United Nations
Educational, Scientific and
Cultural Organization

UNESCO INSTITUTE FOR STATISTICS

TECHNICAL COOPERATION GROUP

SUSTAINABLE DEVELOPMENT GOALS

Classification framework for trained and qualified teachers

TCG6/REF/6

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Analytical report

Contents

1. Introduction

The UNESCO Institute for Statistics (UIS), the UNESCO's Section for Teacher Development and the UIS Education Standards and Methodologies section are developing a global framework and derived data collection strategy to improve the monitoring plan on target 4.c of the Sustainable Development Goals (SDG) scheme (UN, 2015; UNESCO, 2014, 2016b).

Target 4.c aims at "(...) substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least-developed countries and small island developing States". Progress on this target is measured by the following single indicator: "4.c.1. Proportion of teachers in: (a) pre-primary education; (b) primary education; (c) lower secondary education; and (d) upper secondary education who have received at least the minimum organized teacher training (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country" (UNESCO, 2016b, p. 28).

The UIS annually administers the Survey of Formal Education (SFE) (UNESCO, 2016, 2018; Wallet, 2015, p. 0) to monitor cross-national progress on this indicator through data provided by officials from Ministries of Education and National Statistical Offices. Sections A9 and A10 of this instrument collect the "Number of classroom teachers by teaching level of education, employment status, type of institution and sex" and the "Number of classroom teachers by employment status, **qualified and trained status**, teaching level of education, type of institution and sex", respectively. National statistics on these indicators are used to estimate the size of the teacher workforce, including full and part time staff, detailed by level of education as indicated in the International Standard Classification of Education (ISCED). Thereby, the SFU provides crucial evidence on the proportion of teachers with the *minimum organized training* at pre-primary, primary, lower secondary and upper secondary education.

However, the meaning of the concept *minimum organized training* included in the SFE, which is based in the notions of *qualified and trained teachers*, prompts difficulties to assess countries' advance towards target 4.c. External validity of these concepts is likely to be constrained to national standards for the teaching profession, which hinders a fair comparison across countries (Mitchell & Taylor, 2015). Semantic differences included in legislations or practical adjustments applied by institutions, may increase cross-cultural bias in their definitions. Furthermore, the distinction between "academic" qualifications and "pedagogical" training activities is not sharply determined in the current instrument. National requirements to teach may not always reflect these concepts, especially because they are primarily based in the characteristics of the provision of teacher training available in each country (UNESCO, 2019).

This challenge clearly suggests the need for a cross-nationally valid framework that enable the production of reliable data on indicator 4.c.1, based on international standards and descriptors of teacher education programmes and pathways to the profession. This analytical report aims at reviewing current definitions and pathways that describe at the international level the characteristics of a trained and qualified teacher. Consequently, a feasible data collection strategy is suggested to monitor indicator 4.c.1 in the coming years.

2. Mapping standard definitions of current pathways to teaching

2.1 Global policy directions on teacher training

Legislations and educational policies define the basic requirements to enter the teaching profession in each country, including conditions to select into training institutions, to work as a teacher and to maintain such status. In general, completion of a teacher training programme is considered the main requirement to obtain a teaching qualification, but it can be the case that countries adjust such condition in order to solve shortage of teachers (Mulkeen, Ratteree, & Voss-Lengnik, 2017). In these cases, policy makers are challenged to find the right balance between participation in teacher training and other characteristics of teacher candidates. In the worst scenario, countries may be obliged to allow teachers to teach without having had any prior training in this area (Villegas-Reimers, 2003).

At this juncture, global policy analyses have extensively documented cross-national pathways to the teaching profession to support countries in this task (Haddad, 1985; Johnston, 1964; UNESCO, 2006). Since the 1960s, an UNESCO's expert committee on the status of teachers has been established to review national policies and practices and recommend coherent courses of action. The International Labour Organisation (ILO) and UNESCO recommendation concerning the status of teachers, adopted by the Special Intergovernmental Conference on the Status of Teachers (ILO/UNESCO, 1966), is considered the main source of policy standards in this area.

Several aspects of these recommendations are important to define the role of teachers and the attributes of the minimum organised training that should be required to obtain such status. The overarching principle conveyed in this document claims that teacher should be regarded as a profession, which corresponds to a high-level status activity within societies. Such status is based on "knowledge and specialized skills, acquired and maintained through rigorous and continuing study" (ILO/UNESCO, 1966). In other words, teacher status should be conditional to having completed a teacher training programme.

The notion of teacher training is fully defined by the ILO and UNESCO in this document. Indeed, the desired training that countries should offer to teacher candidates embeds several criteria at different stages of the provision. At the institutional level, these should be programmes previously approved by a national body and delivered by universities or at the equivalent level. Admission should at least require the completion of the corresponding certification of secondary education, and the delivery should be clearly orientated to train teachers for specific levels of the school system and to specialise them in particular tasks or groups of students. These recommendations are as specific as to detail the purpose of teacher training programmes and the components that should be included in their curricula, defining areas of content knowledge and the participation in coursework and practicum. One of the relevant features described in this document is also the distinction between concurrent and consecutive teacher training programmes (described below).

Harper and Dunkerly (2009) remarked that, unfortunately, these recommendations have been hardly accomplished by school systems around the world. However, evidence rather suggests wide inequality across countries in the requirements to enter the teaching profession and in complying with recommended practice in teacher training. For instance, in a recent survey administered to approximately 50 national teacher unions (Symeonidis, 2015), the minimum reported qualification required to teach in early childhood, primary, secondary or upper secondary levels ranged from having

no qualification or simply a primary education certificate, through countries that currently asks candidates for the completion of a master's degree in education.

Several international policy documents still express the global concern on the quality of teacher education, in terms of adjusting their contents, delivery and effectiveness to current societal demands (Mulkeen et al., 2017; TE4I, 2010). Cross-national organisations have insisted in attributes recommended by the ILO/UNESCO (1966), while adding new characteristics to face challenges of the 21st century. For instance, the current UNESCO's policy development guide on teachers (UNESCO, 2015) recommends minimum requirements to enter teaching training, as well as relevant curriculum contents and practicum periods leading to qualification. This guide also mentions the possibility of carrying out a probationary period before certification or licensing and recognises the potential contribution of non-state partners in teacher training. In a similar line of argumentation, the main international teachers' union declared in its 6th world congress (Education International, 2012) that teacher training should be provided at higher education institutions and an additional phase of induction should be offered for newly qualified teachers in recruitment.

