 2019^[36]; Robinson, 2017^[37]). Thus, it is important to study how teachers are prepared for diversity in schools (Rowan et al., 2020^[38]) and how they are trained to meet the cultural, linguistic, and special educational needs of students.

TALIS 2018 results tell us that educators in several systems report feeling unprepared to teach in diverse classrooms, as they increasingly identify teaching in multicultural/multilingual settings and teaching students with special needs among the areas where they have the highest level of need for professional development (OECD, 2019^[39]). In this regard, participating in training focused on teaching in diverse classrooms is key (Florian and Pantić, 2017^[40]; Goodwin, 2002^[41]). However, professional development opportunities supporting these skills are generally limited (OECD, 2019^[39]). In addition, according to previous TALIS cycles, the shortage of teachers with competence in teaching students with special learning needs ranks among the most frequent resource issues reported by school principals across the OECD (OECD, 2019^[39]).

Inclusive education implies special needs being addressed in mainstream classrooms with additional support, whereas traditional special education implies addressing special needs in separate classes or institutions. There has been a trend in many countries to provide education for students with special learning needs through inclusive education rather than isolated special education classrooms (Brussino, 2020^[42]; Haug, 2017^[43]). It appears that both approaches are evident in the policies of many countries and present different challenges for teacher education and how best to support students (Florian, 2019^[44]).

Several supports may assist teachers in leading a successful inclusive classroom. There is growing evidence showing the importance of teachers' participation in professional development around inclusive education (Kurniawati et al., 2014^[45]; Loreman, 2014^[46]; Van Mieghem, Verschueren and Struyf, 2020^[47]). Further, specialist inclusion teachers, teaching assistants and support staff have a

critical role in enabling inclusion in mainstream classrooms. They can provide individualised support in the classroom to students with special needs and can co-teach and work in collaboration with classroom teachers on educational inclusion strategies (Brown, Howerter and Morgan, 2013^[48]; Cochran-Smith and Dudley-Marling, 2012^[49]; Fluijt, Bakker and Struyf, 2016^[50]; Giangreco, Suter and Doyle, 2010^[51]). Thus, investigating teachers' professional development participation and opportunities, self-efficacy, and attitudes towards inclusive education, as well as the role of, and collaboration with, specialist inclusion teachers and support staff, and their correlates, can shed light on barriers to, and facilitators of, educational inclusion.

Teachers' work practices

Diversity-related practices are understood as teaching practices used to engage students and meet their diverse needs. The promotion and implementation of diversity-related practices, such as differentiation and adaptation, and culturally responsive teaching, are relevant equity aspects of educational systems and institutions. One set of guidelines that is relevant to these aspects of education are embodied in the Universal Design for Learning Framework developed by the Centre for Applied Special Technology (CAST, 2018^[52]; Griful-Freixenet et al., 2020^[53]; Rose and Meyer, 2002^[54]).

Differentiated instruction refers to teachers' deliberate planning and execution of adaptations to better meet students' learning needs (Smale-Jacobse et al., 2019^[4]; Tomlinson et al., 2003^[55]). Differentiation involves the development of advanced professional skills as it requires careful monitoring of student progress and subsequent adaptation of instruction (Roy, Guay and Valois, 2013^[56]). Differentiation practices can have positive effects on students' performance, and they can be promoted through initial teacher education and continuing professional learning (Deunk et al., 2018^[57]; Parsons, 2017^[58]; Prast et al., 2018^[59]; Reis et al., 2011^[60]; Valiandes, 2015^[61]), but their implementation is often regarded as challenging and limited (Charalambous et al., 2023^[62]; Schleicher, 2016^[63]).

While there is no strong agreement on its operationalisation, differentiated teaching usually goes beyond ability grouping and can consist of planned adaptations in process, learning time, content, product or learning environment for groups of students or individual students. Adaptations can be based on achievement/readiness or another relevant student characteristic (such as prior knowledge, learning preferences, and interest) with the goal of meeting students' learning needs (Deunk et al., 2018^[57]; Roy, Guay and Valois, 2013^[56]; Smale-Jacobse et al., 2019^[4]; Tomlinson, 2014^[64]). The concepts of differentiation and adaptation are further introduced in the Teaching and Professional Practices sections.

Teacher-level variables that correlate with attitudes toward, and use of, differentiated instruction practices are education, professional development and personal characteristics, such as experience, knowledge, attitudes, beliefs, values and self-efficacy (De Neve and Devos, 2016^[65]; Dixon et al., 2014^[66]; Helms-Lorenz, van de Grift and Maulana, 2016^[67]; Inda-Caro et al., 2019^[68]; Maulana, Helms-Lorenz and Van de Grift, 2017^[69]; Parsons and Vaughan, 2013^[70]; Stollman, 2018^[71]; Suprayogi, Valcke and Godwin, 2017^[72]). At the classroom level, diversity of the student population (De Neve and Devos, 2016^[65]) and class size (Blatchford, Bassett and Brown, 2011^[73]; Suprayogi, Valcke and Godwin, 2017^[72]; Stollman, 2018^[71]) may also influence the implementation of differentiation practices. Further, differentiation is best applied within a supportive environment, where teachers receive encouragement from school leaders (Deunk et al., 2018^[57]; Hertberg-Davis and Brighton, 2006^[74]). Lastly, country level requirements and assessment policies that stress differentiated instruction may also affect the extent to which differentiated instruction is implemented (Mills et al., 2014^[75]).

Preparing educators for improving the school success of ethnically diverse students through culturally responsive teaching is another critical issue addressed by the literature (Cochran-Smith, 2004^[76]; Gay, 2002^[77]; Ladson-Billings, 1995^[78]). Culturally responsive teaching is a set of practices designed to build on students' cultural and linguistic backgrounds as teaching and learning occur and, thus, make

pedagogy more culturally relevant. It involves using the cultural characteristics, experiences, and perspectives of ethnically diverse students as conduits for teaching them more effectively (Gay, 2000^[79]; Morrison, Robbins and Rose, 2008^[80]).

The implementation of culturally responsive teaching requires that educators develop a knowledge base about ethnic and cultural diversity, learn how to convert it into culturally responsive curriculum designs and instructional strategies, create classroom climates that are conducive to learning for ethnically diverse students, develop effective cross-cultural communication, and match instructional techniques to the learning styles of diverse students (Gay, 2002^[77]). These skills can be promoted through participation in teacher professional development initiatives – e.g. Hynds et al. (2016^[81]).

Culturally responsive practices, and educators' attitudes and self-efficacy in this area, can affect student outcomes and achievement gaps (Aronson and Laughter, 2016^[82]; Dee and Penner, 2017^[83]; Gay, 2013^[84]; Griner and Stewart, 2013^[85]; Larson et al., 2018^[86]). Further, culturally responsive teaching is a particularly promising approach for meeting the educational needs of ethnically diverse and Indigenous students (Castagno and Brayboy, 2008^[87]; Savage et al., 2011^[88]). Thus, there is value in exploring teachers' practices, attitudes and self-efficacy in relation to culturally responsive teaching, as well as their correlates (Cruz et al., 2020^[89]; Gay, 2015^[90]; Guyton and Wesche, 2005^[91]; Morrison, Robbins and Rose, 2008^[80]; Siwatu, 2007^[92]).

Teacher, leader and school characteristics

It is also important to monitor equity and diversity in the teaching profession. Opportunity gaps occur from systemic unequal distribution of teacher knowledge, qualifications, and experience across schools unless these are deliberately created to support disadvantaged students (Akiba, LeTendre and Scribner, 2007^[93]; Clotfelter, Ladd and Vigdor, 2006^[94]; Lankford, Loeb and Wyckoff, 2002^[95]). This is reinforced by the widespread challenges of managing teacher supply and demand, and attracting and retaining effective educators, in under-resourced and marginalised schools (Borman and Dowling, 2008^[96]; European Education and Culture Executive: Eurydice, et al., 2020^[97]). Thus, novice teachers disproportionately work in schools with a higher share of students from socio-economically disadvantaged homes and students with migrant backgrounds (OECD, 2022^[98]). While these younger teachers may be more likely to be exposed to initial teacher training on diversity and equity issues, they have less practice at integrating their knowledge in the classroom (Chingos and Peterson, 2011^[99]; Clotfelter, Ladd and Vigdor, 2006^[94]; Helms-Lorenz, van de Grift and Maulana, 2016^[67]). Investigating these concerns is key, so allocation of highly qualified and effective teachers can be driven by more nuanced understandings of where the need is greatest.

A diverse demographic composition of the teaching force, which mirrors the demographic composition of an increasingly diverse student body, is also important, as teachers can act as role models for students (Adair, Tobin and Arzubaiaga, 2012^[100]; Grissom, Kern and Rodriguez, 2015^[101]; Holt and Gershenson, 2019^[102]; Paredes, 2014^[103]). However, male teachers are under-represented among educators in most countries (OECD, 2019^[39]), and this is particularly the case in early childhood education and care (ECEC) education and primary education (Cameron and Moss, 2011^[104]; Pardo and Adlerstein, 2016^[105]). Gender imbalances have also been found in the career progression of male and female teachers. Women are under-represented in leadership roles when compared to the female composition in the teaching workforce, over-represented in younger levels of education, and a relatively higher share of women hold part-time positions (OECD, 2019^[39]). Under-representation of educators with immigrant or minority backgrounds in the teaching force is also an issue of concern although TALIS does not collect data on the immigrant or minority backgrounds of respondents (Donlevy, Rajania and Meierkord, 2016^[106]).

Institutional environments for teaching and learning

It is important to monitor educators' equitable access to safe and supportive work environments that provide sufficient preparation time for teachers as well as satisfactory work conditions, workload, development opportunities and career promotion (OECD, 2019^[39]). In this regard, leadership and organisational conditions can play an important role. In addition, leaders and school communities are of critical importance to implement inclusive education and promote social equity in schools (Ainscow and Sandill, 2010^[107]; Brussino, 2020^[42]; Sun, 2019^[108]), and action by teachers to build more inclusive classrooms is often limited by segregated school enrolments (OECD, 2019^[109]).

Educational exclusion still affects students living in rural and marginalised urban areas, and schools can also be impacted by violence in their communities, affecting student participation in education. A safe and inclusive school climate can promote student retention and engagement. Further, a positive school culture can be particularly beneficial for disadvantaged students (Battistich et al., 1997^[110]). Respect for diversity is another important component of the relational dimension of school climate (Cohen et al., 2009^[111]; Thapa et al., 2013^[112]; Wang and Degol, 2016^[113]).

In several systems, there is school-level segregation of Indigenous students, which negatively affects their educational outcomes – see, for example Canales and Webb (2018^[114]) or Friesen and Krauth (2010^[115]). Further, Indigenous peoples are often poorly served by the education systems in their countries, in terms of effectively addressing their needs relating to language, culture and identity (Jacob, Cheng and Porter, 2015^[116]). It is critical to assess the extent to which policies and practices sustain, recognise and value Indigenous culture and language in the communities that schools serve and learn from successful experiences of school-community engagement (OECD, 2017^[117]). More broadly, working with community groups and families from different backgrounds is key to providing pertinent and inclusive education (Ryan, 2012^[118]; Yuan, 2017^[119]).

TALIS 2024 indicators

TALIS 2018 placed a strong emphasis on addressing equity and diversity within the contexts of cultural background. For TALIS 2024, a broader scope is proposed that covers 1) use of diversity-related practices (i.e. differentiation and culturally responsive teaching), 2) teachers' self-efficacy for, and attitudes towards, diversity-related practices and inclusive education, 3) teachers' mindsets and expectations about diversity and inclusive education, 4) the role of, and collaboration with, specialist inclusion teachers, and 5) school engagement with families. Further, issues of diversity and equity intersect with enduring features. Thus, incorporating equity across different content areas allows us to explore the following issues:

- teachers' learning and development:
 - profiles of training received, through initial teacher education and continuing professional learning, in diversity-related practices and inclusive education
- occupational perceptions:
 - disparities in teachers' job satisfaction, stress levels, workload and well-being related to adequate resource supports to meet diverse learning needs of students
 - profiles of self-efficacy in diversity-related and inclusive practices, and their correlates
 - relationships between teacher attitudes to, self-efficacy in, and use of diversity-related and inclusive practices
- teachers' work practices:
 - profiles of use of diversity-related and inclusive practices, and associated factors
 - profiles of collaboration for inclusion in the school, and their correlates

- institutional environments for teaching:
 - profiles of support and conditions for the implementation of inclusive education
 - profiles of implementation of school policies that promote diversity in the composition of students and teachers
- profiles of attitudes towards diversity and inclusive education in the school
- profiles of collaboration with families
- educational use of technology
 - disparities in Internet connectivity and ICT access
 - differences in preparedness and use in pedagogical practices.

In addition, several aspects of diversity and equity in the composition and conditions of the teaching and leadership workforce can be addressed by analysing the within-country distribution of constructs pertaining teachers' and leaders' characteristics, background, qualifications, current work, job satisfaction and professional development opportunities, as well as workload and levels of stress. Diverse environment indicators can be obtained from constructs addressing the characteristics of the school and targeted class student composition. Analysing change in these constructs, in relation to previous TALIS cycles, is also relevant. To this end, it is important to retain scales and items pertaining to class, teacher, leader and school characteristics, school resources, professional development, job satisfaction, workload stress and school climate. Furthermore, some TALIS 2018 scales and items related to equity and diversity are revised and retained: qualification elements and preparedness in teaching in diverse settings and needs for professional development in teaching for diversity.

Educational use of technology

With the growing impact of digital technologies on all areas of society, there is an expectation of substantial changes to the way teaching and learning takes place. While the role of teachers in the process of student learning is expected to remain important, the ways teachers and students interact have begun to change (Kang, 2021_[120]; Yao et al., 2020_[121]). The COVID-19 pandemic had considerable impact on teaching and learning since 2020, and this development has emphasised the importance and crucial role digital technology can play for continued instruction in times of disruptions of more traditional face-to-face settings in education (Schleicher, 2020_[122]). The challenges encountered in implementing remote learning included teacher access to digital technologies, mastery of digital technologies for teaching and learning, varied quality of Internet connectivity, and students' and teachers' access to digital equipment and the Internet from their homes (OECD, 2021_[17]). TALIS 2024 investigates issues related to the educational use of technology to assess the role it plays in teaching and learning across different countries/territories and types of schools.

Technology that can be used for education includes artificial intelligence (AI). AI in education has been researched for more than 40 years (Holmes, 2023_[123]). However, it was the rapid emergence and immediate popularity of ChatGPT, as a form of generative AI, in late 2022 that drew mainstream attention to the use of AI products in schools (Fraillon and Rožman, 2023_[124]). Even though AI is playing a larger role in people's lives, its short- and long-term influence on education is still unclear (Holmes, 2023_[123]). There are societal concerns about the use of AI, such as possible losses of jobs or data privacy, which emerging research suggests are also echoed in education (U.S. Department of Education, Office of Educational Technology, 2023_[125]). As more educational technology products in schools claim to incorporate AI, it is vital that teachers understand what is meant by artificial intelligence in education in its broadest sense (ibid), as well as the AI techniques and technologies it comprises (Miao et al., 2021_[126]).

Definition and scope

The educational use of technology in TALIS refers to the use of digital devices (hardware), software, or online resources for the purposes of teaching and learning. Apart from the issue of providing sufficient resources for education, which remains varied across, as well as within, countries (Frailon et al., 2020^[127]), the successful implementation of any technology resource in schools is also highly reliant on teachers. Schools can purchase software and devices to improve educational outcomes, but any transformation depends on teachers' individual adoption of technology in their teaching practice. If teachers are not using the technology, or do not use it appropriately or effectively, it is less likely that desired outcomes of the educational use of technology will be achieved (Straub, 2009^[128]). Thus, it is important for education leadership at a system and school level, as well as programmes of initial teacher education and professional learning, to understand why some teachers choose to adopt a new technology while others resist. Understanding catalysts and barriers to technology adoption at the level of teachers enables support structures to be put in place at schools to influence the adoption of technology.

For the purposes of TALIS in its focus on the educational use of technology, artificial intelligence (AI) is defined as: the capacity for computers to perform tasks traditionally thought to involve human intelligence. This can include making predictions, suggesting decisions, or generating text. This definition is a simplified version of one adopted by the OECD in their recent Digital Education Outlook (OECD, 2021^[129]). AI technologies are many and varied and include the following: natural language processing (NLP) and speech recognition, learning analytics and data mining, image recognition and processing, autonomous agents (such as avatars and smart robots), among others (Miao et al., 2021^[126]). Notably, the TALIS definition goes beyond generative AI or large language models, such as ChatGPT.

Theoretical background

Technology in education is related to several enduring features of teaching and learning and in the following sections we review some of the ways it interacts with those features.

Teachers' learning and development

The expertise that a teacher needs to teach includes content knowledge for the domain they wish to teach, pedagogical knowledge in general, and an intersection of content and pedagogical knowledge (Shulman, 1986^[130]). A more recent line of research emphasises teachers' knowledge and skills to teach with technology – the so-called Technological Pedagogical and Content Knowledge (TPACK) framework, which has extended the traditional domains of teacher knowledge (Archambault and Crippen, 2009^[131]; Schmidt et al., 2009^[132]). Teacher competence in these areas could be linked to high instructional quality and, ultimately, improved student learning (Blömeke, Gustafsson and Richardson, 2015^[133]). In addition, the TPACK model plays an important framework in teachers' ability to design high-quality learning content for distance learning (Moore-Adams, Jones and Cohen, 2016^[134]), increasingly relevant in the period since TALIS 2018. TPACK is critical to initial teacher training, professional learning, and teaching with technology – see, for example, Voogt and McKenney (2017^[135]). The proposed conceptualisation of teacher knowledge in TALIS 2024 goes beyond the core knowledge dimensions of content knowledge (CK), pedagogical content knowledge (PCK), and general pedagogical knowledge (GPK) and extends them into the TPACK framework.

The extent to which teachers are prepared for teaching with technology, for instance, via blended or distance learning, depends on the learning opportunities they have been provided (Howard et al., 2020^[136]; Prestridge and Main, 2018^[137]). Such opportunities to learn are often provided during initial teacher education and as part of their professional development. Drawing from existing models of

technology integration, teacher preparation, and leadership, Tondeur et al. (2016_[138]) developed a framework synthesising the key strategies for successful teacher education: using teacher educators as role models, reflecting on the role of technology for education, learning how to use technology, collaboration among peers, scaffolding authentic technology experiences, and providing continuous feedback – see also Tondeur (2018_[139]). This model does not only address whether teachers have received or have been offered training for teaching with technology but also the relevance of the content, purpose, and focus of this training to teachers' professional and teaching needs.

In TALIS 2018, teachers reported having little initial education for using ICT for teaching – a finding that suggests the need for providing more support during teacher education. Teachers also indicated their general need for professional development in this area (OECD, 2019_[39]). However, the TALIS 2018 measures did not distinguish between different aspects of teaching with ICT. Initial teacher training may generally be concerned with preparing teachers for teaching in 21st Century classrooms and facilitating their CK, PCK, and GPK via online/blended learning opportunities or means of online/blended collaboration.

The exposure of novice and experienced teachers to learning experiences or goal setting around technology is another important aspect of this issue (Wang, Ertmer and Newby, 2004_[140]). Further, it is of interest to investigate the extent to which their professional learning includes strengthening all aspects of TPACK (Scherer et al., 2018_[141]). Teachers' beliefs and attitudes regarding the usefulness of technology in general and AI products in particular, and the ease with which they can be used, are other aspects that are relevant for teachers (Siddiq, Scherer and Tondeur, 2016_[142]). The importance of continuing professional learning in technology and in the use of AI products is relevant in terms of teachers' technology self-efficacy, which is not a static construct (Teo, 2009_[143]). Even if teachers report high levels of self-efficacy related to the pedagogical use of technology, the appearance of new and unfamiliar technologies in schools may cause teacher's feelings of self-efficacy to wane, unless appropriate professional learning is provided to support their up-to-date knowledge of new technologies. Therefore, continuing professional learning has the potential of facilitating the use of technology for teaching and learning and providing teachers with online learning opportunities and means of connecting with peers.

It should be noted that much of the research on technology-related attitudes has been conducted on pre-service rather than in-service teachers – among others, see Joo et al. (2018_[144]); Sang et al. (2010_[145]); Teo (2009_[143]) – although the technology acceptance model (TAM) has also been tested with in-service teachers (Teo, 2011_[146]). One of the limitations of much of the research to date is that it is often conducted through self-report surveys and, thus, can only measure teachers' reported intentions to use technology, rather than observing or otherwise measuring whether teachers actually use the specified technology (Scherer et al., 2018_[141]).

Teachers' work practices

Although the effectiveness of specific technologies and teaching approaches has been a focus in educational research – see, for example, Tamim et al. (2011_[147]) – the designs of international large-scale assessments, including those of the International Association for the Evaluation of Educational Achievement (IEA) International Computer and Information Literacy Study (ICILS) and TALIS, do not allow for drawing inferences on these matters (Klieme, 2013_[148]). However, TALIS data provide evidence about the frequency and profiles of specific teaching practices and their relationships to other, teacher-related variables. These data cover not only generic teaching practices but also teaching practices specifically tailored to students' learning about technology. Moreover, TALIS facilitates the study of professional practices in and outside of schools that involve technology.

