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INNOVATIVE TEACHING FOR EFFECTIVE LEARNING

Background Document: How is Pedagogical Knowledge Codified in the Teaching Profession? A Critical Review of Selected Competence Frameworks for Teachers and Other Professions

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This paper is being developed as part of the background research for the ITEL project. The purpose of this paper is to critically analyse a) how some countries codify the role of teachers as knowledge professionals, based on the analysis of some key characteristics of their competence frameworks and our currently available body of knowledge on them; b) how competence frameworks (through the professional standards contained in these frameworks) comply with the body of knowledge emerging from the learning sciences research. Competence frameworks for engineers, doctors and nurses are also analysed. This critical review paper is part of the conceptual work currently in progress in ITEL and accompanies the "ITEL Progress Report" EDU/CERI/CD(2013)11.

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HOW IS PEDAGOGICAL KNOWLEDGE CODIFIED IN THE TEACHING PROFESSION? A CRITICAL REVIEW OF SELECTED COMPETENCE FRAMEWORKS FOR TEACHERS AND OTHER PROFESSIONS

Introduction:

1. If we define teachers as knowledge professionals, how is their *knowledge-base* codified in the profession? This is one of the key questions that the OECD initiative *Innovative Teaching for Effective Learning (ITEL)* aims to respond with this paper. ITEL is an OECD on-going effort to investigate whether the knowledge and competence core needed by the teaching profession is "in tune" with the latest developments in learning sciences and today's society's needs. A critical analysis of teachers' competence frameworks, also understanding how these relate to other frameworks (*i.e.* qualifications frameworks), can contribute to this end. These frameworks guide teachers and education systems on what teachers should be able to know and achieve as knowledge professionals.

2. Defining the knowledge-base of a profession can be a shared challenge across professions. In today's global context, societies are becoming increasingly knowledge intensive, and knowledge has become the key connecting element of the multiple levels and dimensions of contemporary governance (Van Damme, 2013; OECD, 2013a). In this new scheme, multiple sources of knowledge will interact, contributing to the continuous generation of new knowledge. These leads to two challenges: the first is defining the knowledge base of a specific community of practice, and the second is defining how to make this knowledge meaningful and readily available from one context to another (Evetts, 2005; Fazekas and Burns, 2011). Succeeding the first challenge will help establish policies that foster the generation of that specific knowledge needed. Succeeding the second challenge will help strengthen the capacity of that knowledge to adapt to different contexts and needs, and become synergic with other types of knowledge. Professional frameworks usually aim to tackle these two challenges.

3. In the context of the teaching profession, this paper aims to understand how the professional knowledge for teachers is codified, but also, from a dynamic perspective, how this knowledge is expected to be progressively acquired throughout the teacher's professional life and compared to other professions. Teacher frameworks, such as competence and qualifications frameworks, help define the role of teachers as knowledge professionals, signalling to teachers and society what is expected from them and how they can improve at different stages of their professional careers. This shared understanding can help align the necessary resources at the classroom, school, and system level to help teachers to better impact student learning and to influence the profession in significant ways (*e.g.* through more suitable development opportunities, or competitive salaries) (Ingvarson and Rowe, 2007).

4. A key question raised is therefore how education systems translate into the classroom the available scientific evidence on what impacts student learning to help students succeed. This critical exercise will focus on competence frameworks, analysing their relation to qualifications frameworks, since this can provide important background to understand how knowledge is codified in the profession. Comparing teaching to other professions, this critical review aims to provide a basic reference of:

- How some countries clarify the role of teachers as knowledge professionals, based on the analysis of some key characteristics of their competence frameworks and our currently available body of knowledge on them.

- How competence frameworks (through the professional standards contained in these frameworks) comply with the body of knowledge emerging from the learning sciences research and how it might impact teachers' practice, based on on-going work by ITEL (EDU/CERI/CD/RD(2013)5).

5. To analyse these issues, this paper follows three pathways of analysis:

- The first pathway aims to *define* what these frameworks are, analysing the main characteristics of competence and qualifications frameworks, and exploring how they relate among each other. Some underlying related concepts, such as "competences", "competencies", "qualifications", "skills" and "standards" are also explored. This is a fundamental exercise since, as many authors agree, the meaning of these concepts and frameworks tends to vary largely across literature (Allais, 2010; Brockmann, Clarke and Winch, 2008; Bourgonje & Tromp, 2011).

- The second pathway aims to *compare* the professional standards' content in competence frameworks with some of the latest findings from the learning sciences, to see whether they have kept up-to-date with new research.