The notion that a coherent teacher education provision should include initial, induction and in-service training is nowadays strongly underlined by international organisations to achieve 21st challenges in education (UNESCO/ILO/UNICEF/UNDP/EI, 2018). The OECD has persistently posed the need of a lifelong learning approach for the teaching profession considering that initial training is not sufficient to deal with the challenges of the process of globalisation (CERI, 1998; Coolahan, 2002; Musset, 2010; OECD, 2005). In 1998, the OECD's Centre for Educational Research and Innovation dedicated an entire chapter to describe how educational reforms should recognise the participation of teachers for the purposes of lifelong learning policy. In particular, the obsolescence of teachers' knowledge becomes a cause of concern given the accelerated progresses of science and technology in the current age of information (Jarvis, 2007).

In addition, it is nowadays widely accepted that initial teacher training can take the form of three different organisational pathways, namely: concurrent, consecutive and alternative. Concurrent and consecutive are still considered the main routes into teaching. Concurrent programmes deliver teacher training from the outset through general academic subjects provided alongside professional subjects (pedagogy, teaching methods, etc.). Consecutive programmes are more flexible since cover opportunities where teacher candidates have already completed a first stage of higher education in a particular subject area and move on to professional teacher training in a separate successive phase to specialise in teaching such subject. In turn, alternative pathways refer to short professionally-oriented programmes or employment-based training that combines work in schools with an individual training programme (European Commission/EACEA/Eurydice, 2015, 2018).

From the preceding discussion it is clear that global policy agrees to consider the professional status of teachers as a function of their involvement in teacher training programmes that fulfil minimum quality characteristics. Such attributes include admission criteria, characteristics of the delivery of programmes and subsequent requirements to obtain certification to teach. In addition, this global approach assumes that initial teacher training must be coherently articulated with successive training phases, including induction and in-service programmes, whereas it defines that initial training pathways can be channelled through concurrent, consecutive or alternative pathways. All in all, global policy discussion generally assumes that characteristics of initial training vary dramatically across countries, thus a unique way to conceptualise pathways into the teaching profession might be hard to honour the complexity observed in all world regions.

Box 1. Current topics discussed on teacher training and qualification in different world regions

In order to examine the expected cross-national variation in the characteristics of teacher training and qualification, the following paragraphs summarise current themes discussed by stakeholders involved in this area in different world regions.

Europe: Current policy interest on teacher training aims at rising qualification level from Bachelor to Master, increasing its average length from 4 to 5 years, establishing clear selection procedures, focusing on relevant contents and enhancing the link with practice (Bokdam, van den Ende, & Broek, 2014). This intention converges to a great extent with the vision supported by the regional teachers' union that considers that effective teacher training requires adjustments in length, quality, price and level (ETUCE, 2014). Interestingly, recent reports indicate that a relevant number of countries uses policies to select candidates to enter into teacher training and induction, while the majority of states offer alternative pathways to the traditional routes into the teaching profession (European Commission/EACEA/Eurydice, 2018; Hálasz, Looney, Michel, & Sliwka, 2018).

East Asia: UNESCO Bangkok Office (2015) documented a wide variation in several features of teacher training and qualification. Some countries still accept primary education to enter into teacher training programmes, while others request Bachelor's degrees to receive training to teach in higher levels of the system. Duration of programmes ranges from 2 to 5 years and, in general, they are mainly focused on delivering content knowledge. Training provides few opportunities to learn from practicum and mentors in schools, although some countries have already formally defined the first year at post for induction purposes. Recently, Sabrin (2018) remarked that East Asian school systems that perform highly in rankings from international large-scale assessments usually train their teachers through concurrent and consecutive pathways that emphasise acquisition of subject content knowledge.

Latin America: Teacher training is commonly provided by universities and secondary level institutions (i.e. escuelas normales), with a duration range between 4 and 5 years (OREALC/UNESCO Santiago, 2012). Puryear (2015) claimed that programmes were not very selective, nor practice orientated, while, in general, nations assume that all graduates were qualified to teach. This would reflect the weak regulation of national authorities on the provision of teacher training, which has also caused surplus of teachers in some countries. The regional office of UNESCO reported differences in regulations for the graduation or certification of teachers who come out of training institutions (OREALC/UNESCO Santiago, 2012). For example, in Colombia there is a probationary period, while in Chile all graduates become qualified to teach. It is worth noting that alternative pathways based on distance learning and the Teach for All model have grown importantly.

The Commonwealth: Keevy and Jansen (2010) developed an accurate framework to classify the type of qualifications needed to teach in each country. This scheme uses relevant variables of initial training programmes for teaching in primary and secondary education, including years of duration, entry level requirement and final degree level (as measured in the ISCED) and number of practical weeks. Results suggested an important variation in all these indicators. Recently, The Commonwealth (2016) reported that some countries have no teaching regulatory body; whereas wide variation persists in the minimum requirements to teach, with a number of countries still neglecting to require teacher training (or even a qualification) to teach.

Africa: In several countries teachers receive training to get qualification status and a national authority issues a corresponding teaching license, which is normally registered in the ministry of education (ADEA, 2016a). However, an important number of countries face dramatic shortages of teachers (UNESCO, 2009). Furthermore, one recommendation recently agreed in the 8th conference of the Africa Federation of Teaching Regulatory Authorities (AFTRA, 2019) underlined that minimum requirements for teaching should be

established by all states. In this context, a report by the Association for the Development of Education in Africa (ADEA, 2016b) suggested that ministries of education should promote alternative pathways to the profession, particularly through in-service training programmes aimed at qualifying current "contract" and voluntary teachers. Rose, Downing, Asare, and Mitchell (2019) recently documented evidence of effectiveness of professional development and induction in experienced and pre-service teachers.