As noted earlier, teaching practices in classrooms are diverse and multifaceted. Some of the core, generic dimensions of teaching include, among others, classroom and time management, teacher

support, cognitive activation, assessment, and feedback – see, for example, OECD (2019_[39]); Wagner (2016_[149]). While each of these teaching practices have been conceptualised for in-class instruction, they may be directly transferred to blended and distance learning. For instance, the concept of “teaching presence” extends existing frameworks of teaching practices by an online and technology component and focuses on the extent to which teachers manage, support, and activate classrooms (Gurley, 2018_[150]; Howard et al., 2020_[136]). As the frequency of blended and distance education has increased since TALIS 2018 (OECD, 2021_[17]), providing evidence about how teachers teach and how they can achieve quality teaching is important to describe current teaching practices.

The extent to which teachers foster students’ digital skills is another key aspect of teaching (Siddiq, Scherer and Tondeur, 2016_[142]). This includes the roles of technology in generic teaching practices, and it may also play a role in teaching diverse classrooms by utilising varied materials and approaches (Warschauer and Xu, 2018_[151]). Moreover, technology can offer new ways of assessment and feedback, tracing students’ learning over time, and facilitating the evaluation of “hard-to-measure” skills, such as complex problem solving, collaboration, and self-regulation – see, for example, Shute and Emihovich (2018_[152]).

Finally, technology has also the potential of facilitating and impacting teachers’ professional practices, such as teacher-teacher collaboration, student-teacher communication, teacher-parents interactions, and lesson preparation, both inside and outside classrooms (Ibieta et al., 2017_[153]; Prestridge and Main, 2018_[137]).

Occupational perceptions

- Technology beliefs and attitudes

The decision to adopt a particular technology in one’s professional practice is complex and social (Straub, 2009_[128]) and is influenced by external and environmental conditions as well as internal conditions such as teachers’ own beliefs or attitudes (Sang et al., 2010_[145]; Scherer and Teo, 2019_[154]). Research around user attitudes toward technology tends to examine the relationship between user beliefs and attitudes and their intention for use or acceptance of technology (Joo, Park and Lim, 2018_[144]). Models look at variables influencing user intentions regarding technology, and the relationships between these variables. Amongst many different models, the technology acceptance model (TAM) – a model that seeks to explain factors influencing users’ technology adoption – is the most well-known in education, and has been thoroughly tested and demonstrated good model fit (Scherer and Teo, 2019_[154]; Teo, 2009_[143]; 2011_[146]).

Research using the TAM has shown that, when teachers believe that technology will be easy to use (perceived ease of use) or that it will help them perform their work effectively or efficiently (perceived usefulness), there is a direct and positive relationship with their intention to use the technology (Teo, 2009_[143]; 2011_[146]). This is echoed in studies using other models as well, where teachers’ positive attitudes towards technology are associated with more frequent reported use of technology in their teaching (Fraillon et al., 2020_[127]).

However, there are other factors that may influence the perceived ease of use or perceived usefulness of technology, which, thus, indirectly influence teachers’ intentions to adopt technology for instruction. Facilitating conditions are the environmental or contextual factors, such as access to equipment or professional learning, that could provide a catalyst or barrier to a person’s intentions for action. For pre-service teachers, their perceptions about facilitating conditions in their teaching environments were found to have the strongest direct impact on their perceived ease of use of technology (Teo, 2009_[143]). Knowledge about the possible barriers and facilitators of the educational use of technology can uncover the possible needs for further support, for instance, as part of continuing professional learning.

In addition, several studies looked at teacher-reported Technological Pedagogical and Content Knowledge (TPACK) and whether it influenced their intentions to use technology. While some findings indicate that TPACK does not directly influence whether teachers say they will use technology in their teaching, it can positively affect their self-efficacy, perceived ease of use, and perceived usefulness of technology, all of which can influence teachers' behavioural intentions to use technology (Joo, Park and Lim, 2018^[144]).

- Teachers' beliefs about using artificial intelligence

Much of the research on teachers' intention to use technology is also relevant to the use of artificial intelligence tools in their teaching practice. Research on the adoption of AI in schools also suggests that other factors may predict teachers' intended engagement with such tools. These include the understanding and minimising of any related ethical issues; teacher trust in the underlying AI; whether the AI tool generates any additional workload for teachers; the provision of additional teacher support in using AI in their practice; and principals' digital leadership (Cheng and Wang, 2023^[155]; Cukurova, Miao and Brooker, 2023^[156]).

The emerging literature on AI in education (AIED) also highlights the known and possible opportunities that AI tools might provide to teachers, and, by extension, to learners. These include, among other benefits: AI chatbots as an additional scaffolding resource for students; AI assistants relieving administrative burden from teachers; recommendations for extension work or extra support produced by AI; generative AI tools helping produce lesson plans, and activities or schemes of work (Chiu et al., 2023^[157]; U.S. Department of Education, Office of Educational Technology, 2023^[125]).

Apart from providing new possibilities, the use of AIED also presents challenges, which include those from the literature around the ethical use of AI in general, as well as those targeted at the use of AI in an education setting. For example, interfaces that students interact with through AIED tools can include AI agents, video capture or NLP tools that might capture and analyse learners' facial reactions or the spoken or written word. Collecting, storing, and analysing such personally identifiable data creates concerns as to the ownership and use of children's identities by corporations and others (Khosravi et al., 2022^[158]). Protecting the privacy of students while providing solutions that consider the individual needs and characteristics of learners is also a concern among teachers (U.S. Department of Education, Office of Educational Technology, 2023^[125]). Teachers tend to worry that AI will not be able to engage diverse learners due to biases in underlying data or incorrect or insufficient scaffolding (U.S. Department of Education, Office of Educational Technology, 2023^[125]). Experts agree that there is a need to promote a better understanding of, and building trust in, AIED systems to improve adoption of these technologies in schools (Khosravi et al., 2022^[158]).

- Technology self-efficacy

TALIS has traditionally measured teachers' self-efficacy in different elements of their teaching practice. However, it is important to more explicitly acknowledge an emerging body of research that examines teachers' self-efficacy in teaching with technology and, as with teachers' beliefs and attitudes, how self-efficacy might be related to teachers' intended or actual adoption of technology in their teaching practice.

One of the ways that learners can judge their own self-efficacy is through vicarious learning experiences, such as by watching someone else successfully putting things into action (Bandura, 1997^[159]). In education, this can happen when pre-service teachers work with an experienced teacher during the practicum. Vicarious learning experiences have also been shown to be positively related to higher levels of computer self-efficacy among pre-service teachers, as well as a successful integration of technology (Wang, Ertmer and Newby, 2004^[140]). In addition to observing other teachers practice, setting concrete and specific goals helps teachers understand what successful technology integration

can look like. This kind of goal setting has also been associated with greater increases in teachers' sense of computer self-efficacy (Wang, Ertmer and Newby, 2004_[140]).

Studies have shown that teachers' computer self-efficacy is positively related to their actual use of computers (Sang et al., 2010_[145]; Wang, Ertmer and Newby, 2004_[140]). Teachers are more likely to use computers in their teaching if they have more confidence in their own technological capabilities. Teachers with higher levels of computer self-efficacy also report using technology more frequently in their teaching than their peers who have lower confidence in their own technology capabilities (Fraillon et al., 2020_[127]). Studies also found that the connection between teachers' computer self-efficacy and their attitudes towards technology (Sang et al., 2010_[145]) as well as their perceived usefulness of technology (Scherer et al., 2018_[141]), provides an indirect influence on teachers' prospective use of computers in their practice. Once again, findings from research on TPACK suggest that when pre-service teachers have higher levels of self-efficacy related to TPACK, they express more positive attitudes toward teaching with technology, and vice versa (Scherer et al., 2018_[141]). This finding provides an important connection between teachers' beliefs about technology and their assessment of their own capacity to teach with technology.

- Self-efficacy in online education

A significant shift to models of online or distance learning occurred as a consequence of school closures caused by the COVID-19 pandemic, which required teachers to become proficient in new pedagogical models for teaching remotely using technology (OECD, 2020_[1]). As the context, resources, pedagogies, and practices differ across online and face-to-face education, the notion of teacher self-efficacy for distance or online education could also vary. There have been some initial investigations into teacher self-efficacy for online education but there does not appear to be an empirically derived measure at present (Corry and Stella, 2018_[160]).

Teacher characteristics

It is of interest to look at some teacher background characteristics in relation to teachers' reported technology use, self-efficacy, and technology attitudes. Some older studies – e.g. Wu and Morgan (1989_[161]) – reported that teachers' gender may be related to both teacher beliefs about technology as well as teacher's technology self-efficacy. These connections have not been found in some more recent studies, as technology use in teaching became mandatory in some areas rather than being optional (Sang et al., 2010_[145]). Teacher background characteristics from TALIS could be used to ascertain whether these correlations still exist. In addition, some teacher background characteristics can be linked to teachers' feelings of self-efficacy in using computers. For example, younger teachers have been shown to have higher levels of technology self-efficacy than their older colleagues (Fraillon et al., 2020_[127]).

Overall, occupational perceptions with respect to technology include teachers' technology and TPACK-related self-efficacy. Furthermore, positive attitudes toward technology and perceptions of its usefulness are key facilitators of the use of technology in education (Wijnen, Walma van der Molen and Voogt, 2023_[162]).

Institutional environments for teaching

From a school principal's point of view, the extant research focuses on leadership aspects around technology integration – e.g. Creighton (2003_[163]) – such as creating a vision for technology at a school level (Richardson, Flora and Bathon, 2013_[164]) and decision making (Sincar, 2013_[165]). In particular, instructional leadership has the potential to impact classroom instruction and, ultimately, student achievement (Sebastian and Allensworth, 2012_[166]). However, not every country enables leaders (or teachers) at a school level to make decisions about purchasing or using technology. These aspects,

however, can depend heavily on school resources and access to technology as facilitating conditions. Technology aspects of school leadership, for instance, are considered in the context of instructional and distributed leadership (Halverson, 2018_[167]), and the availability of relevant school resources.

TALIS 2024 indicators

Although the use of technology could be assessed within each of the TALIS 2024 content areas in detail, only a limited set of indicators was included related to each area. These indicators either represent single items or multiple-item scales.

Moving beyond the use of specific technologies for educational purposes, TALIS 2024 focuses on the practices of technology integration, which are operationalised as the frequency of specific activities involving technology (e.g. teaching and professional practices). In TALIS 2018, technology-related aspects were incorporated mostly via single and standalone items within the thematic areas. For instance, teachers' self-efficacy in teaching with technology was only represented by a single item, which was not used for the scaling of the self-efficacy construct (OECD, 2019_[168]).

AI has been defined separately from digital tools and resources, and with separate questions developed for the questionnaires to collect data related to AIED. This was done to provide nuanced data on the role AI plays in today's education next to the general use of technology in classrooms. Moreover, these data have the potential to contribute to recent research and policy discussions around future teaching and learning (U.S. Department of Education, Office of Educational Technology, 2023_[125]).

To acknowledge the cross-cutting nature of the theme, aspects of technology are included in other content areas, and some new constructs are introduced (e.g. TPACK self-efficacy, practices of teaching with technology, beliefs about technology, and the attitudes towards technologies, such as artificial intelligence).

Incorporating technology in several themes allows us to explore the following issues:

- profiles of teaching and professional practices utilising technology
- profiles of and associations between teachers' technology self-efficacy, initial teacher education in technology, and professional development in educational use of technology
- associations between principals' technology leadership, teachers' teaching and professional practices using technology
- associations between teachers' beliefs, attitudes, and technology use, including AI
- profiles of teachers' beliefs, attitudes, and technology use with respect to their background characteristics, their initial teaching training, and their engagement in professional development activities, including AI.

TALIS 2024 indicators for the educational use of technology include:

- *Initial teacher education and continuing professional learning (Teacher Questionnaire - TQ):* Teachers' needs for professional development to facilitate the educational use of technology; sense of preparedness for teaching with technology; and opportunities to acquire TPACK.
- *Teaching and professional practices (TQ):* Frequency indicators of the extent to which teachers use ICT for teaching purposes, including both surface-level and more extensive integration of technology. This includes the involvement of technology in the generic teaching practices (including lesson development, delivery or assessment); collaboration via technology with specific purposes (e.g. teacher-teacher, teacher-student, teacher-parent communication); the use of more advanced personalised learning or assessment; and the use of artificial intelligence.

- *Occupational perceptions (TQ)*: TPACK-related self-efficacy in relation to Technological Pedagogical and Content Knowledge (TPACK); technological content knowledge (TCK); technology pedagogical knowledge (TPK); and technology knowledge (TK).
- *Teacher attitudes toward and beliefs about technology (TQ)*: Perceived usefulness of technology; reports of barriers and facilitators of teaching with technology; and attitudes towards using AI for teaching and learning.

Social and emotional learning

Social and emotional learning (SEL) develops along the life course and has become increasingly important with associated societal expectations of early childhood, elementary, and secondary education systems (Chernyshenko, Kankaraš and Drasgow, 2018^[169]; Kankaraš and Suarez-Alvarez, 2019^[170]). As such, developmental research on adaptive and maladaptive social and emotional behaviours, driven by related motivations and skills, is essential (Chernyshenko, Kankaraš and Drasgow, 2018^[169]; Denham, 2018^[171]; Schroeder and Graziano, 2015^[172]).

Definition and scope

Despite becoming a key concept in education, the definition of SEL differs in the extant body of research. Cognate to the notion of emotional intelligence, SEL refers to the process of acquiring skills to generate, recognise, express, manage, and evaluate emotions, set and achieve positive goals, establish and maintain positive relationships (student-student, student-teacher), and take and acknowledge the perspective of others – see, for example, Durlak et al. (2011^[173]); Roberts, Zeidner and Matthews (2007^[174]).

The OECD defined SEL broadly and included task performance, emotional regulation, collaboration, open-mindedness, engaging with others, and motivational aspects of learning (Kankaraš and Suarez-Alvarez, 2019^[170]). SEL is also considered to be the process through which all young people (and adults) acquire and apply the knowledge, skills, and attitudes to develop healthy identities, manage emotions and achieve personal and collective goals, feel, and show empathy for others, establish and maintain supportive relationships, and make responsible and caring decisions (CASEL, 2020^[175]).

A focus on the SEL of students aligns with long-term TALIS policy issues specific to developing teachers within the profession, effective teachers and teaching, and school policies supporting effective learning environments. Overall, there needs to be an investment in (a) teacher competencies in meeting the social and emotional needs of students and (b) the well-being of the teachers themselves (Jennings and Greenberg, 2009^[176]), two aspects that are intricately interrelated (Viac and Fraser, 2020^[177]). Discussion on the well-being of teachers can be found in the occupational perceptions section of the conceptual framework.

Theoretical background

The Collaborative for Academic, Social, and Emotional Learning (CASEL) is a Chicago-based organisation that aims to establish high-quality, evidence-based social and emotional learning (SEL) for schools through research-based partnerships (Assessment Work Group, 2019^[178]). Its framework is based on five SEL competencies that should be considered in TALIS 2024: self-awareness, self-management, social awareness, relationship skills and responsible decision making. Much like OECD working papers related to this field (Kankaraš and Suarez-Alvarez, 2019^[170]; Viac and Fraser, 2020^[177]), CASEL also argues for an integration of SEL assessment into policy, practice, and professional learning.

Within CASEL's (2021) new definition of SEL is a focus on educational equity: "SEL advances educational equity and excellence through authentic school-family-community partnerships to establish learning environments and experiences that feature trusting and collaborative relationships, rigorous and meaningful curriculum and instruction, and ongoing evaluation" (CASEL, 2020_[175]). As such, links across the cross-cutting themes of SEL, as well as diversity and equity in TALIS 2024, can identify and inform policies aimed at addressing gaps in socio-emotional outcomes across countries – particularly gaps that may have increased during the COVID-19 pandemic.

In their model of the prosocial classroom, Jennings and Greenberg (2009_[176]) present SEL as an important aspect of teaching that creates and promotes a positive classroom climate and, ultimately, may foster students' social, emotional, and academic skills. More recently, Collie (2019_[179]) proposed a social and emotional competence school model that includes an iterative process of social and emotional competence development informed by self-determination theory. Here, the importance of teaching in a needs-supportive way (i.e. relatedness, competence, and autonomy-supportive teaching practices) is paramount to students' social and emotional skill and behaviour development. This model also provides the foundation for TALIS 2024 to address levels of understanding – from curriculum, to classroom, to school indicators – as complex influences on SEL of students.

Social and emotional skill and behaviour development tends to be investigated separately and, typically, in relation to more traditional academic outcomes, such as achievement. Future research should consider the contextual SEL connections with motivation and instructional practices, teacher-student relationships (e.g. empathy and communication) and peer relationships (e.g. SEL and unstructured play). Therefore, TALIS 2024 can help answer the call for empirical evidence about the contexts for fostering the motivational dimension as a crucial component in student development of social and emotional competence (Collie, 2019_[179]).

Students' social and emotional learning is influenced by teachers' beliefs (Brackett et al., 2012_[180]) and the types of teaching practices being used in classrooms (Durlak et al., 2011_[173]). Most teaching practices that nurture the SEL of students can be categorised according to ten practices that align with the CASEL framework and apply across grade levels, subjects, and contexts: student-centred discipline, teacher language, responsibility and choice, warmth and support, cooperative learning, classroom discussions, self-reflection and self-assessment, balanced instruction, academic expectations, and competence building (Yoder, 2014_[181]). Emphasising these practices in TALIS 2024 highlights school climate and the role of effective teacher-student interactions in supporting SEL. For example, the teaching practice of warmth and support (Yoder, 2014_[181]) aligns with the observable domain of emotional support identified as positive climate and teacher sensitivity in the valid and reliable Classroom Assessment Scoring System (Allen et al., 2013_[182]; Pianta, Hamre and Mintz, 2012_[183]).

Developments of SEL in TALIS emphasise context and culture (e.g. different levels of schooling), school-based challenges, and whether SEL is a unitary or multidimensional construct. Influences on SEL related to culture or specific populations (e.g. refugee displacement and trauma) are one area of increasing importance for educators and, therefore, TALIS 2024 investigates the cross-cutting theme of diversity and equity through contextual correlates of SEL.

With an increased focus on collaborative learning, critical thinking, and technology skills (OECD, 2019_[184]), SEL is often targeted through prosocial interventions that focus on student well-being and associated outcomes (Chernyshenko, Kankaraš and Drasgow, 2018_[169]; Rimm-Kaufman and Hulleman, 2015_[185]). Intervention subtopics of SEL include students' self-esteem, self-efficacy, motivation, growth mindset, mental health, emotional regulation, mindfulness, and positive peer relationships (Kankaraš and Suarez-Alvarez, 2019_[170]). For example, there is evidence of relationships between high-quality SEL interventions and improved academic achievement, as well as decreases in student anxiety and behaviour issues (Durlak et al., 2011_[173]).

TALIS 2024 indicators

An urgent and rigorous focus on societal disruptions (such as those associated with the COVID-19 pandemic), equity, and related impacts on “traditional” school-based interpersonal and social teaching and learning are emerging priorities. For example, technology offers new ways of tracing students’ SEL over time and making accessible “hard-to-measure” skills, such as collaboration and self-regulation. With the increase in online teaching and learning during the COVID-19 pandemic, TALIS 2024 gathers information from a teacher and school principal perspective regarding the social dimension and digitisation of students’ SEL in relation to the educational use of technology.

The SEL of students represents a cross-cutting theme in TALIS 2024 with several indicators within several themes. These indicators may represent single items or multiple-item scales. For example, TALIS 2024 uncovers:

- Teaching and professional practices in and outside of schools that involve SEL through items on teacher beliefs about SEL – e.g. *I would like to attend a workshop to learn how to develop my students’ social and emotional skills*; Brackett et al. (2012_[180]).
- Situational judgement items associated with students’ social and emotional competence are included to uncover the rationale and decision making behind teaching practices (Aldrup et al., 2020_[186]). As discussed in the section on teaching practices, understanding effective SEL teaching practices requires evidence in terms of frequency as well as context. TALIS 2024 includes hypothetical scenarios concerned with addressing the behaviour of a male student who does not interact appropriately with the teacher and a female student who dislikes group work and reacts inappropriately with others in the group. While hypothetical, these scenarios are common occurrences in schooling and require a response from the teachers. Therefore, teachers are asked about the likelihood of their implementing each of three, non-exclusive possible responses to address each scenario.
- The overlap of SEL with school climate and occupational perceptions is addressed in TALIS 2024. Previous TALIS cycles have highlighted affective development by gathering reports from teachers on how they support students’ metacognition, motivation, engagement, and interest, as well as the importance of socially and emotionally attending to their students’ needs and development. Therefore, TALIS 2024 includes items focused on teachers’ self-efficacy and the SEL of students (e.g. *To what extent can you support the social and emotional learning of your students?*).
- While applicable to all levels of education, teachers’ training and professional development foci within SEL may have different emphases across educational levels. For example, the pedagogical approaches to developing students’ growth mindsets may look and feel differently in the primary school years compared to the senior secondary school years (Centre for Education Statistics and Evaluation, 2021_[187]).
- Through previous TALIS cycles, some teachers reported that their initial teacher education did not prepare them sufficiently and, thus, required further professional learning and development (OECD, 2019_[39]). As such, collecting data on teachers’ knowledge, experience, and needs in relation to emerging areas (such as supporting students’ SEL) has been identified as a cross-country priority. For example, TALIS 2024 includes social and emotional learning of students as a topic or focus area when asking about teachers’ professional learning.