2.2 Inputs from the literature on teacher education

Research on teacher education has been traditionally concerned with the contents taught to teacher candidates, the effectiveness of such delivery, and the type of knowledge that should be emphasised (theory vs practice). Currently, there has been an increasing interest in policy aspects, as well as in disentangling the complex mechanisms of teacher learning (Cochran-Smith & Villegas, 2015). The characteristics of pathways into the teaching profession reflect what Tatto and Menter (2019) referred as the theory in action of initial teacher education (ITE), which comprises the set of assumptions on teacher learning and implementation processes underlying teachers' training and qualification.

Roberts-Hull, Jensen, and Cooper (2015) suggested that the main problems of ITE around the world were the lack of evidence-based content, inadequate training in subject knowledge, insufficient focus on data collection and analysis skills for clinical teaching practice, and limited integration between theory and practice. Toon and Jensen (2017) pointed out that current experience of teacher education is fragmented, with ITE, induction and professional development not consistently connected. These authors advocate for a connected teacher education based on a clear focus on new teachers' needs and a common approach to teacher learning throughout the three phases of preparation.

According to Roberts-Hull et al. (2015) and Wang, Coleman, Coley, and Phelps (2003), educational policies can target specific points throughout teacher education to enhance its systemic approach and improve ITE. Accordingly, the "teacher education pathway" proposed by Roberts-Hull et al. (2015) contains the following six focal points:

Selection into ITE: Comprises admission standards and minimum requirements for entry into ITE, as well as enrolment quotas applied to training institutions.

Progress through ITE: Considers regulations on the design of ITE programmes, including their curriculum, the type of practicum and requirements to maintain the training status (e.g. assessments), which can be monitored through institutional accreditation or evaluation procedures.

Exit from ITE: Includes final standards on the quality of teacher candidates used for graduation.

Registration: Refers to schemes used by governments to allow graduates to teach, desirably based on demonstrable knowledge and skills required to fulfil this role.

Hiring: Procedures developed to obtain teaching employment for an agreed compensation.

First year(s) of teaching: Entails opportunities to evaluate the effectiveness of ITE institutions and programmes on school outcomes.

Although nomenclature slightly differed, Wang et al. (2003) "model of teacher supply pipeline" established the same six foci while adding two complementary areas: policies affecting professional

development and policies affecting advanced certification. All in all, both models highlight the potential of educational policies to sustain the quality of teachers within societies, as well as to enhance the necessary coherence between ITE and successive phases of teacher education.

Inspired in Roberts-Hull et al. (2015) scheme, the OECD (2019a) has recently introduced a "pathway model" to define teacher education in a more complex manner. Albeit the previous policy foci are also used in this scheme, the proposal add new categories that classify them into successive teacher education processes. Firstly, a distinction between *pre-service* and *in-service* teacher education is made, with *selection* and *progress into ITE*, as well as *entrance into teaching* included in the former, and *first years of teaching* and *continuous professional development* in the latter.

Within *pre-service* education, *selection into ITE* entails two different processes: *attracting* candidates and *selecting* candidates. Attracting candidates refer to recruitment strategies used to motivate individuals to apply to ITE, while selection specifies the procedures used to assess their fulfilment of entry requirements and allocate them into programmes. Regarding *progress through ITE*, the OECD model includes two complementary process: *equipping prospective teachers with what they need to know and do*; and *ensuring quality delivery of ITE programmes*. This way, this model splits the corresponding focus found in Wang et al. (2003) and Roberts-Hull et al. (2015) frameworks into processes orientated to improve the experience of teacher candidates and processes focused on controlling teacher training institutions.

Entrance into teaching refers at the same time to processes aimed at both *certifying and hiring* new teachers. Unlike the two above presented models, the OECD proposal merges both policy areas and replaces the word "registration" by "certifying", which suggests the relevance of assessing teacher candidates' competences before issuing them with a license to teach in the school system. In addition, within the *in-service* education phase, this model underlines the process of *supporting beginning teachers in the first years of teaching*, which implies that induction and mentoring schemes may play a key role in this stage of teacher education. Finally, an important feature that differentiate this model from the two models mentioned above is the inclusion of *alternative pathways* into the profession, described as parallel routes that encompass specific standards.

Building upon the models presented to describe common pathways into the teaching profession, the following paragraphs deepen on literature focused on each of the successive phases contained in the main routes (concurrent and consecutive) and address the characteristics and findings from research applied to alternative pathways.

2.2.1 Phases studied in the main routes into the teaching profession

a) Recruitment and selection

Recruitment and selection are considered key processes for ITE, especially because attracting the best possible candidates is essential for taking better advantage of the delivery of concurrent and consecutive programmes (Bramwell, Anderson, & Mundy, 2014). Once individuals declare their interest in applying to ITE, institutions can undertake several procedures to assess suitability of candidates. Parker (2018) reported that the following entry requirements were commonly used in developed countries to select candidates into ITE: secondary school qualifications, subject combinations, specialist knowledge in mathematics, standardised tests, specific teacher-oriented tests, interviews, and previous qualifications in the case of consecutive programmes. It is worth underlining that selection requirements differ

according to the ISCED level of the degree, which reflects a key distinction between concurrent (undergraduate) and consecutive (graduate) routes. For graduate programmes only a Bachelor degree or an examination is normally required (Wang et al., 2003).

A recent meta-analysis of 32 studies by Klassen and Kim (2019) showed that selection procedures accounted for small impacts on teacher effectiveness, as measured by external teaching observation ratings and classroom-level student achievement gains. Furthermore, the authors showed that such impact was moderated by the type of procedure used, with academic requirements -such as learning achievement at secondary school or scores in academic tests- having significantly greater predictive power than non-academic measures -e.g. beliefs, attitudes, personality, or motivation scales. These findings suggest that selection requirements to enter ITE actually predict future performance in the classroom, albeit such association is usually of a small size.

b) Initial teacher education

ITE refers to education programmes that prepare beginning teachers for classroom practice and correspond to the first entry level qualification obtained before starting the teacher professional career (Musset, 2010; Reid & Kleinhenz, 2015; Yeigh & Lynch, 2017). Concurrent schemes deliver academic subjects alongside educational and professional studies throughout the duration of the course. In contrast, consecutive programmes include only specialized courses in pedagogy since candidates are required to hold another degree in a discipline usually different from education studies. Consecutive programmes are more common to train secondary school teachers (Schwile, Dembele, & Schubert, 2007).

Concerns and controversy are found in the literature regarding the level of quality in the ITE which is currently delivered in different parts of the world (Bramwell et al., 2014). This is a matter of relevance because research suggests that high-quality ITE is essential for teacher quality, which in turn is one of the main predictors of student learning. In this respect, Rauschenberger, Adams, and Kennedy (2017) underline the great source of heterogeneity that ITE programmes by definition entail considering the different types of activities that are necessary to develop teaching skills and knowledge.

According to Feuer, Floden, Chudowsky, and Ahn (2013), at least the following six components of the quality of ITE can be included in a reliable monitoring and evaluation strategy: (1) admissions and recruitment criteria, (2) quality and substance of instruction, (3) quality of student teaching experience, (4) faculty qualifications, (5) effectiveness in preparing new teachers who are employable and stay in the field, and (6) success in preparing high-quality teachers (value-added models). Components (2) and (3) represents the core components of any ITE programme since they reflect the theory in action (Tatto & Menter, 2019) that training institutions purposefully develops with their teacher candidates. In particular, the quality of the student teaching experience has been a matter of discussion among scholars given its particular relevance to develop teaching skills and to integrate content knowledge through professional experience. In this regard, the literature distinguishes between experience gained through coursework and the one which is developed through practicum -i.e. the supervised teaching practice that normally culminates ITE.

c) Coursework and practicum

The Australia's Centre for Education Statistics and Evaluation (2016) reviewed studies concerned with the way practice based teacher learning was used in preparing teachers and the role of partnerships between universities and schools for this purpose. Findings indicated scarcity of empirical research on the

effectiveness of coursework and practicum. Likewise, the systematic review undertaken by Lawson, Çakmak, Gündüz, and Busher (2015) also remarked that particularly in studies focused on practicum, research was usually of small-scale, based on qualitative methods and used limited samples of teacher candidates. These syntheses underline that more large-scale studies are required to enhance external validity of findings reported in this area.

However, among such findings, short-term benefits of coursework and practicum on candidates' self-efficacy in teaching are remarked, which implies that having the opportunity to observe, reflect on or put into practice teaching skills during ITE improve teachers' perception of competence in this task. Research on practicum also reveals that not only variables from teacher candidates, but from teacher educators and mentors, play a relevant role in making this phase an effective experience for future outcomes in the teaching career. Overall, these findings suggest that institutional characteristics of coursework and practicum may account for positive outcomes in teachers. For instance, the review undertaken by the Australia's Centre for Education Statistics and Evaluation (2016) highlights the consensus on the critical components of highly effective ITE programmes reported by Darling-Hammond (2006). According to this author, teacher training which is based on clear links between coursework and practicum, promotes genuine partnerships between schools and universities and take advantage of effective mentor teachers have greater chances to impact teaching quality.

Research on key features of coursework and practicum is also relevant because attributes of structure and implementation of these experiences vary dramatically across countries (Schwile et al., 2007). To illustrate, Wang et al. (2003) documented a range duration of practicum between 4 (Japan) and 72 (Netherlands) weeks in a sample of programmes implemented in developed countries. In this sense, it can be hypothesised that structure and duration of practicum may account for a relevant share in the future performance of teacher candidates. Evidence suggests that the influence of these factors is rather complex: differences in duration have small or no effect itself, however they could interact with the wide variation in the way institutions structure practicum (Centre for Education Statistics and Evaluation, 2016). Certainly, the amount of time dedicated to developing practical teaching skills constraint the types of learning activities that can be carried out with teacher candidates, which in turn moderate the chances to improve their teaching.

In a recent comparative study, Jenset (2017) examined the opportunities that teacher candidates from Finland, Norway and California, US had to learn from coursework as well as the instructional practices contributing to these opportunities. Despite expected variation in several features of organisation and delivery, the author reported the following eight types of opportunities to learn in this context across countries:

1. Opportunities to plan for teaching and for performing the role of teacher appropriately;
2. Opportunities to practice and rehearse teaching and teacher role(s);
3. Opportunities to analyse evidence on students learning outcomes;
4. Opportunities to include teaching materials, artefacts, and resources into planning and teaching;
5. Opportunities to talk about field placement;
6. Opportunities to consider students' view on the teaching and learning process;
7. Opportunities to see different models of teaching; and,
8. Opportunities to appraise the link between national or state curriculum and own practice.

Comparative research focused on the critical features of coursework and practicum, and in the mechanisms through which supervised practice trigger improvement in teaching skills represents promissory avenues for research in teacher education. It is worth recalling that having successfully completed practicum is normally the final requirement to obtain a teaching qualification, thus evidence on the specific aspects that boost teaching skills in this last stage of ITE are particularly relevant for policy and practice.

d) Induction and mentoring

Nowadays, many countries recognise induction as a subsequent step to ITE. This is generally described as a structured support phase in which newly qualified teachers have the opportunity to put into practice -either fully or partially- their teaching skills, receiving compensation for such job. The formative component of induction is emphasised, concretely through opportunities for additional training an individualised professional advice -i.e. mentoring (European Commission/EACEA/Eurydice, 2018). According to Schwile et al. (2007), induction is also an opportunity for teachers to adapt to the school system and learn about their professional status.

The degree of formality of induction adds variation to the quality of the support received by newly qualified teachers. Deacon (2012) remarked that many types of activities may be considered as induction, including "brief and informal welcome by a principal, [...] perfunctory school orientation activities, to comprehensive mentoring and feedback and professional development programmes". In other words, induction may work either through informal or formal activities; in the absence of formal mentoring programme, induction still occurs because newly qualified teachers will anyway learn about their role from practice and from the cultures and norms of schools.