Environmental and sustainability education

Environmental and sustainability education (ESE) is a multidimensional concept that views education as a long-term strategy to address interconnected global challenges, including environmental degradation, environmental justice, biodiversity loss, poverty and inequality, and climate change (UN

Secretary-General; World Commission on Environment and Development, 1987^[188]). The approach emerged under the label “environmental education” in the late 1960s (Stapp, 1969^[189]; UNESCO/UNEP, 1975^[190]; Palmer, 1998^[191]) with a focus on environmental protection. In the early 2000s, the initiative transformed under the label “education for sustainable development” (Wals, 2012^[192]) to incorporate the three pillars of sustainability – environment, society, and the economy (also known as planet, people, and prosperity).

The past 60 years witnessed an immense increase in international and national activities to promote ESE. This growth is reflected in several global trends. First, schools increasingly allocate time to environmental topics (Benavot and Amadio, 2004^[193]). Second, textbooks include more information on environmental issues and problems (Bromley, Meyer and Ramirez, 2011^[194]). Third, domestic environmental organisations increasingly engage with primary and secondary schools (Pizmony-Levy, 2011^[195]). By 2002, ESE had gained enough momentum that the United Nations declared 2005-14 as the UN Decade for Education for Sustainable Development (United Nations, 2002^[196]). More recently, Agenda 2030 recognised the importance of ESE by including it under Sustainable Development Goal 4: Quality Education, Target 4.7. Specifically, it states that, by 2030, countries have to:

“...ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture’s contribution to sustainable development”. (United Nations, 2015^[197])

Climate change increasingly recognised as an existential threat to life on planet Earth. A 2021 report from the Intergovernmental Panel on Climate Change (IPCC) (Intergovernmental Panel on Climate Change (IPCC), 2023^[198]) shows that emissions of greenhouse gases from human activities are responsible for the rise in global temperature of approximately 1.1°C since the late 19th century. The IPCC, which is the United Nations body for assessing the science related to climate change, finds that climate change brings different changes around the world, including sea level rise, and extreme weather events (e.g. floods, droughts, heat waves).

Definition and scope

ESE aims to raise awareness about the role of individuals and societies in environmental degradation and protection. ESE also aims to motivate students to adopt pro-environmental behaviours and to participate in collective efforts toward addressing environmental challenges (i.e. environmental citizenship) (Wals and Benavot, 2017^[199]). TALIS 2024 is using the term ESE as shorthand to reference the multiple origins of this global educational initiative. Besides Brundlandt’s general definition of sustainability, contemporary literature, especially the concepts of planetary boundaries (Rockström et al., 2009^[200]; Richardson et al., 2023^[201]) and doughnut economics (Raworth, 2017^[202]), highlight the need for a conscientious management of natural resources, safeguarding Earth’s ecological systems by staying within boundaries, while also ensuring social well-being and economic prosperity.

ESE is more than the transmission of knowledge and information about environmental issues – e.g. see environmental science education in Pizmony-Levy (2011^[195]); Stevenson (2007^[203]). Rather, ESE includes teaching and learning in the environment through “outdoor” experiences and raising environmental awareness and pro-environmental attitudes.

Climate change education (CCE) is a main thematic focus of ESE and is concerned with developing “knowledge, skills, values and attitudes” relevant to understanding and addressing the impacts of the climate crisis (UNESCO, 2023^[204]). Like the broader learning area of ESE, it is often regarded as having a cross-curricular focus on the occurrence and consequences of long-term shifts in temperatures and weather patterns rather than a single discipline (Stevenson, Nicholls and Whitehouse, 2017^[205]). For

the purposes of TALIS 2024, we define climate change as follows: “Climate change” encompasses global warming but also refers to a broader range of changes, including rising sea levels, shrinking glaciers, accelerated melting of polar ice, and shifts in flower/plant blooming times as well as its impacts on environment, economy and society.

Theoretical background

Through systematic data collections in a range of countries/territories, international large-scale assessments (ILSAs) offer a unique opportunity to explore how schools, teachers, and students engage with the ESE movement and with sustainability more broadly (Pizmony-Levy and Gan, 2021^[206]). Three different cycles of PISA – 2006, 2015, and 2018 – included multiple items on sustainability, capturing knowledge and attitudes. The OECD and scholars have used these datasets to explore patterns at different levels (Gong and Zheng, 2021^[207]; OECD, 2009^[208]; Pivovarova, Powers and Chachkhiani, 2021^[209]; Schleicher, 2021^[210]). Other ILSAs, including TIMSS and ICCS, also respond to the growing concern about ESE (International Association for the Evaluation of Educational Achievement (IEA), 2021^[211]; Kessler, 2021^[212]; Zuzovsky, 2021^[213]).

While ILSAs provide rich datasets that could inform scholarship, policy, and practice, they also suffer from several limitations in the context of ESE (Pizmony-Levy and Gan, 2021^[206]). Most importantly, ILSAs do not collect sufficient information about teachers’ engagement with ESE.

Teachers’ learning and development

A recent international survey of teachers shows that, while many teachers are motivated to teach about themes related to sustainability, a quarter still do not feel ready to teach this content and less than 40% of teachers are confident in teaching about the severity of climate change (UNESCO and Education International, 2021^[214]). This and other recent efforts to document teachers’ engagement with ESE, however, rely on unrepresentative samples from a small number of countries. TALIS 2024 addresses this gap and provides reliable information from wide range of participants across the world.

Past research on ESE and CCE points to the importance of initial teacher education and continuing professional learning opportunities, for example, Monroe et. al. (2019^[215]); Stevenson, Nicholls and Whitehouse (2017^[205]); Yavetz, Goldman and Pe’er (2009^[216]). Research from New York City (the largest school district in the United States) showed that, while a large majority (72%) were very concerned about climate change, only one-fifth (22%) of educators felt very informed about the topic (Pizmony-Levy, McDermott and Copeland, 2021^[217]). Research from England, for example, also shows a strong correlation between resource availability and feeling comfortable delivering CCE (Howard-Jones et al., 2021^[218]). Further, ESE and CCE take place in formal and informal settings (Stevenson, Nicholls and Whitehouse, 2017^[205]). For example, some teachers may feel uncomfortable to teach about climate change, but they feel comfortable to talk informally about the topic with their students.

Teachers’ work practices

Transforming the next generation’s thinking and acting regarding environmental sustainability more broadly necessitates profound changes in teaching and learning. This includes the development of learning modules on sustainability topics and introducing sustainability themes in existing subjects (e.g. in history/social studies, students can discuss environmental degradation as an impact of the industrial revolution; and as part of civic and citizenship studies, students can learn how to collaborate on a public campaign to encourage reduction in consumption). The realisation of ESE may also include learning about school facilities (e.g. a visit to the heating/cooling room when learning about energy), field trips, teaching and learning outdoor/in nature, and guest speakers from research institutions, NGOs/CBOs, corporations that are part of the emerging green industry, and local policy makers. To accomplish all of

that, teachers need to be aware and motivated, and they need to collaborate with other teachers and with professionals working outside of school.

Institutional environments for teaching

Climate change is already affecting different social systems, including education. The most direct impact is through extreme weather events that devastate infrastructures and buildings and disrupt students' learning. For example, superstorm Sandy, which hit the north-eastern part of the United States in 2012, shut down all New York City public schools for a full week, and many remained closed, damaged, or relocated for weeks if not months (Cramer, 2013^[219]). Research using standardised achievement data for 58 countries (PISA 2000-15) and 12 000 US school districts with detailed weather and academic calendar information show that the rate of learning decreases with an increase in the number of hot school days (Park, Behrer and Goodman, 2021^[220]).

In addition to direct impacts, climate change is also adding indirect stress on schools. The past five years witnessed the emergence of a global youth climate movement "...demanding urgent action on the climate crisis." (FridaysForFuture, 2021^[221]). In many countries, activists use the tactic of school strikes to put pressure on policy makers and society. The global youth climate movement mobilises students, who then bring their disappointment and distrust for society and action-oriented attitude to their schools (Busch et al., 2019^[222]; Feldman, 2021^[223]; Parth et al., 2020^[224]; Pizmony-Levy and Kessler, 2021^[225]; 2022^[226]). These sentiments could have implications for student-teacher interactions, motivation for learning, and actual engagement with school. Related to the movement is the growing public attention on climate change and the rise of climate anxiety in the general population and specifically among youth. A recent survey of 10 000 young people (aged 16-25 years) in 10 countries showed that most respondents (59%) were extremely worried about climate change (Hickman et al., 2021^[227]). Over half felt sad, anxious, angry, powerless, helpless, and guilty. Secondary analyses of ICCS 2016 data from 22 countries shows a correlation between concern about climate change and family background, achievement in civics and citizenship, trust in the United Nations, and opportunity to learn to protect the environment (Kessler, 2021^[212]).

TALIS 2024 indicators

TALIS 2024 gathers information about the extent to which teachers are prepared to implement ESE in schools, and how drivers and barriers affect their work. It further contributes to the United Nations Framework Convention on Climate Change (UNFCCC) efforts by providing a detailed account of teachers' engagement with climate change across many countries. TALIS 2024 provides, for the first time, a global snapshot of teachers' engagement with climate change and their responses to growing concerns among students. It collects data on the following aspects:

- *Environmental and sustainability education (ESE) and climate change education (CCE) teaching practices* include multiple domains: cognitive, affective, and behavioural. TALIS 2024 captures this complexity through a broad scope of indicators on teachers' engagement with ESE and CCE: integrating teaching about sustainability, talking informally about sustainability-related topics, raising awareness, addressing anxiety/concern, and empowering students to participate in individual and collective action. Given that most education systems do not (yet) have curricular standards and guidelines regarding ESE and CCE, teachers are key actors/agents in the realisation of international aspirations into formal and informal learning opportunities.
- *Attitudes towards climate change* will also be measured by TALIS 2024 providing information about teachers' views of climate change, their level of concern about climate change, their familiarity with the current climate justice movement led by youth (e.g. secondary students), and their awareness of students' climate concerns.

- *Professional opportunities for teachers to learn about sustainability and climate change* will be reflected in TALIS 2024 indicators about access to two types of opportunity: formal training and professional learning activities. In addition, TALIS 2024 offers indicators about needs for professional learning about ESE and CCE.
- *Respondents attitudes towards ESE and CCE* will be gauged by a series of questions about self-efficacy to engage students with sustainability and climate change, concerns about possible backlash from parents/guardians, views toward mandatory curriculum, and perception of school leadership support for different domains of ESE and CCE (cognitive vs behavioural).
- *Barriers to teaching about climate change education* are another aspect of information collected by TALIS 2024. In order to understand why teachers decide not to teach about climate change, TALIS 2024 asks this group about the reasons behind their decision. Specifically, the instrument presents respondents with possible barriers, such as lack of knowledge or other resources, and education policy (e.g. curriculum and national assessment). This information provides policy makers with priorities for investment. For example, in contexts where curriculum resources are limited, policy makers and planners may want to invest in curating and developing resources in online hubs – e.g. SubjectToClimate (2022^[228]).

TALIS 2024 collects a rich set of items on teachers' engagement with ESE and CCE. These data allow policy makers to evaluate different domains: cognitive, affective, and behavioural. This information is useful for assessing the strengths and weaknesses of national plans around ESE and CCE. Further, the data allow the exploration of variation across populations, school type, and teacher professional background (e.g. the subject they teach). This kind of analysis is useful for documenting gaps and inequalities, which is a first step towards developing improvement strategy. Finally, using classification techniques, TALIS data can be used to derive a typology of teacher engagement with ESE and CCE. It may be possible to identify unique audiences within the teaching profession that respond to ESE and CCE in their own distinct way. Scholars have used this approach in public opinion research in the United States where they identified Global Warming's Six Americas: Alarmed, Concerned, Cautious, Disengaged, Doubtful, and Dismissive (Leiserowitz et al., 2021^[229]). A similar analysis with TALIS 2024 data would be an important contribution to international knowledge and accountability infrastructure, and for the development of teacher training.

Enduring features of teachers, teaching and learning

A number of enduring features of teachers, teaching, and learning have origins in the report *Teachers Matter: Attracting, Developing and Retaining Effective Teachers* (OECD, 2005^[230]). This report provided a foundation for TALIS and emphasised policy issues concerned with attracting good teachers to the profession, developing teachers' expertise, retaining effective teachers, implementing school policies that promote effectiveness, and supporting quality teachers and teaching. Subsequent cycles of TALIS studied teachers' initial training and professional learning, educational practices, and teachers' affective responses to teaching. TALIS 2024 focuses on *teachers'* learning and development, teachers' work practices, teachers' occupational perceptions, and institutional environments for teaching.

Teachers' learning and development

Teachers' education, from initial training to professional learning throughout their careers, remains central for understanding effective teaching and learning. Together with institutional-level issues of leadership and climate, these teacher-level issues provide potential explanations about how teachers come into and leave the profession.

The importance of teachers' learning and development for quality teaching is widely acknowledged. However, what constitutes teachers' learning, and how that learning is developed is debated among researchers, policy makers, and practitioners. While agreement about what precisely constitutes teacher knowledge is contested, a description of teacher knowledge types provided by Shulman in the 1980s (Shulman, 1987^[231]; Shulman, 1986^[130]) has been widely embraced by the education community. He identified three main areas of knowledge relevant to teaching: content knowledge (CK), pedagogical content knowledge (PCK) and general pedagogical knowledge (GPK).

CK refers to the mastering of core components in a subject-domain, while PCK comprises ways of representing and formulating content that makes it comprehensible to students. PCK represents the blending of content and pedagogy so that particular topics and issues within a subject-domain can be organised, represented, and adapted to the diverse interests and abilities of learners. GPK refers to the broad principles of teachers' classroom management, lesson planning, and assessment that go beyond subject matter.

In addition to these three knowledge types, teachers need competencies related to curricula, students and their characteristics, and the educational context in which they are working (Guerrero, 2017^[232]; Shulman, 1987^[231]). Other contextual factors can also influence how teacher knowledge is acquired and applied. For example, the recent global pandemic has accelerated the need for many teachers to develop aspects of technological knowledge and of technological pedagogical and content knowledge (TPACK). TPACK offers a contemporary direction in understanding the complex link among content, pedagogy, technology, and learning (Angeli and Valanides, 2015^[233]).

Furthermore, the opportunity to learn (OTL) concept also appears to be highly relevant to the development of teacher knowledge (Cohen and Berlin, 2020^[234]) and the OTL concept guided the section on teacher education and initial preparation in TALIS 2018 (Ainley and Carstens, 2018^[235]). OTL was first designed to ensure valid cross-national comparisons (McDonnell, 1995^[236]), asking teachers whether they implemented certain subject content in their teaching (Cohen and Berlin, 2020^[234]). The OTL framework in relation to teacher knowledge is multilevel in nature; it incorporates all aspects of developing teacher knowledge, including initial teacher education, knowledge gained through teaching experience, and continuous professional learning that teachers engage in across their careers. OTL reflects visions of the knowledge and skills that an educational system and its teacher education institutions expect teachers to have (Blömeke and Kaiser, 2012^[237]; Schmidt, Blömeke and Tatto, 2011^[238]), and that knowledge, in turn, has been shown to be related to student achievement (Baumert et al., 2010^[239]; Hill et al., 2008^[240]).

Shulman's teacher knowledge types provide a useful lens for considering what constitutes teacher knowledge, and an examination of differences in OTL can help to explain and understand variation in teacher knowledge development within, as well as across, countries (Blömeke et al., 2014^[241]). TALIS 2024 includes the Teacher Knowledge Survey (TKS) as an optional component for the assessment of teachers' general pedagogical knowledge. However, the focus of the TALIS 2024 main survey questionnaire is, as in previous surveys, on investigating the ways in which teachers develop knowledge but not about assessing their knowledge.

There are two main ways in which teachers develop knowledge: through their initial teacher education (ITE) and through continuing professional learning (CPL), including by working with other teachers and by reflecting on their teaching practice. This section presents details of the two domains ITE and CPL and how they are investigated in TALIS 2024.

Initial teacher education

Although initial teacher education (ITE) is not malleable as a characteristic of practicing teachers (i.e. it is fixed once teachers enter the profession), characteristics of ITE influence subsequent professional

and instructional practices and professional development characteristics (Ainley and Carstens, 2018_[235]). In general, influences of ITE on teachers and their work can be divided into personal and contextual factors. Personal factors that condition the relationship between ITE and teacher's work include characteristics such as prior teaching experiences, certification status, gender (i.e. ITE may gender segregate pre-service training of teachers), and teaching subject, as well as teacher psychological characteristics of motivation (Blume et al., 2010_[242]; Feng, Helms-Lorenz and Maulana, 2023_[243]; OECD, 2019_[39]), self-efficacy (Mintzes et al., 2013_[244]), beliefs about learning (Roehrig and Kruse, 2005_[245]), and their well-being (Harmsen et al., 2018_[246]; Helms-Lorenz and Maulana, 2016_[247]). Building resilience during ITE, for example, prevents emotional exhaustion through the teaching career (Fokkens-Bruinsma, Gemmink and van Rooij, 2021_[248]). Contextual factors of relevance for this domain are related to teacher education institute characteristics, such as institutional type, training duration, regular or fast-track teacher education programme type, and ITE-school partnership. Teacher educators, coaches, and mentors are also important contextual factors (Goodwin and Kosnik, 2013_[249]).

Definition and scope

Shulman's work (1986_[130]; 1987_[231]; Shulman, 1986_[130]) catalysed the development of several related theoretical notions focusing on the knowledge that is needed for teacher candidates – for example, see Depaepe et al. (2013_[250]), and with a focus on mathematical knowledge for teaching, Ball et al. (2008_[251]). The necessity of deep subject knowledge has been proposed as a foundation of effective teaching, with teachers' CK and PCK interacting together to determine teaching effectiveness. Differences regarding the type, length, and grade range for which the ITE prepares candidates to teach, and the content of the degree related to the subject the future teacher intends to teach (number of majors and minors, training as generalists) all contribute to developing teacher knowledge – e.g. Goe (2007_[252]).

The duration of ITE, as part of which teachers acquire the foundations for subject knowledge as well as pedagogical knowledge, is crucial for overall teacher knowledge and, in turn, student achievement (Baumert et al., 2010_[239]; Charalambous, 2010_[253]; Copur-Gencturk, 2015_[254]; Darling-Hammond, 2006_[255]; Darling-Hammond et al., 2005_[256]; Hill et al., 2008_[240]; Johansson, 2023_[257]; Kunter et al., 2013_[258]; Myrberg, Johansson and Rosén, 2019_[259]). Given the many teacher education reforms within and across countries, large variations in teacher knowledge and the ways it develops might be anticipated across teacher cohorts. For example, Alatalo (2016_[260]) identified differences in teachers' CK and PCK as outcomes of teachers' ITE. Myrberg et al. (2019_[259]) analysed content differences in ITE and found a positive link to student reading achievement. This difference could be related to overall time or to the ways the available time is used within ITE. A closer look at teachers' OTL can help us understand how the outcomes of ITE are achieved and identify potential starting points for reforms.

Theoretical background

Although one strand of teacher research suggests that the impact of teacher knowledge on student achievement is not easily measured by observable variables, such as formal qualifications in education (Chingos and Peterson, 2011_[99]; Goldhaber and Brewer, 2000_[261]; Hanushek, 2003_[262]; 2011_[263]), research tends to converge on the idea that teachers contribute to student achievement – e.g. Darling-Hammond (2000_[264]); Nye et al. (2004_[265]); Rivkin et al. (2005_[266]); Ulferts (2019_[267]); Wayne and Youngs (2003_[268]). This consistent finding becomes even more critical, taking into consideration the allocation of teachers to schools: several studies suggest that the most qualified teachers, and more experienced teachers, are disproportionately allocated to the most advantaged schools (Akiba, LeTendre and Scribner, 2007_[93]; Clotfelter, Ladd and Vigdor, 2006_[94]; OECD, 2018_[269]; Sims and Allen, 2018_[270]). TALIS 2024 provides data from which to develop further understandings about this association through examining links between sections on developing teacher knowledge and equity and diversity.

The opportunities to practice the critical content and pedagogy in-field during ITE is crucial to the development of the three main areas of teacher knowledge proposed by Shulman. Boyd et al. (2009^[271]) suggested that ITE focusing on the work of the classroom (i.e. what teachers will be doing as first-year teachers) is also positively associated with students' achievement. Additionally, teacher candidates are more likely to stay in the profession when their ITE experiences are connected to classroom practice. Not only has in-field practice been shown to be important for teacher candidates' opportunities to be fully grounded in the clinical practice, but these practices are also common in high-achieving education systems (OECD, 2018^[269]). Recent research has shown growing interest in a teacher education pedagogy that approximates the work of teaching by means of rehearsals (Kazemi et al., 2016^[272]).

Digital competence has become a key issue in contemporary ITE at a global level (Gudmundsdottir and Hatlevik, 2018^[273]; Instefjord and Munthe, 2016^[274]). Aspects of teachers' knowledge which have become increasingly important, not least due to the COVID-19 pandemic, are technological knowledge and TPACK. These are important ITE areas to investigate and are elaborated in the section about the educational use of technology. Other areas of interest include assessing the extent to which ITE builds teachers' knowledge and skills to foster students' creativity and critical thinking (Vincent-Lancrin et al., 2019^[275]), meet the needs of students from diverse multicultural and multilingual settings (Sapulete et al., 2020^[276]), and other aspects of classroom differentiation (Deunk et al., 2018^[57]; Smale-Jacobse et al., 2019^[4]). Furthermore, there is evidence that having practice teaching in schools while in ITE is a key feature of education systems with high-performing student populations (OECD, 2018^[11]).

TALIS 2024 indicators

TALIS 2018 specifies several ITE indicators. Some of these refer to characteristics of the ITE experienced by teachers, some refer to the relationship of ITE to current teaching and others refer to teacher pedagogical knowledge.