The prevailing view on the effectiveness of induction is that it yields several benefits for newly qualified teachers. Having participated in any type of these activities is generally linked to better teacher commitment and retention, instructional practices of greater quality (Spooner-Lane, 2017) and classes with higher learning achievement (Ingersoll & Strong, 2011). Nonetheless, and as its was also remarked in the previous phases described, few studies on induction are based on rigorous empirical evidence, which would also explain why the mechanisms of teacher learning underlying induction have not yet satisfactorily identified. Even the most revealing randomised controlled trial reported in the review by Ingersoll and Strong (2011) found positive effects of formal well-structured induction on student achievement, but no significant gains in intermediate outcomes related to retention and instruction (Glazerman et al., 2010). Therefore, although evidence supports the effectiveness of induction processes, the channels through which change occurs are not fully described in the literature yet (Spooner-Lane, 2017).

In addition, it is worth noting that induction can be targeted either to teachers new to the profession or for prospective teachers. This distinction underlines the fact that in some school systems this first phase of the teaching professional career can also comply with probationary purposes. In other words, it may well be the case that a phase of induction is experienced alongside a period of assessment of the teaching skills performed by graduates. This aspect touches on the possibility of school systems to include a certification or licensing phase conditional to the successful results of such assessment.

e) Certification and licensing

Musset (2010) noted that having completed ITE was not sufficient in several OECD countries to get a certification to teach. Qualified teachers were still considered candidates until they obtained a teaching license issued by the corresponding national authority. In some of these countries, teacher candidates were requested to approve additional competitive examinations or follow a probation period -normally one year- before getting their certification. In all cases, successful pass of this phase led to permission to teach in the mainstream public-school system, which implies a high stake of these assessments. Thereby, educational policy establishes a final supervisory mechanism over teacher training institutions and individual teachers, based on professional standards and regardless the focus or emphases of ITE programmes.

Albeit competitive certification and licensing are compulsory phases for many teachers in developed countries, this is by no means a requirement in the majority of school systems worldwide. For instance, Wang et al. (2003) reported that apart from the United States and England no other country required qualified teachers to obtain a certification or license on a competitive exam basis. In cases such as Japan teachers received a certificate by the responsible national authority, but only with the purpose of acknowledging their fulfilment of the qualification already provided by ITE institutions. In other words, getting a qualification from an ITE programme enabled teachers to receive almost automatically permission to "be responsible for the education of pupils", i.e. enjoy status of teacher (ILO/UNESCO, 1966).

It is worth remarking that certification and licensing always represent policy mechanisms that governments can use to face imbalances in the supply and demand of teachers. In theory, this phase enables policy makers to control potential wastage of qualified teachers trained through the main routes into the teaching profession, while regulating -through quotas, accreditation or incentives schemes- the contribution of ITE institutions. This is important to understand why nowadays the traditional concurrent and consecutive models (main routes), and the new short professionally-oriented programmes or employment-based training (alternative) are equivalently deemed as the first entry point into the teacher professional career (European Commission/EACEA/Eurydice, 2018; Musset, 2010). School systems strained by sudden and pervasive teachers' shortages may actually enact certification and licensing in order to raise in the short-term the flow of teachers trained through alternative pathways.

2.3 Characteristics of alternative pathways into the teaching profession

The rise of alternative pathways into the teaching profession may be seen as a response to the claims for a refreshed view on ITE (Yeigh & Lynch, 2017). At the core of this perspective, the idea of in-school teacher learning is emphasised as the key mechanism for improving teaching skills. In this sense, alternative pathways prioritise innovative and strong partnerships between higher education institutions and schools (Toon & Jensen, 2017). This kind of teacher training is supposed to directly tackle unresolved issues of the traditional routes into teaching, including adaptability to shortage of teachers and identification of minimum features of effective training.

In words of Musset (2010), alternative pathways into teaching represent a "minimum-competency model of teacher education", especially because they shift the focus from teacher training *per se* to the means that are necessary to certify teaching competences of individuals interested in performing this role. Consequently, a standard definition of the current forms of such pathways describes a process through

which graduates or experienced professionals from subject fields different to education may receive a teaching qualification through schemes that mix work in schools and personalised ways of training (Hálasz et al., 2018). Current alternative pathways into the teaching profession can be classified into two categories: short professional-oriented programmes and employment-based training.

a) Short professional-oriented programmes

Following the definition recently suggested in the joint report by the European Commission/EACEA/Eurydice (2018), this kind of programmes "are usually provided by 'traditional' teacher education institutions and include pedagogical and psychological disciplines, methodology, didactics and practical training. They usually offer flexible forms of enrolment such as part-time, distance or blended learning, as well as evening courses".

Eaton, Dressler, Gereluk, and Becker (2015) reviewed literature on the use of online and blended learning formats for ITE and found that if teachers were equipped with technology and follow well-structured programmes, then such pathways could be cost-effective and particularly relevant for candidates in rural and remote areas. In this sense, information and communication technologies are promising in addressing several purposes of teacher education in short professional-oriented programmes. Burns (2011) mentioned evidence of using distance education to train and qualify pre-service teachers in the Caribbean, to do mentoring in Texas and simulate classroom experience in London. Nonetheless, this author rightly claimed that in order to aspire to develop teacher quality, many distance learning programs should seriously consider issues on the length, duration, and complexity of the change process involved in teacher education.

b) Employment-based training

Unlike short professional-oriented programmes, employment-based training allows trainees to work in schools from the outset while they follow an individualised training programme leading to the teaching qualification (European Commission/EACEA/Eurydice, 2018). The most renowned programme of this type is been globally delivered by Teach for All (2019).

McConney, Price, and Woods-McConney (2012) reported that recruitment and selection phase took longer and more resources in Teach for All than in the main routes provided by universities (concurrent and consecutive pathways), with acceptance rates close to 10%. In general, Teach for All involves selected candidates in a six-week residential intensive training institute over the summer: two-weeks are spent in a school and one in their placement centre. Prior cohorts fellows play a relevant role in exchanging their experience as teachers during this training. After the summer, an employment-based training is provided in the school, including the participation of mentors and partnerships with universities. It is worth recalling that participation in Teach for All schemes do not guarantee certification of license to teach, since this process is finally in charge of national authorities.

These authors also remarked that organisational features of the delivery of Teach for All may differ across countries, however no evidence on differential effectiveness of such adaptations had been reported yet. Although studies on the effectiveness of Teach for All schemes compared with the traditional routes into teaching are relatively new, some findings are promising. For example, McConney et al. (2012) remarked that the majority of the available research on the implementation of Teach for All in the US -i.e. Teach for America, one of oldest versions of the programme- suggests an advantage for students taught by teacher

trained in this programme, particularly in science and mathematics subjects. Hirshberg (2011) also highlighted that findings from effectiveness research on Teach for All as implemented in the US supported the identification of key moderators of the reported effects, including characteristics of placement schools such as leadership, climate and availability of educational resources.

Nonetheless, such auspicious and recent findings of Teach for All should be taken with caution since they refer only to one type of alternative employment-based training, which do not necessarily transfer to all the possible ways through which this kind of programmes can be delivered. More research on the impact of employment-based training is required in order to clarify controversial findings reported in previous decades (Qu & Becker, 2003; Suell & Piotrowski, 2007).

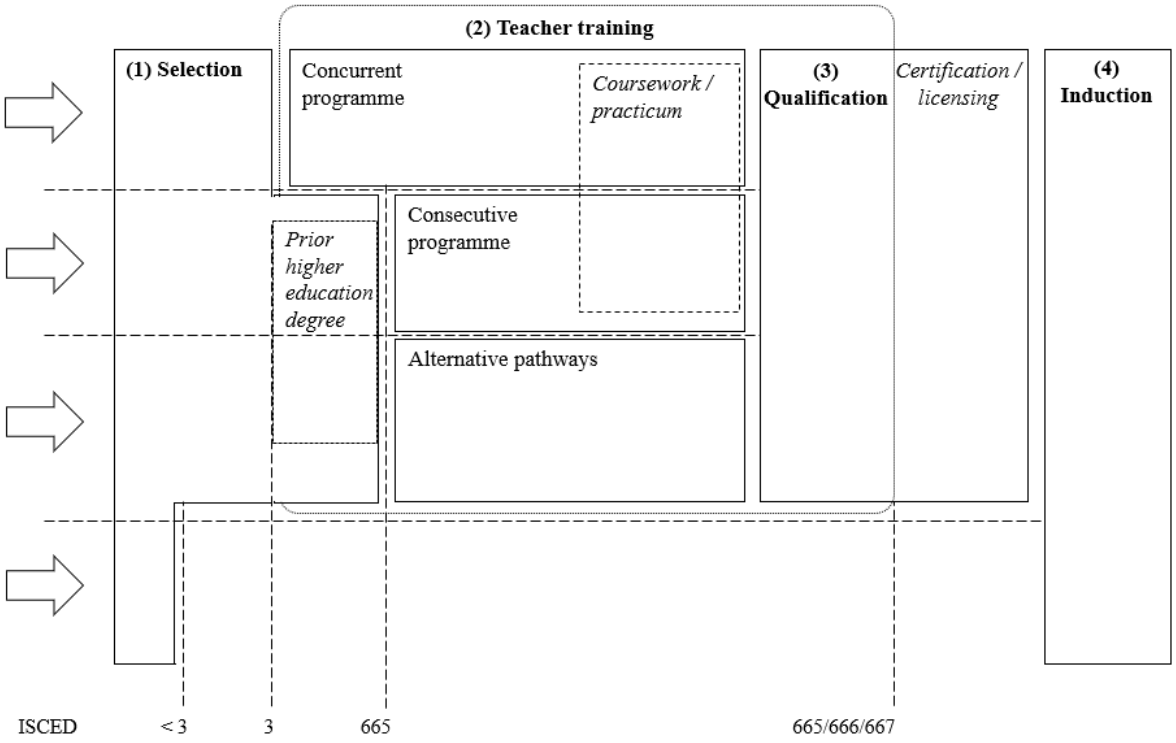
3. Framework dimensions

This section introduces the analytical framework proposed to strengthen monitoring on indicator "4.c.1. Proportion of teachers in: (a) pre-primary education; (b) primary education; (c) lower secondary education; and (d) upper secondary education who have received at least the **minimum organized teacher training** (e.g. pedagogical training) pre-service or in-service required for teaching at the relevant level in a given country" (UNESCO, 2016b, p. 28).

Based on the international standard definitions of teacher training and education presented in the previous sections, this framework defines its central construct -i.e. minimum organised teacher training- as the pathways to the teaching profession documented in global policies and academic literature on teacher education. Figure 1 depicts the main components of this construct in a developmental perspective that describe successive phases of teacher training that lead to obtaining qualifications as measured in the ISCED (UNESCO Institute for Statistics, 2012).

The framework of pathways into the teaching profession establishes four independent routes, namely: concurrent, consecutive, alternative and lack of adequate teacher training. Exempting the latter, all these routes describe progression through phases of selection, initial teacher training, qualification and induction. **Selection** encompasses the set of requirements used to determine suitability of candidates for initial teacher training programmes. **Teacher training** refers to formal programmes that provide a Bachelor's or equivalent level of qualification in the field of education, as defined in the ISCED (UNESCO Institute for Statistics, 2012). This is generally delivered through syllabi that include subject courses, coursework experiences and a final stage of practicum -i.e. supervised teaching practice. **Qualification** is defined as the degree obtained after successful completion of initial teacher training, established as the official requirement that must be fulfilled before acquiring the right to teach -i.e. teacher status (in some countries it may entail additional certification or licensure conditions). **Induction** corresponds to a structured support phase in which newly qualified teachers have the opportunity to put into practice their teaching skills, receiving compensation for such job.

Figure 1. Pathways into the teaching profession



3.1 Concurrent routes

Concurrent routes are mainly characterised by the participation in teacher training that delivers general academic subjects provided from the start of the programme alongside professional subjects (pedagogy, teaching methods, etc.). Table 1 details relevant descriptors on selection, ITT and qualification.