- Characteristics of ITE. Aspects of ITE included in TALIS 2018 will remain relevant as ITE indicators for TALIS 2024. These include graduation year, duration of teacher education, credentials earned, educational avenues to become credentialed, perceived preparedness for different teaching tasks, such as teaching content, classroom management, accommodating student heterogeneity, and responding effectively to individual learning needs (Ainley and Carstens, 2018^[235]).
- Correspondence between teaching areas and ITE studies. TALIS 2024 includes proxy variables like the degree of matching between the subject taught and experience in total/if the subject taught is relevant to understanding aspects of teacher knowledge. While self-assessment of teachers' knowledge is not viewed as the most promising direction (Kruger and Dunning, 1999^[277]), many of the questions in TALIS ask about the fixed characteristics of ITE rather than the perceived quality of teachers' ITE. Thus, there are great possibilities to shed light on the variations within and between countries in terms of distal indicators (such as certification or length of teacher education) using questionnaire data such as TALIS.
- Teacher knowledge. Through the Teacher Knowledge Survey (TKS), TALIS can link school composition to a range of teacher knowledge indicators to determine whether opportunity gaps in teachers' learning are evident in different extents across countries. By considering the TKS and teachers' years of experience, TALIS also offers opportunities to explore the development of GPK across the years in the profession and to shed light on support mechanisms associated with higher levels of teacher knowledge and self-efficacy. For example, for beginning teachers, research has shown that induction focused on personal coaching increased student perceived teaching quality (Maulana, Helms-Lorenz and van de Grift, 2015^[278]). There is growing interest in engaging teachers to rehearse teaching practices and learn in and from their rehearsals (Ball et al., 2009^[279]; Grossman, 2018^[280]; Grossman et al., 2009^[281]; Lampert, 2010^[282]) through

such avenues as video studies. TALIS 2024 allows an examination of the degree to which teachers in different countries were afforded such opportunities as part of their ITE. However, there are limitations on the detail that can be asked of experienced teachers for whom ITE may have been some time ago. ITE questions in relation to early childhood and teacher knowledge are included to deepen our understanding of the different elements of CK, PCK, GPK, and TPACK in this context. We cover a range of types of pedagogic-didactic knowledge and skills, but we expect variations in specific topic areas and the degree of focus. The literature on ITE suggests that many issues cut across different educational levels and systems.

Continuing professional learning

Recent and emerging developments in teacher professional learning include a greater focus on ongoing professional learning, forms of professional learning, and new foci of professional learning. Continuing professional learning (CPL) acknowledges a paradigm shift that places the focus on teachers' learning and professional growth across their career. Boeskens, Nusche and Yurita (2020, p. 14^[283]) propose a broad definition of teachers' CPL as "formal and informal activities that aim to update, develop and broaden the skills, knowledge, expertise and other relevant characteristics of in-service teachers". Possible areas of investigation include professional growth mindsets and practices, teacher agency in the learning process, the role of reflection and enactment in professional learning processes – for opportunities to understand, practice and reflect on the implications of new approaches and practices, see Clarke and Hollingsworth, (2002^[284]) – schools as learning organisations and communities of learners, and collective efficacy and shared accountability.

Definition and scope

Continuing professional learning forms occur through three different types of activities: (i) formal (structured activities with accreditation or certification), (ii) non-formal (structured activities without curriculum accreditation or certification), and (iii) informal (learning activities that are not structured but part of work or leisure). These activity types include school- (e.g. mentoring) and system-provided (e.g. courses and workshops) professional learning opportunities, teacher-led collaborative activities and learning opportunities, and teacher self-directed learning opportunities. An increased focus on online collaborative and self-directed professional learning opportunities is necessitating rapid acceleration of teachers working and learning remotely. Details regarding teachers' collaborative activities are elaborated in the domain professional practices. Professional learning is common across levels of education, although the specific needs of professional learning content areas likely vary by the level and classroom needs of the students. Moreover, teachers continually need to refine their skills as their classroom dynamics change across levels and demographics during their tenure.

New professional learning foci acknowledge changing contexts and demands in teaching that require new knowledge, skills, and practices for teachers. Anticipated changes that might impact professional learning include new developments in curricula, modalities of learning, understanding of learning processes, student needs, ICT, and new accommodations needed to address disruptions to education.

Theoretical background

Teachers' continuing professional learning has been demonstrated to have a strong impact on students' learning (Hattie, 2009^[285]). Several studies suggest that teacher knowledge can be developed through professional learning activities – e.g. Copur-Gencturk (2015^[254]); Kennedy (2016^[286]); Steele et al. (2013^[287]). However, there are different opinions about the desired focus of such activities. For example, Kennedy's (2016^[286]) review of the literature suggests that programmes including aspects of PCK and GPK can improve teachers' effectiveness, while programmes that focus exclusively on CK tend to have less effect on student learning – see also Ball and Bass (2000^[288]). Yet, other authors suggest CK as

the main requirement for professional learning activities, e.g. Desimone (2009^[289]); Greenleaf et al. (2011^[290]); Heller et al. (2012^[291]); Niess (2005^[292]); Yoon et al. (2007^[293]). Still other researchers have proposed that the pedagogical part of teacher knowledge is difficult to develop through education and that these skills are better developed by way of work experience, e.g. Chingos and Peterson (2011^[99]). However, a fair share of the literature suggests positive effects of professional learning, especially in relation to GPK and PCK.

Some authors emphasise the importance of professional learning communities, or collective participation, for professional learning to be effective, e.g. Desimone et al. (2003^[294]); Loucks-Horsley and Matsumoto (1999^[295]); Yoon et al. (2007^[293]); de Vries, et al. (2016^[296]). Results with respect to this attribute tend to be consistent across subjects; as with mathematics – see, for example, Copur-Gencturk (2015^[254]) – teachers' knowledge about reading improves through intensive, extended programmes of professional development in literacy (Carlisle, Cortina and Katz, 2011^[297]; McCutchen et al., 2002^[298]).

Self-reported survey data cannot evaluate the objective quality of teachers' professional learning, nor how it relates to teaching quality. For example, some governments removed barriers to professional learning after prior TALIS reports and yet implementations of professional learning and their impact on teaching and learning remained unknown, as stated by OECD (2020^[299]), who also argues that teacher-generated professional learning may have more impact than system-mandated professional development. A meta-analysis of research on teacher coaching as a form of professional learning concludes that it has moderate effects on teaching and small effects on student achievement (Kraft, Blazar and Hogan, 2018^[300]). TALIS 2024 captures data on the extent to which teachers engage in professional learning broadly. From previous TALIS cycles, it is evident that teachers reporting that professional learning positively impacts their teaching relates to higher levels of self-efficacy and job satisfaction.

To evaluate further the impact of professional learning, TALIS asks teachers about the relevance of the professional learning they received in the past few years in terms of supporting their learning and growth. Boeskens, Nusche and Yurita (2020^[283]) describe an analytical framework that guided the development of questions regarding CPL. They describe five dimensions of high-quality CPL: 1) "Motivation – What shapes teachers' motivation to engage in CPL?"; 2) "Access – How accessible is CPL for teachers?"; 3) "Provision – How and by whom is CPL provided?"; 4) "Content – How are CPL contents selected and developed?"; and 5) "Quality assurance - How is the quality of CPL monitored?".

TALIS 2024 indicators

TALIS 2024 includes indicators of the perceived quality of professional learning, whether the professional learning involves collaboration with colleagues and whether it incorporates online provision of learning opportunities.

- Perceived quality of professional learning. The TALIS survey collects data about the perceived quality of teachers' professional learning and explores those aspects of knowledge that teachers perceive as insufficient. TALIS also monitors whether teachers perceive that there is sufficient time for professional learning, and whether they are given the opportunity to use the knowledge they develop through professional learning in their teaching at schools. TALIS 2024 includes items concerning opportunities to learn (OTL) about several aspects of professional development. For example, teachers are asked whether they have accessed professional learning opportunities that focus on subject content areas (CK); more general teaching aspects including classroom management, assessment, etc. (GPK); or, approaches to the teaching of specific subject matter (PCK). TALIS 2024 further asks teachers and principals specific questions about the time devoted to professional learning and its frequency. The possibilities for CPL may be different for advantaged and disadvantaged schools, and across countries.

- Collaborative professional learning. TALIS 2018 asked teachers about whether their professional learning was collaborative, included colleagues from their school, used active learning methods, or was conducted over an extended period. The TALIS 2018 principal questionnaire also asked whether the results of teacher appraisals can lead to professional learning, as well as their perceptions of the availability of professional learning programmes for teachers in their schools (e.g. mentoring, induction) and what these offerings look like (which teachers are eligible, what format they take, etc.). In addition to including these questions from the previous cycle, TALIS 2024 can also make use of the TKS option to capitalise on these aspects of professional learning and investigate links to the development of teachers' knowledge.
- Online professional learning. The COVID-19 school closures led to an increased need for access to online/remote opportunities for teachers' professional learning – see, for example, Minea-Pic (2020^[301]). Continuation of using this delivery mode could remove some of the barriers (time/distance) associated with teachers' professional learning participation. It could also have the long-term impact of encouraging teachers to self-direct their CPL, engage with peers in collaborative professional learning and apply learnings across multiple contexts. If teachers are no longer limited by their physical location and scheduled times for professional learning, a more diverse range of offerings could become available. It is expected that there may have been an increase in self-directed professional learning.
- Differences in CPL participation. TALIS 2024 data allow the study of cross-country differences in the take-up of CPL by teachers of different subject areas and at different grade levels. TALIS 2024 data also make it possible to examine what additional support in terms of CPL is provided to less and more experienced teachers including through coaching and mentoring. Tying CPL to teacher knowledge may be possible for countries that participate in TKS.

Teachers' work practices

TALIS 2024 investigates two domains of teachers' work practices: teaching and professional practices. While teaching practices pertain to the work that teachers do inside the classroom and in other direct interactions with students, professional practices capture aspects of teachers' work beyond their regular classroom duties. The latter term also relates to conditions under which teachers work that influence their individual professionalism and the status of their profession, in general. Teaching practices are critical for student learning and professional practices are critical for teachers' professionalism within and outside of the school.

Teaching practices

Over the past decades, research has consistently attested to the critical role of teachers for student learning – e.g. Muijs et al. (2014^[302]); Muijs and Reynolds (2011^[303]); Nilsen and Gustafsson (2016^[304]). Although teacher characteristics (e.g. knowledge, beliefs, and dispositions) contribute to student learning, it is what teachers do in the classroom that has been shown to have a pivotal role in what students learn. This domain focuses on teaching practices, defined as what teachers "...do, constantly and habitually" (Lampert, 2010, p. 25^[282]) and whose "...proficient enactment [...] is likely to lead to comparatively large advances in student learning." (Ball et al., 2009, p. 460^[279]).

Definition and scope

Teaching is a complex endeavour (Cohen, 2011^[305]). Therefore, it is not surprising that, over the past decades, several frameworks and models have been proposed to capture different components of teaching practices and teaching quality. Broadly speaking, research has focused on two categories of teaching practices: those that cut across different subject matters – often identified as content- or

subject generic – and those that are unique to teaching specific subjects or content areas or “...have a particular functioning and specialised manifestations when occurring in the teaching of these areas.” (Charalambous and Kyriakides, 2017, p. 426_[306]). Research has highlighted the critical role that both types of practice play for student learning, e.g. Charalambous and Kyriakides (2017_[306]); Seidel and Shavelson, (2007_[307]). Therefore, different frameworks have been proposed to combine subject generic and subject specific aspects, e.g. TRU (Schoenfeld, 2016_[308]); Charalambous and Praetorius (2020_[309]); Walkington and Marder (2018_[310]). However, covering content-specific practices in a single survey intended for teachers teaching different subject matters would be unrealistic. Therefore, the TALIS 2024 survey, in line with the TALIS 2018 survey, focuses on generic practices.

Focusing on generic practices still yields a wide array of practices to consider – see, for example, Creemers and Kyriakides, (2007_[311]); Danielson (2013_[312]); Klieme et al. (2009_[313]); Pianta and Hamre (2009_[314]); van de Grift (2014_[315]). Despite the plethora of different frameworks, recent syntheses identified practices attended by several teaching frameworks (Maulana et al., 2021_[316]; Praetorius and Charalambous, 2018_[317]). The practices identified in these studies include classroom and time management, clarity of teaching, cognitive activation, formative assessment and feedback, adaptation, supporting students’ social and emotional learning, and support for consolidation. The first five practices were considered in the TALIS 2018 survey. The sixth practice can be linked to teacher support that was included in TALIS 2018; in TALIS 2024, there is a more explicit focus on supporting student social and emotional learning rather than learning in general. The seventh practice is a new addition to TALIS 2024 to complement the focus on cognitive activation by providing opportunities for students to reinforce their procedural knowledge and skills by working on tasks.

Theoretical background

In this section, we briefly define each practice and summarise study findings linking it to student learning.

- Classroom and time management

Classroom and time management represent basic aspects of instructional quality and refer to ensuring an orderly environment via classroom rules and procedures, addressing disruptions, and the efficient use of instructional time during lessons (Seidel and Shavelson, 2007_[307]; Van Tartwijk and Hammerness, 2011_[318]). Numerous studies have documented the positive associations between good classroom management, a positive school climate, and student achievement, e.g. Korpershoek et al. (2016_[319]); Wagner et al. (2016_[149]); Wang and Degol (2016_[113]). Besides, managing classrooms forms a prerequisite for sufficient instructional time, enabling teachers and learners to engage in cognitively activating practices, such as problem solving and scientific inquiry, e.g. Dorfner et al. (2018_[320]). Classroom and time management were among the most frequently reported practices across 48 countries in TALIS 2018 (OECD, 2019_[39]).

- Clarity of teaching

Clarity is another characteristic of good teaching, supporting students’ information processing. This practice targets aspects of content and process clarity in classrooms that are critical for students’ cognitive and affective learning, such as setting clear learning goals, reviewing and organising the sequence of teaching, providing clear explanations and examples, making explicit the connections between topics, summative and formative assessment of student learning and task progression (Seidel, Rimmel and Prenzel, 2005_[321]; Titsworth et al., 2015_[322]).

The extant body of research suggests that high teaching clarity can be positively associated with better student achievement, motivation, and interest, e.g. Bardach et al. (2021_[323]); Hospel and Galand (2016_[324]); Wagner et al. (2016_[149]). In TALIS 2018, more than two-thirds of teachers across the participating countries reported that they engaged in this teaching practice frequently (OECD, 2019_[39]).

Given that teaching clarity involves supportive, managerial, and cognitively activating practices, it overlaps with other teaching practices.

- Cognitive activation

Cognitive activation comprises a multidimensional concept and is associated with opportunities to develop deep conceptual understanding and to solve problems (Praetorius et al., 2014^[325]; Schlesinger and Jentsch, 2016^[326]). It is typically related to the type and level of thinking required and the cognitive processes utilised by the students as they interact with content (Kunter et al., 2013^[258]; Stein et al., 2009^[327]; Tekkumru-Kisa and Stein, 2015^[328]).

Cognitive activation has been operationalised in different ways in the past, including aspects such as using challenging tasks and questions, exploring and activating prior student knowledge, exploring students' ways of thinking, co-constructing learning with students, generic-Socratic teaching, and supporting metacognition – cf. Praetorius et al. (2018^[329]). Regardless of these different operationalisations and despite the different terms often used to capture this construct, research has consistently pointed to the role that cognitive activation plays for students' cognitive – e.g. Baumert et al. (2010^[239]); Hattie (2023^[330]); Jackson et al. (2013^[331]); Li, Liu, Zhang and Liu (2021^[332]) – and affective – e.g. Boaler and Staples (2008^[333]); Förtsch et al. (2017^[334]); Lazarides and Buchholz (2019^[335]) learning outcomes. In TALIS 2018, only about half of the teachers reported that they engaged in cognitive activation practices (OECD, 2019^[39]).

- Formative assessment and feedback

Defined as the practice of gathering information about student learning to help teachers make instructional decisions to enhance student learning (Stiggins and Chappuis, 2012, p. 23^[336]), assessment comprises an integral part of teaching and a critical teaching practice for advancing student learning (Hattie, 2009^[285]; 2023^[330]; Muijs et al., 2014^[302]). Both summative and formative assessment are considered pivotal for student learning (Stiggins and DuFour, 2009^[337]) and gauging teachers' use of the two forms is an important distinction. In addition to summarising what students retain in learning, formative assessment – or assessment for learning – has a more decisive role for advancing the quality and quantity of student learning (Black and Wiliam, 2010^[338]; Chappuis and Stiggins, 2017^[339]; Hattie and Timperley, 2007^[340]), largely because it provides students and teachers with timely feedback that can inform and guide their next steps.

Three key questions are often considered in formative assessment, thus providing a means of operationalising this practice – see Black and Wiliam (2009^[341]): where the student is going (i.e. learning goals or objectives), where the student is right now, and how the gap between the current student state and the targeted learning goals or objectives can be reached. In this respect, the information provided to students and their teachers is expected to serve three functions: to sketch the reference level (feed-up), to evaluate the current level of performance (feedback), and to provide information on how to proceed to the reference level (feed-forward) (Hattie and Timperley, 2007^[340]).

Feedback is also expected, among other things, to be provided in a timely manner, to be sufficiently detailed to help delineate next steps without, however, overloading the learner, and to be adapted to students' needs and readiness levels (Hattie and Timperley, 2007^[340]; Shute, 2008^[342]). Two of the assessment practices examined in TALIS 2018 were reported more frequently than others: providing students with immediate feedback and administering one's own assessment to students (OECD, 2019^[39]). Prior research findings, especially from meta-analyses, e.g. Hattie (2009^[285]); Kluger and DeNisi (1996^[343]), converged in pointing to the role of such feedback (and formative assessment) for promoting student learning.

- Adaptation

Given that classrooms can differ notably in students' background characteristics, cultural background, readiness levels, ability levels, interests, and learning styles (Parsons, 2017^[58]; Tomlinson, 2017^[344]), adaptation is imperative for supporting student learning (Smale-Jacobse et al., 2019^[4]). In fact, research has empirically validated the importance of adaptation for student cognitive and affective learning outcomes in various settings and subject matters, e.g. Deunk et al. (2018^[57]); Prast et al. (2018^[59]); Simpkins, et al. (2008^[345]); Smale-Jacobse et al. (2019^[4]).

Adaptation hinges on the premise that students can achieve their full potential when their teachers consider the diversity of their learning needs. Therefore, teachers need to adjust teaching and resources to meet students where they are and to help them achieve maximum growth as learners (Tomlinson, 2015^[346]). Therefore, adaptation is not only a key aspect of quality teaching (Creemers and Kyriakides, 2007^[311]; Van Geel et al., 2019^[347]), but it also emphasises current issues of equity and diversity, cf. Ainscow, (2016^[348]) Although different ways of adapting teaching have been proposed, cf. Tomlinson (1999^[349]) and provided that this practice intersects with the other teaching practices, a broad operationalisation of it concerns teachers' proactive (planned) and interactive (during teaching) adaptation of learning goals, the content, the tasks chosen, the expected products, and the processes followed to reach these products. Given the increased emphasis on issues of equity and diversity, this operationalisation can focus on how teachers adapt their planning and lesson enactment to meet the needs of students from different, broadly defined cultural backgrounds.

- Supporting students' socio and emotional learning (SEL)

Researchers, policy makers, and educators agree that students should not only acquire knowledge and skills within academic disciplines, but also develop social and emotional skills in schools (Chatterjee Singh and Duraiappah, 2020^[350]; OECD, 2024^[351]). Given the increased attention to SEL in recent years, several research syntheses have documented the positive effects of SEL interventions on academic achievement in reading, mathematics, and science (Corcoran et al., 2018^[352]), social and emotional skills (Durlak et al., 2011^[173]), and the reduction of problem behaviours (Murano, Sawyer and Lipnevich, 2020^[353]).

Therefore, teacher support may not only contain practices creating a positive and supportive climate in classrooms to facilitate students' well-being, sense of belonging, and the learning of content, but also practices that focus on the development of students' actual social and emotional skills. Effective SEL teaching practices, like those concerned with teaching other aspects of development, connect, focus, co-ordinate, and target specific social and emotional skills throughout the daily learning at school (Durlak et al., 2011^[173]).

- Support for consolidation

Unlike cognitive activation, support for consolidation through iterations of repetition and reinforcement has received much less attention in different frameworks and models on teaching quality. Support for consolidation captures the opportunities teachers give to students – often during seatwork – to solidify their procedural knowledge and skills by working on tasks that might not necessarily be challenging, and which require more procedural (repetitive) work. During the classroom plenary, such opportunities can be afforded when describing and discussing the steps involved in different procedures. In Praetorius and Charalambous' (2018^[317]) synthesis, only 5 out of 12 of the prominent frameworks and models included support for consolidation explicitly, whereas cognitive activation was incorporated in all.

Given the importance of strengthening all different strands of student proficiency – including their procedural fluency (Kilpatrick, Swafford and Findell, 2001^[354]) – and considering findings that corroborate the role of supporting students' procedural knowledge, e.g. Rittle-Johnson et al. (2015^[355]), TALIS 2024 explicitly considers support for consolidation, thus, complementing prior rounds in which attention was largely paid to cognitive activation. The importance of attending to such opportunities is

highlighted by theoretical conceptualisations and empirical findings suggesting that students' conceptual and procedural knowledge often develop in bidirectional ways with improvements in one type of knowledge supporting improvements in the other, e.g. Hecht and Vagi (2010^[356]); Rittle-Johnson (2017^[357]); Rittle-Johnson et al. (2015^[355]).