Table 1. Descriptors of concurrent routes into the teaching profession

Phase	Descriptors
(1) Selection	Secondary school qualification, ISCED level 3. Other requirements may include scores in standardised tests of learning achievement in different subject areas, combination of grades in secondary school subjects related to the teaching area of specialisation, specific teacher-oriented tests and interviews.
(2) Teacher training	Courses on general studies; theory and history of education; elements of philosophy, psychology, sociology of education; other areas of educational research (e.g. comparative education); school management; instructional and assessment methods on subjects in the candidate's intended field of teaching. Coursework prescribed in some of the aforementioned courses. Practicum -i.e. practice in teaching activities under the guidance of fully qualified teachers.
(3) Qualification	Long first degree at tertiary level in the field of teacher training and educational science (more than 4 years; Bachelor's or equivalent programme, ISCED level 666)

3.2 Consecutive routes

Consecutive routes cover opportunities where teacher candidates have already completed a first stage of higher education in a particular subject area and move on to teacher training in a separate successive phase to specialise in teaching subjects related to that area. Table 2 shows descriptors of this type of routes.

Table 2. Descriptors of consecutive routes into the teaching profession

Phase	Descriptors
(1) Selection	First degree at tertiary level (3-4 years, Bachelor's or equivalent programme, ISCED level 665). Other requirements may include examinations on the subject area of specialisation.
(2) Teacher training	Courses on instructional and assessment methods on subjects in the candidate's intended field of teaching. Coursework prescribed in the aforementioned courses. Practicum -i.e. practice in teaching activities under the guidance of fully qualified teachers.
(3) Qualification	Second or further degree at tertiary level in the field of teacher training and educational science (following a Bachelor's or equivalent programme, ISCED level 667).

3.3 Alternative pathways

Alternative pathways define training processes through which graduates or experienced professionals from subject fields different from education science receive a teaching qualification through short schemes that mix work in schools and personalised ways of training. Table 3 details descriptors on alternative pathways.

Table 3. Descriptors of alternative pathways into the teaching profession

Phase	Descriptors
(1) Selection	First degree at tertiary level in any field (3-4 years, Bachelor's or equivalent programme, ISCED level 665) and not having received a teaching qualification or currently not studying towards it. Other requirements may include having completed higher level degrees, telephone and behavioural interviews.
(2) Teacher training	*Short professional-oriented programmes:* (a) provided by teacher education institutions; (b) include courses on pedagogical and psychological disciplines, methodology, didactics and practical training; and (c) offer flexible forms of enrolment such as part-time, distance or blended learning, as well as evening courses. *Employment-based training:* (a) provided by partnerships between schools and higher education institutions; (b) candidates work in a school from the outset; and (c) follow an individualised training programme.
(3) Qualification	*Short professional-oriented programmes:* Second or further degree at tertiary level in the field of teacher training and educational science (following a Bachelor's or equivalent programme, ISCED level 667). *Employment-based training:* No qualification is obtained, but successful completion might lead to certification and licensing.

3.4 Lack or incomplete teacher training

This route reflects the realistic approach of this framework, which assumes that many students in the world are taught either by (a) individuals without any prior training in educational sciences; (b) teacher candidates currently following a concurrent or consecutive route into the teaching profession, or; (c) teachers that completed teacher training, but didn't obtain the corresponding qualification. In all these cases, at least licensing procedures are carried out by national authorities, which may lead to certification after completing additional in-service training requirements. Normally, secondary school qualifications, ISCED level 3, are defined as the main selection requirement to issue such license, but countries facing shortage of teachers are even more flexible and may require lower levels of education.

3.5 Dimensions included in the international analytical framework

In order to inform about the potential of this framework to explain in a higher proportion the minimum organised teacher training described through the pathways to the teaching profession, Figure 1 also underlines the core dimensions that may be prioritised for the assembly of the international analytical framework. These dimensions are circled within the phase "(2) Teacher training" but includes some key descriptors of adjacent dimensions -i.e. "(1) Selection" and "(3) Qualification". To be more precise, if dimensions of this framework must be prioritised to inform the basic elements of a minimum organised teacher training (regardless the pathway followed by teachers), then they should include the following descriptors in descending order of relevance (Table 4).

Table 4. Dimensions prioritised in the international analytical framework

Dimensions	Descriptors
1. Teacher training	1.1. Courses on instructional and assessment methods on subjects in the candidate's intended field of teaching. 1.2. Coursework prescribed in some of the aforementioned courses. 1.3. Practicum.
2. Selection and qualification	2.1. Secondary school qualification, ISCED level 3, used as a selection requirement to enter into teacher training. 2.2. Bachelor's or equivalent programme in the field of educational science, ISCED levels 666 or 667, used as a required teacher qualification. 2.3. Other selection requirements contingent to the type of pathway (concurrent, consecutive or alternative). 2.4. Certification and licensing based on successful completion of (a) Bachelor's or equivalent qualification in a field different from educational science, and/or (b) employment-based training.

It is worth recalling that results from this prioritising exercise attempt to maximise the validity of the construct "teacher training" as defined in its minimum possibly observed level worldwide. In this sense, these dimensions must be interpreted with caution because they are far from informing the ideal characteristics of initial teacher education across pathways or nations. In addition, they should be seen as an interim outcome of this framework that should serve as a guide for further consultations and experts' validation. In return, these results enhance the degree of feasibility of this framework for data collection procedures in cross-national monitoring settings. The following section describes features of

the strategy suggested to measure progress on indicator 4.c.1 based on this international analytical framework.

4. Data collection strategy

This monitoring strategy is based on a two-phase plan for longitudinal data collection at the international level. The first phase aims at gathering available aggregate level data on the descriptors of the international analytical framework, while exploring feasibility on collecting individual level data from teachers at each country. The second stage aims at surveying representative samples of teachers across the educational levels required on the indicator 4.c.1. It must be noted that the longitudinal component of this strategy requires collection/collation of data in at least two different time points through 2030. This way, valid country measures on target 4.c - "increase [in the] supply of qualified teachers"- could be obtained.

4.1 Plan for aggregate level data collection

4.1.1 Survey design and guidelines for data collection

Overall, the design of this component will build upon current efforts carried out by the UNESCO under the implementation of the SFE. It is therefore suggested to take advantage of this annual exercise to gather available macro level data on the descriptors of the international analytical framework as provided by Ministries of Education or National Statistical Offices. For this purpose, a complementary module on the **"Characteristics of initial training received by teachers"** will be added in the SFE. This module of the instrument will be included at the earliest convenience by UNESCO and further implementations will follow according to the reporting needs of countries.