TALIS 2024 indicators

Decomposing teaching quality in the seven practices and assessing teachers' work with respect to them lends itself to exploring several issues, including:

- profiles of teaching practices and potential determinants at the teacher level
- cross-cultural differences in (profiles of) teaching practices
- relationships between (profiles of) teaching practices and teachers' background characteristics (e.g. credentials, years of experience)
- relationships between (profiles of) teaching practices and teachers' initial education and ongoing professional development opportunities
- relationships between (profiles of) teaching practices and teachers' perceptions and beliefs about their practice (e.g. self-efficacy, job satisfaction)
- relationships between (profiles of) teaching practices and school-level variables (e.g. school climate, school leadership).

The exploration of the first two issues, which are more descriptive, allows the investigation of within- and between-country differences in the teaching practices employed by teachers in different schools, as well as identifying the practices that are the most or least frequently observed. The next three issues (which are more exploratory) pertain to connecting individual teaching practices or the emerging profiles of teaching practices with certain teacher-level characteristics, including their background, education, beliefs and stance regarding their profession. Acknowledging the contextual and situational character of teaching – cf. Hall, et al. (2020^[358]) –, the last issue (also exploratory) examines contextual relations, by focusing on how school-level variables might relate to certain teaching practices or profiles thereof.

With respect to measuring these teaching practices, there has been increasing interest in understanding how different measures of teaching quality – classroom observations, student ratings, and teacher ratings – can function complementarily in capturing different aspects of teaching practice, e.g. Cantrell and Kane (2013^[359]); Dobbelaer (2019^[360]). Unlike classroom observations that are often based on limited classroom visits, teacher ratings/self-reports are based on teachers' classroom practice experiences over a long period of time; research findings have shown these ratings to be aligned with expert observers' ratings from classroom observations (Kaufman, Stein and Junker, 2016^[361]). At the same time, teacher self-reports could be biased due to a perceived social desirability of more positive responses (Kunter and Baumert, 2006^[362]); this possibility is thought to be reduced when asking teachers to focus on the frequency with which they engage in certain teaching practices (as opposed to describing the quality of their work).

In TALIS 2024, the following seven sub-dimensions are considered as indicators for the teaching practices proposed above:

1. classroom and time management: employing prevention (e.g. setting rules and routines) and intervention (e.g. addressing disruptions) behaviour management strategies; and using time management efficiently.
2. clarity of teaching: setting clear learning goals; reviewing and structuring the information provided; providing clear explanations and examples; building connections among different topics and real-life situations; organising tasks and activities progressively; and using appropriate language for the student population under consideration.

3. cognitive activation: selecting and implementing cognitively activating tasks; facilitating students' cognitive activity; and supporting students' meta-cognitive learning.
4. formative assessment and feedback: checking for student understanding; providing timely and quality feedback to students to indicate where they are, where they need to go and how to reach the set learning goals; capitalising on formative assessment information to inform next teaching steps.
5. adaptation: proactively and inter-actively adapting goals, content/tasks, expected products, and processes to accommodate student differential needs based on their background characteristics and their readiness levels and interests (and, hence, account for equity and diversity in the classroom).
6. support for students' SEL: creating a positive and supportive classroom climate; employing practices to foster students' social and emotional skills and learning.
7. support for consolidation: selecting and implementing tasks to solidify students' procedural knowledge and skills; providing students support during the consolidation process (e.g. by appropriately remediating student errors and difficulties).

In developing these indicators, TALIS 2024 draws on and complements the respective items from the "Teaching in General" and "Teaching in the Target Classroom" sections of the TALIS 2018. To measure teaching practices for social and emotional learning, situational judgement test items included in TALIS 2024 elicit both the implicit and explicit beliefs and values influencing teachers' decision making and judgements in the classroom (Durksen and Klassen, 2018^[363]; Klassen et al., 2018^[364]).

Professional practices

Teachers' work does not only include their teaching practices in classrooms, as discussed, but those professional practices that contribute to teachers' own sense of professionalism and the professionalisation of teaching in general. It is important to examine these professional practices, as they are related to other teacher outcomes, such as teacher self-efficacy, job satisfaction, and teachers' perception of the value of the profession in society.

Definition and scope

Professional practices, such as the ability to make decisions at a school level and collaborate with peers, as well as teachers' perceptions of having autonomy over their own classroom teaching practice, are some of the characteristics that distinguish teaching as a knowledge profession (Guerriero, 2017^[232]; Price and Weatherby, 2018^[365]) rather than a semi-profession (Ingersoll and Collins, 2018^[366]).

Teacher professionalism involves the individual, psychological characteristics of the teacher that allow them to be labelled a professional (Tschannen-Moran, 2009^[367]). Teachers' autonomy and power to make decisions over their own work, and their ability to collaborate with colleagues as part of peer networks along with possessing and continually updating the knowledge required for their work are further characteristics of an individual teacher's professionalism (OECD, 2016^[368]).

Theoretical background

This section focuses on three aspects of professional practices that were included in past TALIS cycles and are also addressed in TALIS 2024, namely collaboration (with teacher colleagues or with parents and other key stakeholders outside school), teachers' roles in decision making, and teachers perceived autonomy regarding their work. In the following sections we will not only discuss these concepts in isolation but also their intersection with each other and their relationships to other teacher outcomes.

- Teacher collaboration

Collaboration was not always the norm in teaching (Goddard, Goddard and Tschannen-Moran, 2007^[369]). Hargreaves (2000^[370]) identifies four “ages of professionalism” in teaching, which begin to explain why the vestiges of independence and isolation exist today, particularly in Anglophone countries. He argues that, for decades, the structure of the school building itself, as well as the development of teachers into trained professionals, encouraged teachers to work individually and separately in their classrooms. Teachers’ practices included the things they had experienced as successful and were rarely developed by observing teaching practices of other staff. Since that publication, there have been important developments in school building design, partly in response to new pedagogies, that attempt to rectify the constraints previously imposed and which may influence teaching practices (OECD, 2017^[371]).

Teacher collaboration manifests itself in many ways in schools, depending on factors such as school climate/culture, school size, and school location, as well as with whom teachers collaborate and the purposes of the collaboration (Goddard, Goddard and Tschannen-Moran, 2007^[369]). It can include the forms of in-depth co-teaching or more superficial exchanges of resources or ideas (Vangrieken et al., 2015^[372]) that have been explored by TALIS in the past. There is evidence that teacher collaboration can positively influence student achievement, teacher self-efficacy (Goddard, Goddard and Tschannen-Moran, 2007^[369]), innovation, teacher absenteeism and work-related enjoyment (Vangrieken et al., 2015^[372]). The act of teachers making connections with their peers can also support teacher well-being (Durksen, Klassen and Daniels, 2017^[373]). Another aspect of collaboration extends beyond peers to include semi-professionals in schools (e.g. teaching assistants) and other specialist professionals (such as social workers and nurses).

When teachers collaborate, they are also sharing knowledge, which can contribute to their own professional learning (Goddard, Goddard and Tschannen-Moran, 2007^[369]). This kind of collaborative professional learning allows teachers to co-construct, rather than passively receive, knowledge (Ostovar-Nameghi and Sheikahmadi, 2016^[374]) and positively relates to teachers’ own professional motivation (Durksen, Klassen and Daniels, 2017^[373]). In recent years, research has paid more attention to teacher collaboration (Vangrieken et al., 2017^[375]), expanding it to include forms of collaboration for professional learning that include professional learning communities (Blankenship and Ruona, 2007^[376]), communities of practice (Wenger, 1998^[377]) and teacher networks (online or otherwise) (Schlager et al., 2008^[378]).

Teachers can collaborate by observing and offering feedback on the teaching practice of their peers, which can be productive when it is used as professional learning, rather than as a form of teacher evaluation (Cosh, 1999^[379]). An aspect of teacher collaboration that may influence teachers’ learning and development involves teacher consultations with peers or school leaders for advice or guidance (Ortego et al., 2020^[380]; Schuster, Hartmann and Kolleck, 2021^[381]) which is less likely to occur when teachers perceive a competitive school environment (Siciliano, 2015^[382]). Teacher collaboration has also been linked to school climate, and there is evidence that overall patterns of social relationships within schools can help to understand why and whether teachers collaborate (Moolenaar, 2012^[383]).

Engaging with parents and other key stakeholders outside of the school is an increasingly important professional practice for teachers (Guerrero, 2017^[232]). Parents play a vital role in the learning of their children from birth and a child’s home life and structure can influence students’ academic achievement in school (Dumont, Istance and Benavides, 2010^[384]; Hattie, 2009^[285]). Working with parents to help them support their children’s in-school learning has been linked to greater achievement gains for students as well as skill-building for parents and more positive relationships between the school and community (Hattie, 2012^[385]). Over the course of a school year, children spend a low percentage of their overall time in school compared to their time at home or in the community. Connecting in-school learning with the community in which the students live is an important part of students’ overall

development (Darling-Hammond and Bransford, 2005^[386]) and necessitates teacher collaboration with others outside their schools.

- Decision making

Research shows variation in the level of decision making that is afforded to teachers. In some schools and education systems, for example, teachers may have authority to make decisions at a classroom level, but once the decisions go beyond the classroom, they are made by someone else (Ingersoll, Sirinides and Dougherty, 2018^[387]). Teacher leadership focuses on teachers' roles beyond their classroom teaching, including influencing or making school policy or decisions (Wenner and Campbell, 2017^[388]). A teacher leader is defined as being a teacher who maintains "...classroom-based teaching responsibilities, while also taking on leadership responsibilities outside of the classroom." (Wenner and Campbell, 2017, p. 138^[388]). Multiple teacher and student outcomes have been shown to be more positive when teachers are actively involved in implementing educational change, rather than being the recipients of it (Harris and Jones, 2019^[389]). For example, teacher leadership is shown to be positively related to student achievement. Specifically, some studies have found that allowing teachers the authority to make school-level decisions over student discipline or behaviour policies has a greater impact on student achievement than the curriculum-based decisions that they make (Ingersoll, Sirinides and Dougherty, 2018^[387]). Teacher participation in school-level decisions can also have an impact on teacher retention. The rationale here is that teachers who are involved in school policy at this level are more committed to the school and its outcomes (Kemper, 2017^[390]).

As mentioned, having the authority to make decisions is one of the aspects differentiating a profession from a semi-profession or an occupation (Ingersoll and Collins, 2018^[366]). When teachers report that they can participate in school-level decisions, they are more likely to feel that teaching is valued by society (Price and Weatherby, 2018^[365]). Teacher decision making is also one of the key elements of an individual teacher's degree of professionalism. This "decisional capital" (Hargreaves and Fullan, 2012^[391]) can impact the collective level of professionalism seen in teachers in a school; in schools with more top-down, bureaucratic management, the degree of teachers' professionalism was lower (Tschannen-Moran, 2009^[367]). Indeed, the authority of teachers to make school-level decisions is, in part, dependent on the level of autonomy their school leaders afford them (Wenner and Campbell, 2017^[388]).

- Autonomy

When teachers have autonomy, they can use their own beliefs, values, knowledge, expertise and experience to choose the educational strategies and teaching methods and resources they use in their teaching practice, and teachers need autonomy to be able to manage the myriad unforeseen circumstances that can present themselves in teaching every day (Skaalvik and Skaalvik, 2014^[392]). This includes autonomy regarding their own teaching and assessment practices, the selection and development of curriculum and content for teaching, making decisions about their own professional learning and providing input into the organisational functioning of the school (Vangrieken and Kyndt, 2020^[393]).

Teachers' perceived autonomy is positively associated with job satisfaction (Avanzi et al., 2013^[394]; Koustelios, Karabatzaki and Kousteliou, 2004^[395]) and increased feelings of empowerment and professionalism (Pearson and Moomaw, 2005^[396]). Teachers who feel they are more autonomous are also more likely to report that the teaching profession is valued by their societies (Price and Weatherby, 2021^[397]). Teacher reports of having less autonomy have also been linked to teachers' feelings of burnout and a lower sense of accomplishment (Skaalvik and Skaalvik, 2009^[398]) as well as teachers' intentions to leave the profession (Worth and Van den Brande, 2020^[399]).

The level of autonomy that teachers experience in their schools has been shown to be related to the extent and possible types of collaboration. Schools with a tight, top-down control on decision making

outside the classroom do not always provide staff with ample opportunities for collaboration or professional conversations (Goddard, Goddard and Tschannen-Moran, 2007^[369]). Scholars argue that deep-level collaboration, while less frequently observed in schools (OECD, 2020^[400]), engages teacher beliefs and, thus, is necessary for educational change (Vangrieken et al., 2017^[375]). In addition, teachers' beliefs about and understanding of their own autonomy can influence how they collaborate.

Vangrieken and Kyndt (2020^[393]) developed three profiles of teachers based on their value of autonomy: autonomous collaborative, autonomous individualistic, and low autonomy collaborative. The extent and strength of social networks, together with the nature of school structures, appear to be associated with collaboration and the likelihood of seeking advice from colleagues, although the strength of the association appears to vary among countries (Siciliano, 2015^[382]; Ortego et al., 2020^[380]; Schuster, Hartmann and Kolleck, 2021^[381]).

Teacher autonomy can facilitate collaboration, but it can also act as a barrier when teacher autonomy is seen as teachers being independent or focusing solely on their own individual work (Vangrieken et al., 2017^[375]). However, this does not have to always be the case and, when looking at collaboration, it is important to also consider teachers' attitudes toward working together (Vangrieken et al., 2017^[375]). The TALIS 2018 data supported the link between collaboration and decision making. Namely, teachers who reported being able to participate in school-level decisions were also more likely to engage more frequently in more in-depth forms of collaboration (OECD, 2020^[400]).

A wide range of countries note a return to top-down regulation of teacher work as part of attempts to hold teachers accountable for the quality of education in their classrooms (Hargreaves and O'Connor, 2018^[401]). Notions of accountability, ranging from primary inputs to outcomes, as well as investment in strengthening teacher performance evaluation, have expanded. Much of the literature emphasises the potential costs and negative consequences of the frequent monitoring of teachers' work. Close surveillance and evaluation of teachers' classroom behaviour links to teacher stress (Perryman et al., 2011^[402]), de-professionalisation (Zeichner, 2010^[403]), decreasing attractiveness of the teacher profession (Ingersoll, Sirinides and Dougherty, 2018^[387]), and teacher attrition (Borman and Dowling, 2008^[96]). These issues are also discussed in the school leadership and school climate content areas.

TALIS 2024 indicators

Teacher collaboration (with colleagues), decision making, and autonomy have been measured in past TALIS surveys. TALIS 2024 examines some of the same issues that were examined in TALIS 2018, namely:

- What do teachers and principals perceive to be teachers' roles in school decision making?
- What do teachers and principals perceive to be teachers' roles in leadership?
- In what ways does collaboration stimulate and support teaching practice?

The theoretical framework also suggests relationships between the professional practices of collaboration, decision making, and autonomy themselves, as well as between these practices and other areas in TALIS. While some of these relationships were explored in TALIS 2018, TALIS 2024 considers some additional relationships between variables:

- relationships between teachers' autonomy and their level of collaboration with peers
- connections between teachers' in-depth and surface-level collaboration and professional learning and school climate
- influence of teachers' perceptions of their appraisal and feedback on their perceptions of autonomy
- relationships between teachers' professional practices and the perception of the value of the teaching profession within society

- relationships between teachers' professional practices and their thoughts on how long they will remain in the teaching profession
- connections between teachers' self-reports of engaging in professional practices and their well-being
- possible influences of classroom characteristics on teacher collaboration.

TALIS 2024 uses, where possible, the same or updated measures of these constructs from previous cycles of TALIS to enable the comparison of results over time. In addition, using the same items or scales to measure the constructs in both the teacher and principal questionnaires enables the comparison of results from two different points of view. Newly developed items examine teacher collaboration outside of school, with teachers from other schools, parents, or other key stakeholders, as well as investigate relationships with other areas of TALIS such as school climate.

In TALIS 2024, the following sub-dimensions were considered to develop indicators for the professional practices proposed above:

- *Teacher collaboration*: teaching jointly in the same class, co-planning and collaborating on elaborating resources, observing other teachers and providing feedback, working with teachers across classes and age groups, participating in collaborative professional learning with colleagues, exchanging teaching materials with other teachers and sharing good practices, discussing specific students with colleagues, working with other teachers on assessment policy and standards, attending team conferences, seeking advice from others in the school, participating in networks/communities of teachers for professional development, perception of collaborative culture in school, collaboration with parents and/or community members.
 - *Principal*: perception of collaborative culture, encouraging staff to collaborate.
- *School-level decision making*: participating in school-level decisions, leading new initiatives, developing school policy for behaviour/discipline.
 - *Principal*: teacher participation in various school- and classroom-level decisions, including participating in staffing or human resources decisions (including hiring, disciplinary or salary issues); school-level policy decisions (including assessment, discipline/behaviour); school-level actions (including determining/approving budget, curriculum, course offerings, professional learning); and classroom decisions (selecting learning materials, determining course content, choosing learning, assessment and class discipline strategies).
- *Teacher autonomy*: selecting or developing teaching materials/resources, determining curriculum or course content, choosing educational strategies or teaching and assessment practices, choosing professional learning, disciplining students in and beyond classroom, providing input into school-level functions.

Occupational perceptions

There have been growing concerns about the increasing complexity of the teaching profession (OECD, 2019^[404]). Some profession-related factors identified as contributing to this rising complexity include high workload, changes in policy priorities toward teaching quality improvement, disruptive student behaviour, negative relationships with students and colleagues, and increases in accountability and compliance (Harmsen et al., 2019^[405]; OECD, 2019^[404]). Although teachers' main work has remained broadly similar over time, their roles have extended beyond classroom processes, including to collegial coaching and co-operation, teacher leadership, and engagement in continuous professional learning (Maulana, Kington and Ko, 2023^[406]; Van der Lans et al., 2024^[407]). Consequently, their feelings about themselves as teachers may be changing along with changes in personal and contextual factors.

Among other constructs, job satisfaction, well-being and perceived value of teaching, as well as self-efficacy, continue to receive growing attention. TALIS 2024 distinguishes between two domains reflecting distinct types of occupational perceptions: (i) Job satisfaction, well-being and perceived value of teaching, and (ii) teacher self-efficacy. TALIS 2024 also addresses related aspects such as teacher motivation and commitment to the profession. Interrelationships between these constructs have been highlighted in research showing a connection between self-efficacy and aspects of well-being, teaching effectiveness, job satisfaction, and teachers' learning (Helms-Lorenz and Maulana, 2016^[247]; Klassen and Tze, 2014^[408]).

Job satisfaction, well-being and perceived value of teaching

Occupational perceptions – teachers' feelings about themselves as teachers and teaching as a profession – are strongly tied to their perceptions of job demands and resources. Some aspects of occupational perceptions, like negative emotion and job dissatisfaction, can result in poor teaching quality and teacher attrition (Harmsen et al., 2018^[246]).

Definition and scope

Teacher well-being refers to positive and effective functioning at work (Collie and Martin, 2016^[409]). To measure well-being, researchers suggest questions about job satisfaction or work engagement (Collie, Shapka and Perry, 2012^[410]) as well as various emotions (e.g. joy, sadness) as part of teachers' experience over a period of time (Eldor and Shoshani, 2016^[411]). In addition, there have been suggestions to consider a broader measurement scope, including teachers' job demands (e.g. workloads), resources (e.g. workload reduction, professional support), responses (e.g. job dissatisfaction, tension), and outcomes (e.g. attrition/retention) (Harmsen et al., 2019^[405]; Helms-Lorenz and Maulana, 2016^[247]; Harmsen et al., 2018^[246]; Helms-Lorenz and Maulana, 2016^[247]). Perceived value of teaching can be viewed as a component of occupational responses in relation to motivation, commitment, and well-being.

Theoretical background

The job demand-resources model (JD-R) (Bakker and Demerouti, 2007^[412]; Schaufeli and Taris, 2014^[413]) provides a relevant framework for studying teachers' workplace experiences and entails multifaceted constructs underlying occupational perceptions. The JD-R model illustrates teachers' well-being as a result of positive resources (e.g. self-efficacy) and negative demands (e.g. high workload). The JD-R model, together with the theory of preventive stress management (TPSM) (Quick, Quick and Nelson, 1998^[414]), which derives from an area of medicine concerned with the prevention of organisational stress, provide a framework for related research and measurement.

Several scholars have applied the JD-R model (Bakker and Demerouti, 2007^[412]) to the teaching context. Collie (2019^[179]) investigated five demands and resources that are linked to teachers' capability to undertake their work effectively, including barriers to professional development (demand), disruptive student behaviour (demand), teacher collaboration (resource), teacher involvement in decision making (resource), and self-efficacy for teaching (resource). Helms-Lorenz and Maulana (2016^[247]) and Harmsen, Helms-Lorenz, Maulana and van Veen (2019^[415]) combine the JD-R and the TPSM models to examine the link between beginning teachers' occupational demands and resources, and their occupational responses. Job satisfaction (as well as self-efficacy) are central components included in their frameworks.

Job satisfaction is also recognised as a key component of teachers' well-being (Viac and Fraser, 2020^[177]). Job satisfaction can have many facets, two of which refer to satisfaction (i) with the teaching profession and (ii) the school as a work environment – the latter also reflecting perceptions of school

climate and school leadership. Information about job satisfaction has the potential to reveal the effects of the possible challenges (e.g. stress, dissatisfaction) teachers are facing. One prominent indicator often associated with job dissatisfaction is workload (e.g. administrative work) or lack of resources (Viac and Fraser, 2020^[177]). Therefore, attention to teachers' well-being has policy implications and can highlight job-related factors contributing to professional satisfaction (Collie, 2021^[416]).

To proactively address the stresses of teaching, initial teacher education programs have recently increased their focus on promoting well-being through building resilience – see Fokkens-Bruinsma et al., (2021^[248]) – and developing and nurturing the overall social and emotional competence of prospective teachers. Teacher recruitment and selection practices are also seeking valid and reliable ways to assess important non-academic skills, often with emotional intelligence measures – see AITSL (2015^[417]); Kankaraš and Suarez-Alvarez (2019^[170]); Turner and Stough (2020^[418]). Teacher-specific situational judgement tests and scenario-based learning across several countries also provide evidence on how to measure teachers' non-academic competencies like empathy and resilience (Klassen et al., 2018^[364]).

Of particular significance to TALIS 2024 is the OECD teacher well-being framework (Viac and Fraser, 2020^[177]), which identifies four components of teachers' well-being (physical and mental, cognitive, subjective, and social well-being). These four components as they relate to working conditions consist of both positive and negative influences – all of which impact the psychological attributes of a quality teacher and are associated with behavioural outcomes of quality teaching. Discussion of the latter relates to other sections, such as teaching practices and attention to the social and emotional learning of students.

Job satisfaction is related to instructional quality, well-being, sense of belonging, engagement, commitment to activities in a school, and stress (Collie, 2021^[416]; Harmsen et al., 2018^[246]; Granziera and Perera, 2019^[419]; Reeves, Pun and Chung, 2017^[420]; Skaalvik and Skaalvik, 2011^[421]; Toropova, Johansson and Myrberg, 2019^[422]). Research finds teachers satisfied with aspects of their work, but less than satisfied with their work conditions, such as access to learning resources, treatment by others as professionals, and applicable professional development (Crossman and Harris, 2006^[423]; Dinham and Scott, 1998^[424]; National Academy of Education, 2008^[425]; OECD, 2013^[426]). Teachers' satisfaction – both the levels and changes – is strongly correlated with teaching performance (Banerjee et al., 2017^[427]) and teacher attrition (Canrinus et al., 2012^[428]; Carver-Thomas and Darling-Hammond, 2017^[429]; Ingersoll, 2001^[430]; Whipp and Geronime, 2015^[431]).

Occupational perceptions can also be linked to aspects of school leadership and institutional climate. School leadership also relates to school-wide learning climate and classroom teacher practices. For example, effective school leadership can promote a positive school climate (Price and Moolenaar, 2015^[432]; Price, 2012^[433]), thus, creating better workplace conditions and improving teachers' job satisfaction can be key to preventing teacher turnover and promoting teachers' self-efficacy, particularly among novice teachers (Kraft, Marinell and Shen-Wei Yee, 2016^[434]; Ladd, 2011^[435]; Meristo and Eisenschmidt, 2014^[436]; OECD, 2016^[368]; Weiss, 1999^[437]).

TALIS 2024 indicators

The TALIS 2024 indicators cover the three sub-domains of occupational perceptions, perceived valuing of teaching, teachers' job satisfaction and aspects of motivation.

- Perceived valuing of teaching. TALIS 2013 measured teachers' perceived general value of teaching, while TALIS 2018 asked about the value of teaching in relation to various societal groups and gauged the perceived utility of teaching in society. So far, analyses of TALIS data have consistently shown that teachers tend to feel that their profession is undervalued in their countries while overwhelmingly expressing satisfaction with their work at school. Given

developments due to the COVID-19 pandemic, the global rally to increase the appreciation of teachers' work, and the rapid changes to how teachers interact with their students, teachers may feel more valued than in the past. Yet, the long-term effects on perceived value of teaching, among other occupational perceptions, are unknown. Therefore, keeping track of this development in TALIS 2024 could shed further light on the standing of the teaching profession within and across countries. This is especially important since the extent to which teachers feel that others treat them as professionals or semi-professionals matters for teachers' commitment and success in the classroom (Price and Weatherby, 2018^[365]).

- Teachers' job satisfaction. Questions on teachers' job satisfaction, and teachers' perception of their professional value as teachers were altered between previous TALIS cycles. The questions about job satisfaction were split into two subsections in 2013: (i) satisfaction with their school, and (ii) satisfaction with the teaching profession. TALIS 2018 introduced new items to gauge teachers' intentions of leaving teaching, either for another education position or the profession altogether, as well as to measure their workplace stress. There is evidence that teachers' well-being changes over time, and the change is influenced by various job resources, such as workload reduction policies and professional development support (Harmsen et al., 2018^[246]). TALIS 2024 also provides opportunities to investigate the extent to which job satisfaction (or the intention to leave teaching) varies across the levels of education systems.
- Aspects of motivation. Items on job satisfaction and teacher emotion, such as enjoyment (Frenzel et al., 2016^[438]) and enthusiasm (Kunter et al., 2011^[439]) in teaching, are also included in TALIS 2024. Items related to teachers' initial and current motivation, e.g. motivation to teach; commitment to the profession (Watt and Richardson, 2007^[440]) can help inform policies on attracting, recruiting, and retaining teachers. Attention to job demands (e.g. workload), job resources (e.g. autonomy-supportive leadership), stress/burnout, and classroom social climate in TALIS 2024 can also provide further information and policy implications for teacher well-being.

Teacher self-efficacy

Teacher self-efficacy refers to teachers' beliefs in their capabilities of teaching and facilitating learning (Bandura, 1993^[441]; Tschannen-Moran, Hoy and Hoy, 1998^[442]). Teachers' self-efficacy combines domains of self-confidence in teaching that motivates how they relay information on content-based material, manage classroom behaviours of students, modify lessons to fit the various learning needs of students, and reflect on the effectiveness of current practices in efforts to improve teaching expertise (Bandura, 1997^[159]; Tschannen-Moran, Hoy and Hoy, 1998^[442]).

Definition and scope

Teacher self-efficacy beliefs reference specific teaching practices, knowledge, and skills. TALIS 2018 defined three associated core dimensions of instruction, including general instruction, student engagement, and classroom management, for which teachers were asked to indicate the extent to which they believed they could perform. In addition, self-efficacy develops over time with teachers' experience and can predict the quality of teachers' instruction (Zee and Koomen, 2016^[443]).

Teacher self-efficacy also includes teacher beliefs regarding their capacity to apply "modern" teaching practices, such as online teaching (intensified during the COVID-19 pandemic) and hybrid teaching (Mentzer, Krishna and Mohandas, 2023^[444]). These teaching practices aim to create quality instruction and presence in digital settings (Gurley, 2018^[150]; Howard et al., 2020^[136]; Koehler et al., 2014^[445]; Voogt et al., 2013^[446]). Self-efficacy can also differ for specific job duties, such as teaching for equity in multicultural and diverse classrooms, teaching about environmental sustainability, or teaching social and emotional skills to students.

Theoretical background

Measures of occupational perceptions, such as teachers' self-efficacy, have been considered as key outcome variables for policy analysis. Reviews of teachers' self-efficacy have shown substantial evidence of direct impact on students' academic self-efficacy, engagement, and achievement (Zee and Koomen, 2016^[443]); see also Hoffman and Seidel (2014^[447]); Holzberger, Philipp and Kunter, (2013^[448]); Hoy, Hoy and Kurz, (2008^[449]); Klassen and Tze (2014^[408]); Siwatu and Chesnut (2014^[450]). Research findings also show considerable evidence that teachers' self-efficacy pervades school teaching climates (Zee and Koomen, 2016^[443]); see also Collie, Shapka and Perry (2012^[410]); Hoy et al., (2008^[449]); Rosenholtz (1989^[451]); Siciliano (2016^[452]); Skaalvik and Skaalvik (2014^[392]); Tschannen-Moran, Salloum and Goddard, (2014^[453]).

Like other occupational perceptions, such as job satisfaction and perceived value of the teaching profession, self-efficacy links to teachers' feelings of self-worth which, in turn, depend on the degree of training and position in the school. For example, teachers with higher knowledge levels, and self-efficacy, could be expected to cope differently with their work demands and, therefore, to perceive their working conditions in a different light when compared with less knowledgeable and self-confident colleagues. Therefore, teacher knowledge and self-efficacy might have moderating roles regarding the relationship between working conditions and job satisfaction.

TALIS 2024 indicators

Questions on teachers' self-efficacy were asked only in a rather general way in TALIS 2008, while in 2013 questions about self-efficacy also included aspects of classroom teaching. TALIS 2018 further expanded these questions to ask about self-efficacy related to technology in education and multicultural learning.

- The teacher self-efficacy scale construct from previous cycles is preserved in TALIS 2024, allowing for comparisons across cycles. Some of these items that were also included in TALIS 2018 are from the Teachers' Sense of Efficacy Scale (TSES) developed by Tschannen-Moran and Woolfolk Hoy (2001^[454]). The items from the three sub-scales (student engagement, classroom management, and instructional strategies) of the TSES are considered "...superior to previous measures of teacher self-efficacy..." (Woolfolk Hoy and Burke Spero, 2005, p. 354^[455]).
- TALIS 2024 also introduced domain-specific self-efficacy items to gauge teachers' confidence in addressing the contemporary issues of diversity and equity, educational use of technology, social and emotional learning, and environmental sustainability education.

Institutional environments for teaching

While individual teachers impact students' learning, the environment of the school – students' peers, other teachers, the principal, families, and the wider community – further conditions how learning in the classroom looks, feels, and operates. Even though TALIS does not survey parents or other external stakeholders, it does survey school leaders (principals) about their leadership, their teachers, and conditions at their schools. It also gauges teachers' perceptions of other teachers, students, parents, stakeholders, and their principals' views of the school climate. School leadership and school climate topics are discussed separately in this section as two domains of institutional environments for teaching.

School leadership

While leadership is viewed as a primary quality of an organisation, the topic of leadership in the educational sector can span from school management to principals as leaders to teacher-leaders to

students, parents and local communities involved in school decisions. As indicated in the TALIS 2018 report, “School leadership, as enacted by school leaders and teachers, is one of the most important school-level factors influencing students’ development and achievement.” (OECD, 2020, p. 182_[400]).

Definition and scope

Instructional leadership has been the core school leadership approach linked to student achievement. It focuses mostly on high-quality instructional practices, curriculum improvement, professional learning community, and data assessment aspects of school leadership. Its key components include defining school missions, managing instructional programs, and promoting the school learning climate (Hallinger, 2003_[456]). Over time, the definition of school leadership expanded to four dimensions: setting directions, developing people, focusing on learning, improving the instructional program (Leithwood and Seashore-Louis, 2011_[457]).

Meanwhile, stylistic approaches of school leadership encompass collaboration, sharing power, co-operation, and empowerment through distributing and sharing school responsibilities (Diamond and Spillane, 2016_[458]; Gronn, 2016_[459]; Woods, 2016_[460]). Though this type of distributed leadership often includes students, parents, local communities, external social agencies, and the like, teacher leadership is at the forefront of this approach. Teacher leadership emphasises empowerment – an approach that involves leadership by teachers and professional staff, especially in instructional practices, policies, and decisions (Wenner and Campbell, 2017_[388]).

As the field of educational leadership evolves, it is particularly compelling to address diversity, inclusiveness, social and emotional learning, and climate change. With the focus on improving all students’ learning and achievement, the central role of effective school leadership surfaces since it has the potential of contributing to differences in teachers’ occupational perceptions, professional development, student and community engagement, school climate and school resource use, as well as to ultimately improve student learning.

Theoretical background

Principals are viewed as the catalyst for raising teaching quality and establishing and maintaining the school and work climate, thereby impacting student learning, albeit indirectly (Dicke et al., 2019_[461]; Price, 2020_[462]; 2012_[433]; Sun and Xia, 2018_[463]; Veletić, Price and Olsen, 2023_[464]). Research posits that instructional leadership focuses on academic and programmatic changes, while other aspects of leadership focus on building professional learning communities, trust among stakeholders, and engaging spaces. Recent studies exploring the possible associations between principals of colour and the recruitment of teachers of colour (Sun and Miller, 2020_[465]) and students’ voices diversifying inputs for school decision making (Gottschalk and Borhan, 2023_[466]) indicate possibilities of how diversity and inclusiveness can be addressed to promote social justice. Inevitably, school leadership plays a crucial role in creating and fostering an environment where teachers feel they have the appropriate resources, time, ownership, and supports to best serve their students (Bellibas, Gümüş and Liu, 2020_[467]).

Leadership does not necessarily involve management. For example, school leadership could foster professional development (PD) in ways that target teachers’ specific needs and interests and, ultimately, invigorate classroom instructions and student learning (du Plessis and Eberlein, 2018_[468]; Spillane, Shirrell and Hopkins, 2016_[469]). However, the management and resource agency aspects of the larger educational system could also restrict the agency of school principals. Principals in some countries may be aware of the PD needs of the teachers in their schools but lack the authority to bring that PD to their school. This may be because they may have no leeway in choosing their schools’ PD beyond the existing governing board recommendations, no budgetary discretion to use schools’ funds for such PD activities, or simply lack funds to support PD activities. If leaders have the autonomy to

shape continuous professional development, they can establish and maintain a culture of improvement and develop a shared vision of learning across teaching and management staff (OECD, 2013^[426]).

Distributed leadership and teacher leadership are terms that are sometimes used interchangeably. They are, however, distinct. Distributing leadership can assign teachers authority for tasks but still leave the ultimate decision in the hands of the principal (Harris, 2004^[470]). Teacher leadership formally or informally deems some teachers as leaders among their fellow teacher colleagues (Wenner and Campbell, 2017^[388]). Teachers go to teacher-leaders to obtain advice, best practices, or mentorship on professional issues and teaching practices. Research, however, has long been at odds over how best to develop teacher leadership, motivate teachers to engage in the school decision-making process, and improve teachers' practices and student learning – see, for example, Al-Yaseen and Al-Musaileen (2015^[471]); Bademo and Tefera (2016^[472]); Wenner and Campbell (2017^[388]). Nevertheless, a common research finding is that teacher leadership can only be developed in schools where leadership is shared (Gulmez, 2022^[473]; Oppi, Eisenschmidt and Jogi, 2022^[474]; Wenner and Campbell, 2017^[388]).

Research also shows that distributed leadership is associated with more satisfied school staff members as well as the benefits of school-level outcomes of organisational citizenship and collegial co-operation (Hulpia et al., 2012^[475]). Grubb and Treadway (2010^[476]) suggest that, if leadership delegates power, fosters collaboration among teachers and staff, and promotes equity, enables everyone to develop essential leadership skills, and enhance participation in decision making, then this also directly contributes to students' success.

In schools where leadership has evolved from being individual to distributed and where stakeholders collaborate, share, and are collegial, we see teachers' empowerment and engagement improve (Diamond and Spillane, 2016^[458]). However, pluralist leadership often still operates tied to a culture of schooling with a powerful leader. Recent school leadership theorists who are critical of the inequity and homogeneity of the traditional school leader model propose a hybrid concept of distributed leadership emphasising collaboration and sharing at the horizontal direction coupled with a supportive principal at the top (Woods and Roberts, 2016^[477]).

The scope of leadership in prior cycles of TALIS had been narrower than in other research literature particularly in organisational research. TALIS 2024 now includes ideas of schools as learning organisations, professional learning communities, leadership for learning (which is not necessarily the same as instructional leadership – see Veletić and Olsen, (2024^[478]) –, relational leadership, and teacher leadership. Areas related to teaching, such as instructional leadership and distributed leadership, continue as solid foci of TALIS.

TALIS 2024 indicators

Given the primary orientation of TALIS as a voice of the teachers, the survey distributed to the principal (or otherwise named school leader) serves two purposes: (i) to collect data about the school as an organisation, and (ii) about the principal as a school leader. The first three TALIS surveys (2008, 2013, and 2018) kept the concepts of school leadership and management quite distinct, and TALIS 2024 continues to do so. TALIS 2024 asks principals about their leadership as well as their management. The teacher questionnaire focuses on the principals' leadership practices and relationships with staff, parents, guardians and students. While an effective school leader sets the strategic direction, adjusts the alignment of staff to organisational needs, and motivates people (Algahtani, 2014^[479]), a well-functioning school also needs school leaders with management skills to navigate specific teaching and learning issues. Adjusting to the remote learning and digital classrooms since the pandemic era, for example, necessitated school leaders' management as well as their leadership skills.

Ideas about leadership that involve a level of agency by the principal, such as their style as a leader, are asked of the principals and the teachers in their respective questionnaires. Other questions

regarding leadership, such as the authority of the principal to implement policy based on the local context of their school, are only asked of the principal. Principals are also asked questions about resources and management flexibility which may impact leadership, such as the authority to hire teachers or implement their own testing measures.

TALIS 2024 conceptualises school leadership in terms of six key dimensions:

- who principals are in terms of qualifications and development of principals
- what principals do in terms of their roles, functions and work, instructional leadership terms and conditions, workload, hours, autonomy, and actions
- how leadership and teacher leadership roles are distributed, as well as teachers' perceptions of these shared powers
- school leadership and individual and organisational job satisfaction and commitment
- school leadership and targeted professional development
- school leadership engaging diversity, inclusiveness, social and emotional learning of students, and the world climate change.

Teachers are asked about their principal's leadership practices, such as involving teachers in school decisions. The change to remote learning and digital classrooms since the COVID-19 pandemic morphed the demands on principals. Since schooling has become more focused on the classroom, principals will likely find themselves spending more of their time managing infrastructure and addressing basic needs of students and teachers rather than fostering academic learning as instructional leaders. Understanding how principals are navigating these changing demands is expected to become important information for policy makers.

Lastly, the continuing global migration and economic downturn since TALIS 2018 has possibly shifted the socio-demographic distribution of school children to varying extents across schools. Newly rising in the field of educational leadership are ideas about leadership for social justice and the role of school leaders in ensuring students' basic physical and socio-emotional needs are met. Given this background, TALIS 2024 collects perspectives on how school leadership can address students' extra-school needs.

School climate

A large body of research demonstrates the vital importance of school climate on teaching and learning. Consequently, growing interest over the past decade seeks to better understand and improve school climate. Understanding and improving school climate are even more important in the contemporary (post) pandemic context, characterised by the heavy digitalisation of teaching and learning process worldwide. For a long time, the knowledge base on school climate has been dominated by research in Western and high-income countries (i.e. Australia and those in Europe and North America), but more recent evidence shows that school climate is also a relevant factor in other national contexts (Larson et al., 2020^[480]). Particularly, research shows that conceptualisations and operationalisations of school climate in low- and middle-income countries are similar to those in high-income countries (Larson et al., 2020^[480]).

Definition and scope

TALIS 2018 covers the main dimensions of school climate, including the academic, community, safety, and institutional environment domains (Ainley and Carstens, 2018^[235]; Wang and Degol, 2016^[113]). To retain comparability between TALIS cycles for trend analyses, TALIS 2024 continues to survey the four dimensions of school climate used in TALIS 2018, as well as updating some indicators. Some new sub-areas of interest to integrate were defined as academic rigour, bullying, inclusion, differentiation, adaptive practices, collaborative practices, infrastructure quality, and technology and digitalisation.

School climate is defined differently across studies and contexts, but with certain key elements (Larson et al., 2020^[480]; Wang and Degol, 2016^[113]). In general, school climate encompasses structure and support components (Larson et al., 2020^[480]). The structure component can be equated to the school's physical environment, while the support component conceptually links to the school's social environment (Thapa et al., 2013^[112]; Wang and Degol, 2016^[113]). Together, school climate refers to the quality and character of school life. It is usually defined as the patterns of people's experiences at school (socially, emotionally, civically and ethically, and academically), which reflect norms, goals, values, interpersonal relationships, teaching and learning practices, and organisational structures (Cohen et al., 2009^[111]; Thapa et al., 2013^[112]).

Theoretical background

School climate is a multidimensional construct frequently operationalised through the dimensions of safety (e.g. rules and norms, physical safety, social and emotional safety, and disciplinary climate), community (e.g. respect for diversity, school connectedness/engagement, social support, peer collaboration, teacher-student relationships and relationships with families and the community), academic (e.g. social, emotional, ethical and civic learning; academic press; professional development; leadership; quality of instruction; and teachers' and students' perceptions of learning climate) and institutional environment (e.g. physical surrounding, resources and structural organisation) (Cohen et al., 2009^[111]; Freiberg, 1999^[481]; Thapa et al., 2013^[112]; Wang and Degol, 2016^[113]; Zullig et al., 2010^[482]) (see Table 3.3).

A systematic narrative review on teacher working conditions (TWCs) in the United States by Merrill (2021^[483]) lists a set of sub-dimensions of TWCs that overlaps with many aspects of school climate – cf. Larson et al. (2020^[480]); Wang and Degol (2016^[113]) –, suggesting a strong conceptual link between the two constructs. Despite the conceptual overlaps between TWCs and school climate, both constructs emerged separately and exclusively from fragmented studies originally developed in Western countries. The two constructs have developed over time, thus providing a dynamic insight into the knowledge base in a hierarchical manner (e.g. meta-construct, construct, component, or indicator). It is likely that these two constructs may conceptually converge in the future.