The inclusion of this module is recommended without changing current definitions on trained and qualified teachers established in the SFE instruction manual (UNESCO, 2016). Indeed, the module is intended to empirically examine the characteristics of the training received by the current (or previous) population(s) of trained and qualified classroom teachers, which preserve the target population already surveyed in section A10 of the SFE. Moreover, UNESCO should favour a collaborative approach in which data already accessible from other international surveys and assessments can be provided to national authorities for their revision and completion of unavailable information. This would imply an additional preparatory phase of the survey based on desk-based data collation developed by UNESCO teams. The following section specifies the indicator methodology of this plan.

4.1.2 Indicator methodology

The additional module suggested for the SFE will collect characteristics of the training received by the current (or previous, if available) population of classroom teachers in the country. Technically, the construct of interest will be the minimum organised teacher training observed in classroom teachers from all relevant levels of the school system mentioned in indicator 4.c.1.

Section 1 of this module will examine structural characteristics of the teacher training pathways approved by national authorities and in force over the time period covered by the survey. Although this section will not collect quantitative data per se, it is considered a key step to compare the provision of teacher

training across nations and set the benchmark in each country. The following instruments are recommended to inspire development of indicators:

The curriculum questionnaire used in the Trends in International in Mathematics and Science Study (TIMSS) Encyclopedia (IEA, 2012a, 2012b) may be useful to collect characteristics of the main preparation routes (subject-matter specialization, duration, qualification/certification requirements).

The methodology implemented by Keevy and Jansen (2010) in The Commonwealth may well complement this information, providing key information on the qualifications needed to teach, described in terms of duration (years), entry level requirement (ISCED), final degree (ISCED) and number of practice weeks.

OECD Education at a glance approach used for indicators D5 "Who are the teachers" (OECD, 2012) and "D6.2c - Requirements to enter and progress in initial teacher education, lower secondary education (2013): In public institutions" (OECD, 2014a) is also highly recommended. These data will directly shed light over the key dimensions and descriptors of the international analytical framework.

The instrument for teacher-education institutions and programs used int the Teacher Education and Development Study in Mathematics (TEDS-M, Tatto et al. (2012)) includes items relevant to examine several characteristics of teacher training programmes, such as: type of route (concurrent vs consecutive), qualification levels, extent of subject-matter specialization (generalist vs specialist), duration and size

The OECD Teacher Knowledge Survey (Sonmark, Révai, Gottschalk, Deligiannidi, & Burns, 2017) could also provide insights on the governance and organisation of initial teacher education, entry and completion requirements, selection policies, programme content, field experience of teacher candidates and profiles of teacher educator staff.

The objective of Section 2 will be two-fold. On the one hand, it will explore current availability of valid data on the percentage of classroom teachers that received training as described in the international analytical framework. Accordingly, Ministries of Education or National Statistical Offices will provide estimates on the three key descriptors of teacher training (i.e. 1.1. courses on instructional and assessment methods on subjects in the candidate's intended field of teaching; 1.2. coursework prescribed in some of the aforementioned courses; 1.3. practicum). Estimates on descriptors related to selection and qualification will be also collected, particularly 2.4 Certification and licensing based on successful completion of (a) Bachelor's or equivalent qualification in a field different from educational science, and/or (b) employment-based training. In other words, this section will inform the percentage of trained and qualified classroom teachers that received teacher training with these characteristics. A selection of corresponding indicators from Section 1 will be used to capture variability in these dimensions within countries.

Taking into account the modest percentage of countries with available data in indicator 4.c.1 recently reported by the UNESCO -i.e. 46% (UNESCO, 2018), it becomes important to examine feasibility of data collection at the individual level for descriptors not satisfactorily informed in Section 2 (Miller et al., 1990). Consequently, Section 2 will also include questions on the extent to which unreported descriptors could be easily or conveniently collected from representative samples of classroom teachers. It is important for this information to be specified for all relevant levels of the school system mentioned in indicator 4.c.1.

4.2 Plan for individual level data collection

4.2.1 Survey design and guidelines for data collection

If feasibility of data collection for descriptors underreported in Section 2 of the module on "Characteristics of initial training received by teachers" is adequate, then the UNESCO will favour the implementation of plans for individual level data collection within countries or across regions. Target populations will be defined as in the SFE -i.e. trained and qualified classroom teachers from all relevant levels of the school system mentioned in indicator 4.c.1 at post over the time period covered by the survey. Hence, in order to fully comply this indicator, the following four different levels will be separately targeted: pre-primary education, primary education, lower secondary education and upper secondary education. The design of these surveys may follow several options depending also on findings from the feasibility sub-section of the module added to the SFE. Overall, flexible multi-stage stratified sampling strategies are recommended to improve efficiency and reliability, and ensure that all parts and specific groups of target populations are represented (OECD, 2014b, 2017).

4.2.2 Indicator methodology

The plan for individual level data collection will use a **"Teacher questionnaire"** with the purpose of requesting self-reported information on the characteristics of initial training received as described in the international analytical framework. Accordingly, this instrument will cover the different dimension and descriptors of the international analytical framework, as well as other from the framework of pathways into the teaching profession considered relevant. In order to develop valid and reliable measuring tools for these descriptors, it is highly recommended to take advantage of teacher questionnaires' items developed by the following two international studies:

The OECD Teacher Knowledge Survey (Sonmark et al., 2017) includes questions on the type of route followed (main vs alternative), duration of practicum, highest level of qualification and a wide list of possible contents of teacher training.

The OECD Teaching and Learning International Survey (International Project Consortium, 2013; OECD, 2008) has standard questions on the highest level of formal education completed (ISCED) and the focus of the teacher training programme (e.g. practical experience, subject-matter training and pedagogical training). The recently released version of this instrument (OECD, 2019b) includes items on the type of route (concurrent, consecutive, alternative, others) and contents of teacher training.

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