Table 3.3. School climate framework

| | | | |
|---|---|---|---|
| Academic | | | |
| Leadership | Academic rigour | Professional development | |
| Principals and administration support, pedagogical and administrative leadership, team constellations, teachers, openness of communication | Quality of instruction, (formative) assessments, teacher expectations of students, achievement goal structure, resiliency, innovation | Opportunities and programmes for growth and development | |
| Community | | | |
| Partnership | Relationships | Connectedness | Respect for diversity |
| Role of community members and parents in schooling, stakeholder involvement, collaborative practices, teacher training institute partnerships with schools | Trust, interpersonal relationships between staff and students, between staff, between parents and staff, between stakeholders inside and outside the school | Cohesion, sense of belonging, student activities, teacher collaboration, teacher engagement with families and wider school community, Indigenous culture and language connections | Fairness, autonomy, stakeholders' opportunities for decision making, cultural awareness, inclusion, multilingualism, multiculturalism, language diversity, dealing with discrimination, diversity-related practices (e.g. meeting needs of differently advantaged students, teacher migrant background, gender balance), adaptive practices |
| Safety | | | |
| Social and emotional | Discipline and order | Physical | |
| Bullying, accessible counselling | Clarity, fairness and consistency of rules, belief in school rules, conflict resolution | Level of violence or aggression, students and staff feel safe, security measures (including post-pandemic) | |
| Institutional environment | | | |
| Environmental | Structural organisation | Availability of resources | |
| Building safety, heating, lighting, air conditioning, acoustical control, cleanliness, upkeep of maintenance, quality of building, greening of education and green transition | Class size, school size, ability tracking, time use, joint teaching in large classroom spaces | Adequacy of supplies, resources, support, and materials, technology and digitalisation, sharing of resources, schooling transitions (e.g. primary to secondary) | |

Note: Adaptation from Kristine E. Larson et al. (2020^[480]), "A systematic literature review of school climate in low and middle-income countries", *International Journal of Educational Research*, Vol. 102, pp. 289-301, <https://doi.org/10.1016/j.ijer.2020.101606> and Wang, MT. and J. Degol (2016^[113]), "School climate: A review of the construct, measurement, and impact on student outcomes", *Educational Psychology Review*, Vol. 28/2, pp. 315-352, <https://doi.org/10.1007/s10648-015-9319-1>.

While conceptualised by Wang and Degol (2016^[113]) in the relationship between sub-dimensions of school climate, growing research emphasises the primacy of trust in fostering positive school climates. Principals' influence on teachers' work and the learning climate necessitate a trusted work environment (Bryk et al., 2010^[484]; Hoy, Smith and Sweetland, 2002^[485]; Seashore-Louis et al., 2010^[486]; Rosenholtz, 1985^[487]; Tschannen-Moran and Gareis, 2004^[488]) because trust in school workplaces provides an organisational culture where innovation can thrive (Bryk and Schneider, 2002^[489]; Bryk et al., 2010^[484]). In trusting schools, teachers cite higher incidences of efficacy, which translates into more effective classroom lessons and management and improved student learning (Bryk and Schneider, 2002^[489]; Bryk et al., 2010^[484]). Importantly, the atmosphere of trust begets teacher commitment, not the other way around (Price, 2013^[490]). In these trusted school spaces, students exhibit more pro-school behaviours, which benefit their learning (Goddard, Goddard and Tschannen-Moran, 2007^[369]; Goddard, Tschannen-Moran and Hoy, 2001^[491]; Tschannen-Moran and Hoy, 2000^[492]).

School climate creates conditions for effective teaching and learning and is, therefore, an important construct in the field of school improvement (Hargreaves, 1995^[493]; Veletić, Price and Olsen, 2023^[464]; Kyriakides et al., 2010^[494]; OECD, 2022^[98]). The school climate affects school communities' capacity for innovation, adaptation, and resilience. It distinguishes schools that are "beating the odds" more so than teachers' qualifications or personnel resources (Voight, Austin and Hanson, 2013^[495]). For example, school climate is central to boosting students' and teachers' attendance and engagement (Dorn et al., 2020^[19]; Maldonado and De Witte, 2020^[20]), and research has found a link between the strength of teacher-parent relationships and student attendance (Epstein and Sheldon, 2002^[496]). For outcomes like these, school climate is increasingly relevant in efforts to reduce educational inequalities and exclusion.

A positive school climate can improve students' educational outcomes, both cognitive (with enduring effects on student achievement) and socio-emotional (e.g. self-esteem, self-concept, well-being, school satisfaction, engagement and persistence), as well as student behaviour and mental health, (Anderson, 1982^[497]; Cornelius-White, 2007^[498]; Hoy, Hannum and Tschannen-Moran, 1998^[499]; MacNeil, Prater and Busch, 2009^[500]; Maxwell et al., 2017^[501]; Nilsen and Gustafsson, 2014^[502]; OECD, 2021^[503]; Thapa et al., 2013^[112]; Welsh, 2000^[504]) (Wubbels et al., 2012^[505]; Zullig, Huebner and Patton, 2011^[506]). For teachers, a positive school climate is associated with improved job satisfaction, commitment to their profession, teaching self-efficacy, collective efficacy, retention, and effectiveness (Aldridge and Fraser, 2016^[507]; Dou, Devos and Valcke, 2016^[508]; Hoy and Woolfolk, 1993^[509]; Ladd, 2011^[435]; Malinen and Savolainen, 2016^[510]; Moolenaar, Slegers and Daly, 2012^[511]; Price and Collett, 2012^[512]; Thapa et al., 2013^[112]).

Previous cycles of TALIS and PISA assessed several aspects of school climate, from the perspectives of students, teachers, and principals. These studies confirmed associations of school climate with students' academic, socio-emotional, and behavioural outcomes, as well as its association with teachers' practices and self-efficacy (OECD, 2023^[513]; OECD, 2020^[1]; OECD, 2020^[400]; OECD, 2019^[184]; OECD, 2015^[514]; OECD, 2011^[515]; OECD, 2009^[516]). Moreover, the 2018 TALIS-PISA link study connected the extent of parent and community engagement in school activities (as shown above in Table 3.3) to differences in expectations and performance in school (OECD, 2021^[517]). Across systems, teachers' overall evaluation of their relationships with students are extremely positive, however, there is less consensus when it comes to evaluating the quality of teachers' relationships with colleagues (2020^[400]; OECD, 2019^[39]).

TALIS 2024 indicators

With new teaching and learning arrangements and modified school and classroom organisation in a world changed by the COVID-19 pandemic, students and teachers have experienced changes in school life, norms, safety, and patterns of relationships and interactions among educators, students, leadership, families, and the community. For example, we are only beginning to understand how a principal's role in fostering a positive school climate might be changing as their work tasks change in post-pandemic traditional (face-to-face), newly adapted hybrid, or fully online learning environments. Although classroom

climate operates at the classroom/teacher level (Nilsen, Gustafsson and Blömeke, 2016^[518]), it links to climate at the school level in that school climate influences classroom climate. Therefore, it is of interest to explore how the role of classroom climate will develop further as learning is taking place more frequently in digitised classrooms with hybrid attendance options. In addition, school climate research in low- and middle-income countries has so far focused on the institutional environment dimension more than on other dimensions and the comprehensiveness of TALIS 2024 may contribute to reducing such knowledge gaps (Astor and Benbenishty, 2019^[519]).

Indicators related to the four school climate dimensions can trace changes in school climate since TALIS 2018 to answer the following matters, whenever those indicators were retained as trend items:

- School and classroom climate variation within and between countries:
 - To what extent did school climate change since 2018?
 - To what extent did aspects of classroom climate change since 2018?
 - How have the interrelationships between the four dimensions of school climate changed? Did the extent of the interrelationships change consistently across the globe?
 - To what extent do school climate dimensions explain classroom climate?
- The relationships between school and classroom climate and teacher and school outcomes:
 - What relationships are evident between each of academic, community, safety and institutional dimensions and the following variables:
 - leadership practices
 - instructional practices
 - technological advances
 - equity and diversity in schools
 - socio-emotional learning
 - occupational perceptions
 - teacher turnover, absentee rates, and attrition?

Building upon the four dimensions of school climate previously used in TALIS 2018 allows us to capture critical changes in the quality and character of school life, its norms, safety, and patterns of relationships and interactions among educators, students, leadership, families, and the community, especially since the global rebuilding of how schools look and feel. The existing indicators were kept as identical as possible to maximise an assessment of these changes.

In addition, TALIS 2024 includes an indicator related to possible improvements in the system-level environments in which teachers work (Fullan, 2016^[520]). TALIS 2024 seeks the views of teachers regarding what they see as the most important development they want to be implemented in their education system at the level of schooling where they teach. This question invites an open-ended response to be coded after the survey (Neuert et al., 2021^[521]; Züll, 2016^[522]) and aims to capture depth and nuance that is otherwise not captured by the targeted questions, items and closed response options otherwise used in the survey. The rapid advancement of multilingual large language models (LLM, as a sub-class of artificial intelligence models) bring open question formats more into reach for cross-cultural surveys such as TALIS. The question also relates to previous, and largely unsatisfactory, attempts to capture teachers' policy recommendations and priorities through ranking or forced-choice items.

Teacher, principal and school characteristics

Teacher, principal and school characteristics are important independent variables in analyses of variations in contemporary influences and enduring features of teaching and learning. Even though these variables

are not necessarily used for exploring differences within and between school systems and are not included in the table of conceptual relationships they are important, and it is necessary that they be consistently and unambiguously defined.

Teacher characteristics

Relationships between characteristics of teachers and student achievement feature in research literature and policy deliberations. Analyses of data from international studies that include matched data from students and their teachers serve to highlight the characteristics of teachers surveyed in TALIS. A number of these analyses have been based on the Progress in International Reading Literacy Study (PIRLS) and the Trends in International Mathematics and Science Studies (TIMSS). In both studies, students are sampled in intact classrooms, and teachers of those classrooms are also surveyed (Mullis et al., 2020^[523]). Based on TIMSS 2011 data for the fourth grade from 47 countries, Blömeke, Olsen and Suhl (2016^[524]) suggested that there were positive associations among teachers' experience, educational level, whether the teachers had a major study in mathematics or mathematics education, and students' mathematics achievement. Other studies suggest that these effects were consistent across subjects, levels of schooling, and countries (Blömeke and Olsen, 2019^[525]; Toropova, Johansson and Myrberg, 2019^[422]). Baumert et al. (2010^[239]) showed that there were positive relationships between teachers' coursework in mathematics, student perceptions of teaching quality and student achievement in mathematics (in TIMSS 2011).

Teaching experience was found to be related to student achievement in a non-linear pattern, with the effect increasing until the middle years of experience and then declining slowly (Toropova, Johansson and Myrberg, 2019^[422]). Darling-Hammond and Liebermann (2012^[526]) argue that information about initial teacher education (ITE) needs to be interpreted in the context of when teachers completed their ITE because there have been changes over time in ITE and changes in the characteristics of student teachers recruited into the profession (Alatalo, Hansson and Johansson, 2021^[527]; Johansson, 2023^[257]). For that reason, information about teacher age and teaching experience may be important for interpretations of findings about teaching practices.

Evidence regarding teacher gender and approaches to teaching is less clear. Research findings have shown differences in teacher qualifications that are associated with gender (e.g. a smaller percentage of female teachers have qualifications in mathematics than is the case for male teachers) and there may be differences in these patterns between countries (McDowell and Klattenberg, 2019^[528]). Interestingly, data from the International Computer Information Literacy Study (ICILS) in 2013 showed that differences in experiences of, dispositions toward, and uses of information and communication technologies between female and male teachers were small and inconsistent across countries (Gebhardt et al., 2019^[529]).

In addition to teachers' educational backgrounds, age and gender, TALIS 2024 also gathers information about language backgrounds of teachers to understand the extent of diversity in the teaching workforce. Data concerned with the backgrounds of teachers are important for understanding how the teaching workforce has changed over the course of TALIS surveys since 2008. Employment status (whether being employed part- or full-time) is also expected to be related to different occupational perceptions, while experience of other work prior to entering the teaching profession may also be associated with differences in approaches and perceptions (Bauer, Thomas and Sim, 2017^[530]).

Within-country variability in teacher background characteristics is generally large and usually reflects large differences in teacher profiles. These background characteristics are expected to affect student outcomes through transmitted effects (e.g. teaching practices) rather than direct effects. The ability to describe and compare the composition of the teaching force across countries relies on having at hand information about teacher background in terms of factors such as age, gender, employment status, and job experience. This information is also important for anyone conducting complex analyses of the antecedents of outcomes or when undertaking profile analyses.

School and principal characteristics

Several characteristics of schools are of interest in relation to both teaching and learning processes and to student achievement. One of the most well-documented findings is concerned with the socio-economic context of schools. Schools enrolling students predominately from households with higher socio-economic levels have higher average achievement scores than schools enrolling predominantly students from households with lower socio-economic levels (Davoli and Entorf, 2018^[531]; Hopfenbeck et al., 2018^[532]; OECD, 2019^[533]; Sirin, 2005^[534]). However, it is evident that the strength of these compositional effects varies among countries and that there are schools within countries which do not follow the general association. All this suggests that it may be important to interpret approaches to teaching and learning in relation to the schools' socioeconomic contexts. Similar considerations apply to associations with the immigrant and language backgrounds of students and the potential associations of approaches to teaching and learning in schools with different immigrant compositions (OECD, 2019^[533]).

In several countries, it further appears that schools in rural and remote locations, as well as those in other under-resourced areas, have difficulties in attracting and retaining teachers (OECD, 2022^[98]; OECD, 2019^[39]; Sims and Allen, 2018^[270]). For schools in rural and remote locations, there may be difficulties in infrastructure resource access, such as Internet access (Fraillon et al., 2020^[127]).

Information about school size may be helpful in interpreting differences among schools in approaches to teaching and learning. Egalite and Kisada (2016^[535]) suggest that students' academic achievement in mathematics and reading declines as school size increases and this is most evident in upper secondary schooling. There was a strand of research from the 1960s that suggested that small high schools offered more opportunities for student engagement than in large high schools and that this impacted student behaviour (Barker and Gump, 1964^[536]; Fowler and Walberg, 1991^[537]); more recent studies continue to find this relationship (Lee and Smith, 1997^[538]; Leithwood and Jantzi, 2009^[539]; Hendriks, 2014^[540]). As an extension of this theory, it might be possible that small schools provide more opportunities for teachers to assume leadership roles than large schools.

TALIS 2024 gathers relevant personal information about principals including their education and experience in schools. The TALIS 2018 report highlighted the key role of school leadership in promoting students' development and achievement (OECD, 2020^[400]), and TALIS 2024 collects data on the background of school leaders, such as their age, gender, prior experience in teaching and leadership, as well as their length of involvement as a leader in their current school. In addition, it is relevant to know about their experience, qualifications, and experience in other fields before entering the field of education. Some countries have reported difficulties in recruiting school leaders, and information about the backgrounds of school leaders across time is relevant to inform policy.

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Notes

¹ Educational foresight perspectives were provided by Amy Bellinger and Katie Godwin (Education Commission), A. Lin Goodwin (University of Hong Kong), Jaime Saveedra (World Bank), Ranjitsinh Disale (World Teacher Prize Winner 2021), and Andreas Schleicher (OECD).

4 The TALIS 2024 study design

The TALIS 2024 core survey investigates aspects of teaching and learning in schools using reports from samples of teachers and principals. Data are gathered using online questionnaires (as the main data collection mode) and paper questionnaires (as a substitute or fall-back mode) administered to samples of teachers and school principals.

Population definitions and sampling

The target populations for the TALIS 2024 core survey are teachers and principals of schools providing education at ISCED level 2 and, similarly, teachers and principals of schools providing education at ISCED level 1 and ISCED level 3 for the optional survey modules. To ensure consistency and comparability, the definitions of teachers and principals are the same as those used in previous cycles of TALIS.

For TALIS, a principal is defined as the person with the most responsibility for the administrative, managerial and/or pedagogical leadership at the school. As part of the leadership role, principals may be responsible for the monitoring of students, the supervision of teachers, contact with parents and guardians, and/or the planning, preparation and carrying out of the pedagogical work in the school. Principals may also spend part of their time teaching.

Teachers are those persons who, as part of their regular professional duties in the school, provide student instruction in programmes at the respective ISCED level. Teachers who teach a mixture of programmes at different levels, including the respective ISCED programmes, in the target school, are included in the target population. There is no minimum specified for how much teaching for the respective target population they need to be engaged in. Principals are not considered as teachers, for the purpose of sampling, regardless of whether they also teach alongside their duties as principal. Substitute and other emergency teachers are not part of the target populations.

As in all previous cycles of TALIS, schools entirely devoted to students with special needs and schools exclusively offering adult education are considered out of scope for the survey. However, teachers working with students with special needs in regular schools are in scope.

The sampling approach in TALIS 2024 is a two-stage design, with schools as primary sampling units and teachers as secondary sampling units. In the first stage, schools are selected with a systematic random sampling approach, selection with probability proportional to size yet in some circumstances with equal probability. In the second stage, teachers are randomly selected within each school, albeit with some stratification within schools. Where possible, stratification of schools in the sampling frame is used to provide greater precision.

Samples for the main survey are defined in relation to known characteristics of school systems in each country. These samples typically consist of approximately 200 schools per participating country (at each ISCED level) and 20 randomly selected teachers within each school. If a school has fewer than 20 teachers, all those teachers are included in the sample. This means that the nominal sample size for each country includes about 4000 teachers.

As part of the sampling process, schools that decline to participate may be replaced by other schools, following approved procedures that ensure that replacement schools are similar to the original schools. To minimise the risk of replacement bias, replacement schools have to belong to the same stratum and are of similar size to their sampled school. Potential replacement schools are selected at the same time as the original sample.

If countries are prevented, for various reasons, from surveying teachers from all schools that are in scope (e.g. in very remote schools or schools in areas affected by natural disasters), there are provisions to exclude schools. However, no more than 5% of teachers within each target population may be excluded.

Instrument design

As with the first three cycles of TALIS, the fourth cycle, TALIS 2024, includes the three major components of large-scale international comparative surveys: a pilot study, a field trial, and the main survey. The pilot is focused on validating especially new materials as well as existing materials in new countries, using focus groups with multiple sets of materials. The field trial then uses all materials in all countries in a split design to limit response burden and time needs. Materials are then further refined and selected for inclusion in the main survey.

Throughout the design and development of the principal and teacher materials, TALIS uses a comprehensive set of approaches and design principles. In previous cycles of TALIS, the same resulting questionnaires were administered to every principal and teacher. For the first time, the TALIS 2024 main survey teacher questionnaire is designed to use a rotated/split design to broaden the conceptual coverage of TALIS while at the same time limit the amount of time needed from each respondent (with a target of between 45-60 minutes on average). The design principles and the approach to the rotated/split design are described in the remainder of this section.

General questionnaire design principles

Over time, TALIS developed and follows a set of survey design principles for the pilot, field trial and main survey phases including those that guide question and item development.

TALIS follows established guidance for cross-cultural surveys and adapted these to the specifics of the survey's framing, concepts, and population. General approaches used in TALIS include: clarity and consistency of terminology and, when needed, concise definitions in a glossary, translation, and adaptation notes, or directly in the instrument for respondents' information; avoidance of overly burdensome response processes, e.g. memory-telescoping and retrospection for initial education or other responses that are difficult to recall, aggregate or record; or consideration for reasonable reference time frames (e.g. "last 12 months", to limit seasonal patterns).

Given evolving contexts since the inception of TALIS, the 2024 cycle considers the following specific issues:

- an "online first" perspective, given that paper is now relegated to an (elective) option expected to be used rarely, but nevertheless designing materials that can be applied in both modes
- a third and country-specific gender option in the international source given that inclusion has become statutory law in a range of countries, with a possibility to opt out
- gender-neutral language, checked during the translatability assessment
- development of materials for a broader group of participants given an expanded country coverage, where questions need to be applicable to the diverse contexts, cultures, languages, populations, and teacher career pathways.

As for any cross-cultural survey of this kind, TALIS faces challenges around cross-cultural comparability of questionnaire items and scales, stylistic responding, cognitive load, overall response burden, fatigue, and general response processes. Previous cycles of TALIS made contributions to the better understanding and refinement of survey approaches and explored potential strategies, alternative item types, statistical approaches to better understand measurement invariance, as well as designed experiments during field trials. TALIS 2024 continued to address similar survey challenges.

Table 4.1 presents the key question design principles to enhance validity, reliability, and comparability of questionnaire measures. The table organises these principles by group and articulates specific considerations for TALIS 2024. It is important to note that some principles may conflict with others, e.g. important measures established in previous cycles for trend measurement could violate one or more principles for new developments in 2024.

Table 4.1. Key survey principles and considerations for TALIS 2024

| Group | Design principle | Specific considerations |
|------------------|--|---|
| Question types | Use of matrix questions with common response options (Likert-type, rating-scale or yes/no) | <ul style="list-style-type: none"> • Limitation of new questions to 5-10 items to balance construct coverage, cognitive load/fatigue, and the use of small mobile devices • Drafting of 6-10 items per construct for the field trial to allow for attrition/deletion before main survey • Exceptions apply to factual/low inference questions (e.g. subject domains) and existing questions (strict trend) |
| | Exploration of alternative item formats | <ul style="list-style-type: none"> • Requires clear path towards improved measurement and added conceptual value, to be clearly stated to allow evaluation after the field trial • Situational materials earmarked for TKS, situational judgement tasks for the core survey |
| | Limited use of fill-in/free response type questions | <ul style="list-style-type: none"> • Other-specify and open responses limited to field trial to check completeness of items • Restricted use in main survey to collect required factual information (e.g. language diversity) or “voice” not easily captured by closed questions |
| | Use of yes/no response formats rather than check-all-that-apply | <ul style="list-style-type: none"> • To better disentangle non-response |
| Question wording | Use of positively and negatively framed items where conceptually mandated | <ul style="list-style-type: none"> • Preferably develop only positively OR negatively framed items • Avoid double inversions/negation |
| | Avoidance of double/multi-barrelled questions | <ul style="list-style-type: none"> • n/a |
| | Strict avoidance of sentence completion between stem and items | <ul style="list-style-type: none"> • In relation to languages with syntax that do not allow for sentence splitting |
| | Avoidance of possessive pronouns | <ul style="list-style-type: none"> • No assumption about respondent’s relationship • Clearer deixis |
| | Anticipation of length inflation due to translation as well as right-to-left scripts | <ul style="list-style-type: none"> • n/a |
| | Limit for examples in question | <ul style="list-style-type: none"> • Use of two to three examples to help understanding yet limit reading load and avoid |

| Group | Design principle | Specific considerations |
|------------------------|--|---|
| | | priming (i.e. misinterpretation as definition/exhaustive list) |
| Response options | Preference of quantifiable over fuzzy frequency response options | <ul style="list-style-type: none"> Especially for low inference (e.g. easily observable) statements |
| | Use of four response options for perceptions and attitudes, unless a different number is clearly mandated for a particular construct | <ul style="list-style-type: none"> Frequently used bipolar format include “strongly disagree”, “disagree”, “agree”, “strongly agree” No “neutral” mid-point given the long-standing argument that this may exacerbate modesty response style and flatten variance |
| | Presentation of response options in ascending order (e.g. lowest to highest, or in direction of latent construct) | <ul style="list-style-type: none"> n/a |
| Routing and validation | Use of digital delivery to apply deterministic routing | <ul style="list-style-type: none"> Automated routing configured in online mode, matching skip instructions on paper Routing questions need to be brief, self-contained an ideally objective/low inference to avoid misrouting |
| | Limited use of soft/hard consistency checks during completion | <ul style="list-style-type: none"> Avoid dissatisfaction Review of field trial data to configure initial limits |
| Log data | Use of log data to inform question selection assembly | <ul style="list-style-type: none"> Estimate time needs for field trial and main survey Review actual time used against time targets, i.e. 45-60 minutes on average for the teacher and principal questionnaire |

Rotated/split design for the teacher questionnaire

Over time, the TALIS programme has tried to strike a balance between existing and new interests for entire content areas, as well as specific topics for policy development with the response burden for teachers. This was done within the constraints of a traditional questionnaire design, namely an identical set of questions in a static sequence for every teacher and principal. To balance conceptual coverage, survey length and response burden for teachers.

TALIS 2024 applies a new rotated/split design for the teacher questionnaire, using three forms. Rotating or splitting questionnaires under a controlled scheme, essentially means that: 1) no respondent takes all survey materials, and 2) no (or only some) questions are administered to all respondents. The data not collected from the full survey sample by design can be treated as missing completely at random (MCAR). Given the need for complete data at the level of schools/principals, the principal questionnaire is defined to be administered in only one form at the outset, i.e. with identical questions to all respondents.

Each questionnaire form starts with demographic information and certain background questions, then led through, conditional on the form’s configuration, qualification and initial education, current work, professional learning, teaching in general, education and environmental sustainability, teaching in the target class, school climate, to end with occupational perceptions. This sequence aims primarily to match a “lifecycle” model of teaching, maintain a natural flow, and avoid (emotional) priming or recency influences, that may occur as an undesirable effect of more randomised sequencing. Rotation in this design could be described as “pathways” through the teacher questionnaire.

Rather than eliminating entire sections of questions for individual teachers, which would lead to severe limitations during analyses, each question (or set of questions) is classified by its analytical priority, namely: *common*, *standard*, and *low inference*. The default is *standard*, which presents a question to two-thirds of

all teachers (appearing on two out of the three forms). A limited and clearly defined set of questions is classified as “key” or common questions with high priority within a section to be on all three forms and thus to be addressed to all teachers, even if other questions in that section are not administered to all teachers. This analytical priority was introduced for questions necessary for cross-tabulation, or as dependent or control variables in regression analyses. Finally, a *low inference* priority (appearing in one of three forms) is assigned to questions that are not planned to be cross tabulated with other questions or are more exploratory in nature, for which a lower sample size and precision were deemed sufficient and acceptable.

The design critically hinges on the strict limitation on the number of common questions designated with a high analytical need and priority. Inclusion of many questions in this category would, in turn, reduce and quickly exhaust the available response time for other materials. An upper limit of 15 common questions was defined.

Another important consideration is that data from standard and low inference questions (the majority) are “missing by design” for some teachers in the resulting database. This limits the full range of analyses that would, otherwise, have been possible if there were a full information matrix. While data are not imputed in the TALIS 2024 datasets, analytical techniques to handle missing data remain a possibility for future TALIS data analyses.

Consultations with the OECD Secretariat on analytical needs and reporting plans, the TALIS Governing Board (TGB) on policy priorities, and the TALIS Technical Advisory Group on possible side-effects and potential biases, resulted in a set of questionnaire constructs and their allocations to the three main survey teacher questionnaire forms is presented in Annex 4.A.

Operational design

TALIS 2024 and all previous cycles comprise three major phases of international large-scale surveys: a pilot, a field trial, and a main survey.

- The pilot produced useful information from which to further develop instruments and operational plans. It collected qualitative feedback and comments from teachers and principals through moderated focus group discussions, mainly in the form of a retrospective think-aloud exercise. Feedback collected at this time, as well as reviews by national project managers (NPMs) and experts in questionnaire design fed into the development of the field trial instruments.
- Next, the field trial had two main objectives: to test the survey instruments and the operational procedures in all participating countries. The nominal sample size was 600 teachers and their principals from 30 schools per country for each ISCED level. A school co-ordinator, identified for each school, facilitated required communication, listing, distribution of materials, and follow-up.
- The main survey data collection was planned to be conducted in two waves relative to the different school calendars in the Northern- and Southern-Hemisphere countries (Northern Hemisphere: February to April 2024, Southern Hemisphere: June to August 2024). The main survey involves a nominal sample of approximately 4 000 teachers and their principals in 200 schools for each ISCED level.

TALIS 2024 is a self-administered survey with online data collection as the default response mode. Paper delivery was available where online delivery was either not possible or where paper was planned to be used for non-response follow-up. Source questionnaires were made available in English. National centres adapted and translated questionnaires and submitted those questionnaires for international translation verification.

More generally, technical standards and operational manuals define the rules and guidelines for national centres to follow when preparing and implementing the surveys within their country. The international

research consortium provided training to national centres on all operational activities and tasks. International Quality Observers (IQOs) observed national implementations and collected information from a sample of schools in each country.

Following all data collection, adjudication in consultation with the international sampling referee determines the overall quality of the data, leading to recommendations on data quality, use, and reporting for the OECD Secretariat and TALIS Governing Board. Finally, a fully documented international database, a technical report, and a database user guide will be produced.

Annex 4.A. Questionnaire constructs and themes

Annex Table 4.A.1. Teacher questionnaire

| Section | Number | Construct | Theme | Format | Form Assembly | | | Comment |
|------------------------------|--------|--|------------------------------------|------------------|---------------|--------|--------|---------|
| | | | | | Form A | Form B | Form C | |
| Background and qualification | TQ-01 | Gender | Teacher characteristics | Multiple choice | X | X | X | |
| | TQ-02 | Age | Teacher characteristics | Fill-in (number) | X | X | X | |
| | TQ-03 | Highest educational attainment | Teachers' learning and development | Multiple choice | X | X | | |
| | TQ-04 | Qualification pathway | Teachers' learning and development | Multiple choice | X | X | X | |
| | TQ-05 | Qualification year | Teachers' learning and development | Fill-in (number) | X | X | | |
| | TQ-06 | Training characteristics | Teachers' learning and development | Matrix | X | X | | |
| | TQ-07 | Training preparedness | Teachers' learning and development | Matrix | X | X | X | |
| | TQ-08 | Career commitment to teaching | Teachers' learning and development | Multiple choice | X | X | | |
| Current work | TQ-09 | Employment status tenure | Teacher characteristics | Multiple choice | X | X | | |
| | TQ-10 | Work commitment in multiple schools | Teacher characteristics | Multiple choice | X | X | X | |
| | TQ-11 | Work commitment in multiple schools (count) | Teacher characteristics | Fill-in (number) | X | X | X | |
| | TQ-12 | Current employment status | Teacher characteristics | Multiple choice | X | X | | |
| | TQ-13 | Work experience | Teacher characteristics | Fill-in (number) | X | X | X | |
| | TQ-14 | Time distribution – total hours | Teachers' work practices | Fill-in (number) | X | X | | |
| | TQ-15 | Time distribution – teaching hours | Teachers' work practices | Fill-in (number) | X | X | | |
| | TQ-16 | Time distribution – non-teaching hours | Teachers' work practices | Fill-in (number) | X | X | | |
| Professional learning | TQ-17 | Participation in induction programmes/activities | Teachers' learning and development | Matrix | | X | X | |
| | TQ-18 | Induction at current school – types formats | Teachers' learning and development | Matrix | | X | X | |
| | TQ-19 | Involvement in | Teachers' | Matrix | | X | X | |

| Section | Number | Construct | Theme | Format | Form Assembly | | | Comment |
|-----------------------------|--------|---|------------------------------------|-----------------------------|---------------|--------|--------|---------|
| | | | | | Form A | Form B | Form C | |
| | | mentoring | learning and development | | | | | |
| | TQ-20 | Professional learning types/formats | Teachers' learning and development | Matrix | X | X | X | |
| | TQ-21 | Professional learning topics | Teachers' learning and development | Matrix | X | X | X | |
| | TQ-22 | Professional learning impact | Teachers' learning and development | Multiple choice | | X | X | |
| | TQ-23 | Importance of professional learning characteristics | Teachers' learning and development | Matrix | | X | X | |
| | TQ-24 | Professional learning needs | Teachers' learning and development | Matrix | | X | X | |
| | TQ-25 | Professional learning barriers | Teachers' learning and development | Matrix | X | | | |
| Teaching in general | TQ-26 | Collaborative practices/activities | Teachers' work practices | Matrix | X | X | X | |
| | TQ-27 | Teacher self-efficacy | Teacher self-efficacy | Matrix | X | X | X | |
| | TQ-28 | Self-efficacy in multicultural environments | Diversity and equity | Matrix | | X | X | |
| | TQ-29 | Language use | Teacher characteristics | Multiple choice; open-ended | | X | X | |
| | TQ-30 | Fixed mind-set general population | Social and emotional learning | Matrix | | X | X | |
| | TQ-31 | Self-efficacy in SEN inclusion | Diversity and equity | Matrix | | X | X | |
| | TQ-32 | Social and emotional learning teacher beliefs | Social and emotional learning | Matrix | | X | X | |
| | TQ-33 | Self-efficacy using digital tools/resources | Educational use of technology | Matrix | | X | X | |
| | TQ-34 | Beliefs about digital tools/resources | Educational use of technology | Matrix | | X | X | |
| | TQ-35 | Attitudes towards using AI in teaching and learning | Educational use of technology | Matrix | X | | | |
| | TQ-36 | Use of AI in teaching and learning | Educational use of technology | Multiple choice | X | | | |
| | TQ-37 | Use of AI in teaching and learning | Educational use of technology | Matrix | X | | | |
| | TQ-38 | Use of AI in teaching and learning | Educational use of technology | Matrix | X | | | |
| Education and environmental | TQ-39 | Integrating ESE in teaching | Environmental and | Matrix | X | | X | |

| Section | Number | Construct | Theme | Format | Form Assembly | | | Comment |
|------------------------------|--------|--|--|------------------|---------------|--------|--------|---------|
| | | | | | Form A | Form B | Form C | |
| sustainability | | | sustainability education | | | | | |
| | TQ-40 | Self-efficacy in ESE | Environmental and sustainability education | Matrix | X | | X | |
| | TQ-41 | Teaching formats/depth | Environmental and sustainability education | Multiple choice | X | | X | |
| | TQ-42 | Teaching obstacles | Environmental and sustainability education | Matrix | X | | X | |
| | TQ-43 | Informal practice | Environmental and sustainability education | Multiple choice | X | | X | |
| | TQ-44 | Personal concern | Environmental and sustainability education | Multiple choice | X | | X | |
| | TQ-45 | Scientific belief | Environmental and sustainability education | Multiple choice | X | | X | |
| Teaching in the target class | TQ-46 | Target class size | Teachers' work practices | Fill-in (number) | | X | X | |
| | TQ-47 | Target class student composition | Diversity and equity | Matrix | | X | X | |
| | TQ-48 | Target class subject focus | Teachers' work practices | Multiple choice | | X | X | |
| | TQ-49 | Target class subject match with training | Teachers' learning and development | Multiple choice | | X | X | |
| | TQ-50 | Target class time distribution | Teachers' work practices | Fill-in (number) | | X | X | |
| | TQ-51 | Teaching practices-general/core | Teachers' work practices | Matrix | | X | X | |
| | TQ-52 | Teaching practices - digital tools/resources | Educational use of technology | Matrix | | X | X | |
| | TQ-53 | Teaching practices - assessment and feedback | Teachers' work practices | Matrix | | X | X | |
| | TQ-54 | Target class behavioural disruptions | School climate | Matrix | | X | X | |
| | TQ-55 | Adaptation | Teachers' work practices | Matrix | | X | X | |
| | TQ-56 | Support for consolidation | Teachers' work practices | Matrix | | X | X | |
| | TQ-57 | Autonomy | Teachers' work practices | Matrix | | X | X | |
| | TQ-58 | Teacher lesson reflection | Teachers' work practices | Matrix | X | X | X | |
| | TQ-59 | Classroom infrastructure quality | School climate | Matrix | | X | X | |

| Section | Number | Construct | Theme | Format | Form Assembly | | | Comment |
|---------------------------------|--------|---|--|------------------|---------------|--------|--------|--------------------------------|
| | | | | | Form A | Form B | Form C | |
| | TQ-60 | SEL empathy and engagement | Social and emotional learning | Matrix | | X | X | |
| | TQ-61 | SEL skill development | Social and emotional learning | Matrix | | X | X | |
| | TQ-62 | SEL relationship skills (SJT) | Social and emotional learning | Matrix | | X | | International option (opt-out) |
| | TQ-63 | SEL social awareness (SJT) | Social and emotional learning | Matrix | | X | | International option (opt-out) |
| School climate | TQ-64 | Distributed leadership Teacher leadership | Institutional environment for teaching | Matrix | X | X | X | |
| | TQ-65 | Student-teacher relations | Institutional environment for teaching | Matrix | X | | X | |
| | TQ-66 | Instructional leadership Relational leadership | School leadership | Matrix | X | | X | |
| | TQ-67 | Trust in school | Institutional environment for teaching | Matrix | X | | X | |
| | TQ-68 | Feedback types and sources | Teachers' learning and development | Matrix | X | | X | |
| | TQ-69 | Feedback impact | Teachers' learning and development | Matrix | X | | X | |
| | TQ-70 | Anti-bullying | Institutional environment for teaching | Matrix | X | | X | |
| | TQ-71 | Harassment | Institutional environment for teaching | Matrix | X | | X | |
| | TQ-72 | Change fatigue | Institutional environment for teaching | Matrix | X | | X | |
| Occupational perceptions | TQ-73 | Career motivations | Occupational perceptions | Matrix | X | X | | |
| | TQ-74 | Retention | Occupational perceptions | Fill-in (number) | X | X | | |
| | TQ-75 | Attrition | Occupational perceptions | Matrix | X | X | | |
| | TQ-76 | Workplace stress | Occupational perceptions | Matrix | X | X | X | |
| | TQ-77 | Workload stress | Occupational perceptions | Matrix | X | X | | |
| | TQ-78 | Professional satisfaction | Occupational perceptions | Matrix | X | X | X | |
| | TQ-79 | Perceptions of value and policy influence | Occupational perceptions | Matrix | X | X | | |
| | TQ-80 | Emotional engagement | Occupational perceptions | Matrix | X | X | | |
| | TQ-81 | Teacher voice | Occupational perceptions | Fill-in (text) | X | | | International option (opt-out) |

| Section | Number | Construct | Theme | Format | Form Assembly | | | Comment |
|------------------|--------|----------------------------|------------------|-----------------|---------------|--------|--------|-------------------------------|
| | | | | | Form A | Form B | Form C | |
| Teacher mobility | TQ-82 | Foreign country experience | Teacher mobility | Matrix | X | | | International option (opt-in) |
| | TQ-83 | Foreign country purposes | Teacher mobility | Matrix | X | | | International option (opt-in) |
| | TQ-84 | Foreign country duration | Teacher mobility | Multiple choice | X | | | International option (opt-in) |

Annex Table 4.A.2. Principal questionnaire

| Section | Number | Construct | Theme | Format |
|---------------------------------|--------|---|---|------------------|
| Personal background information | PQ-01 | Gender | Principal characteristics | Multiple choice |
| | PQ-02 | Age | Principal characteristics | Fill-in (number) |
| | PQ-03 | Highest educational attainment | Principal characteristics | Multiple choice |
| | PQ-04 | Work experience | Principal characteristics | Fill-in (number) |
| | PQ-05 | Teaching obligation | Principal characteristics | Multiple choice |
| | PQ-06 | Current employment status | Principal characteristics | Multiple choice |
| | PQ-07 | Education and training components | Principals' professional learning | Matrix |
| | PQ-08 | Professional learning formats/types | Principals' professional learning | Matrix |
| | PQ-09 | Professional learning activities | Education for sustainability | Matrix |
| | PQ-10 | Professional learning needs | Principals' professional learning | Matrix |
| School background information | PQ-11 | School location | School characteristics | Multiple choice |
| | PQ-12 | School funding | School characteristics | Fill-in (number) |
| | PQ-13 | School management | School characteristics | Multiple choice |
| | PQ-14 | School staff resources | School characteristics | Fill-in (number) |
| | PQ-15 | Staff turnover, attrition and absenteeism | School characteristics | Fill-in (number) |
| | PQ-16 | School grade levels/programmes | School characteristics | Matrix |
| | PQ-17 | School total student enrolment | School characteristics | Fill-in (number) |
| | PQ-18 | Student enrolment characteristics | School characteristics | Matrix |
| | PQ-19 | Ability tracking | School characteristics | Matrix |
| | PQ-20 | Teaching/learning mode | Institutional environment for teaching | Matrix |
| | PQ-21 | Student composition | Diversity and equity | Matrix |
| School leadership | PQ-22 | School management team | Institutional environments for teaching | Multiple choice |
| | PQ-23 | School management team composition | Institutional environments for teaching | Matrix |
| | PQ-24 | Distribution of responsibilities/leadership | Institutional environments for teaching | Matrix |
| | PQ-25 | Significant responsibilities | Institutional environments | Matrix |

| Section | Number | Construct | Theme | Format |
|---|--------|---|---|------------------|
| | | | for teaching | |
| | PQ-26 | Principal's time distribution | Institutional environments for teaching | Matrix |
| | PQ-27 | Principal's responsibilities/activities | Institutional environments for teaching | Matrix |
| | PQ-28 | Supportive actions | Institutional environments for teaching | Matrix |
| | PQ-29 | Teacher leadership | Institutional environments for teaching | Matrix |
| | PQ-30 | Transition practices | Institutional environments for teaching | Matrix |
| Induction, mentoring and formal appraisal | PQ-31 | Induction programmes/activities | Teachers' professional learning | Matrix |
| | PQ-32 | Induction types/formats | Teachers' professional learning | Matrix |
| | PQ-33 | Mentoring availability for teachers | Teachers' professional learning | Multiple choice |
| | PQ-34 | Mentoring subject field matching | Teachers' professional learning | Multiple choice |
| | PQ-35 | Formal appraisal agency/frequency | Teachers' professional learning | Matrix |
| | PQ-36 | Formal appraisal users/sources | Teachers' professional learning | Matrix |
| | PQ-37 | Formal appraisal action frequency | Teachers' professional learning | Matrix |
| School climate | PQ-38 | Climate - general dimensions | Institutional environments for teaching | Matrix |
| | PQ-39 | Academic rigor | Institutional environments for teaching | Matrix |
| | PQ-40 | Staff and resource obstacles | Institutional environments for teaching | Matrix |
| | PQ-41 | School safety | Institutional environments for teaching | Matrix |
| Schooling in diverse environments | PQ-42 | Cultural/ethnic composition | Diversity and equity | Multiple choice |
| | PQ-43 | Diversity practices and policies | Diversity and equity | Matrix |
| | PQ-44 | Diversity beliefs/perceptions | Diversity and equity | Matrix |
| Education and environmental sustainability | PQ-45 | Leadership beliefs | Education for Sustainability | Matrix |
| | PQ-46 | Barriers to teaching | Education for sustainability | Matrix |
| | PQ-47 | Personal concern | Education for sustainability | Multiple choice |
| | PQ-48 | Scientific belief | Education for Sustainability | Multiple choice |
| Occupational perceptions | PQ-49 | Retention | Occupational perceptions | Fill-in (number) |
| | PQ-50 | Workplace stress | Occupational perceptions | Matrix |
| | PQ-51 | Workload stress | Occupational perceptions | Matrix |
| | PQ-52 | Professional satisfaction | Occupational perceptions | Matrix |
| | PQ-53 | Job satisfaction | Occupational perceptions | Matrix |

The Teaching and Learning International Survey (TALIS) is the world's largest international survey of teachers and principals. The TALIS 2024 conceptual framework builds on foundations established since 2008 and underpins the survey's focus on teachers and teaching conditions.

Key themes in the framework include teachers' educational background and initial preparation; their professional development, classroom practices; well-being and job satisfaction; autonomy, terms of employment and intent to stay in the profession. It also addresses emerging themes related to the use of artificial intelligence, increasingly diverse student populations and environmental sustainability education.


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