- The third pathway therefore aims to *outline* the general characteristics of competence frameworks for teachers and other professions, as well as the professional knowledge components that their professional standards identify as characterising a successful professional.

6. This analysis focuses mainly on competence frameworks for teachers, nurses, engineers and doctors in Australia, the United Kingdom (England and Scotland), Canada (Ontario) and the United States, as well as some international examples. These frameworks include competence-based standards (also known as professional standards). The analytical work carried out is based on desk-based research, using documents available to general public in official websites of the cases selected, as well as existent research on the topic. In recent years, the OECD has made significant efforts to help countries develop better teacher policies. These efforts have translated into the development of publications focusing on teachers specifically, or as components of policies for better learning, such as: Teachers Matter, the Teaching and Learning International Survey, Improving Schools, Equity and Quality in Education, Synergies for Better Learning, among others. This critical review will also build upon this OECD work, and on non-OECD sources from countries, academia and international institutions.

7. Part I of this paper discusses some evidence available on the use of teacher frameworks. By using the metaphor of a "teacher's knowledge wall", it also discusses the main characteristics of qualifications and competence frameworks, to show how these two frameworks can come together to help teachers respond better to the student and education system's needs throughout their professional careers. Part II focuses on teacher competence frameworks, analysing their general characteristics (coverage, internal structure and quality assurance and support tools), as well as how their professional standards reflect the latest findings from the learning sciences, as identified by ITEL. Part III analyses the general characteristics of frameworks for nurses, engineers and doctors. It also defines some comparable knowledge components to understand how the teachers' professional knowledge can compare to that of other professions. A summary of key findings is presented below.

Summary of key findings (in progress)

8. Teachers face today **increasing complex demands in education systems**, and teacher frameworks (such as competence and qualifications frameworks) are seen across countries as tools that can help them to better address these demands. At the same time, the literature points to a challenge that countries have in agreeing the meaning and scope of key concepts related to these frameworks. More evidence-based clarity will allow better defining the directions that these frameworks should take, and strengthening the value of these frameworks in fostering teacher improvement.

9. Despite the **variety of definitions** and the "common agreement that there is no agreement" on what different concepts such as competences, competencies, qualifications, skills or standards, the competence frameworks analysed show some convergence in what countries expect from teachers (and other professions). This can be because some countries adopt a framework from another country. It raises a question on the effects of such a framework if other components in the country's system have similar concepts, but remain with different meanings (Brockman *et al.*, 2008).

10. The professional standards in the competence frameworks analysed show some similarities in their **general characteristics**, such as: a broad description of competences/competencies, encouraging diversity in practice and, addressing innovation in teaching (at least generally). The more expert the teachers, the more adaptable they are expected to be across these frameworks. This is a more interesting finding if we consider that "competence" relates to the ability of an individual to deal with complexity, unpredictability and change. Hence, a higher level of competence would lead to more evidence of self-directedness and critical reflection (meta-competence) across domains (Sultana, 2008). At the same time, the emphasis put on the teacher's capacity to adapt (through the use of different teaching strategies, by focusing on the possible differences of students, or both) suggests a shared importance that these frameworks place on equity issues.

11. Regarding elements from the **learning sciences' research findings**, differentiated instruction, engagement and challenge, student feedback and classroom management are the aspects most shared across the professional standards analysed. Other less addressed elements are self-reflection and meta-recognition, rehearsal, questioning or active learning. It is noticeable that differentiated instruction is the only element present across all the professional standards analysed, which requests from the teacher to adequate practice and the environment to the various ways in which students can be different (socio-economically, culturally, in achievement, having special needs, etc.). This also suggests an important emphasis on equity issues in the definition of teacher competence in the frameworks analysed.

12. How are **improvement pathways** set for teachers in the cases analysed? Besides the NBPTS professional standards, all professional standards for teachers analysed target teachers in general ("generic" coverage), and the "roadmap" approach that clarifies a teacher's professional evolution is less common than compared to the other professions analysed (only Australia has a full roadmap approach as part of a single set of professional teacher standards). Nevertheless, improvement as a progressive, continuous process seems targeted by the overall competence framework in all cases analysed. Continuing professional development guidance can have different approaches: from overarching evidence-based objectives to specific examples of training possibilities. There seems to be some convergence on the approach to teacher appraisals, such as: relying on a variety of sources of evidence, aiming to be context-based and depending on the professional judgement of both teachers and appraisers.

13. **For other professions**, the competence frameworks analysed for engineers, doctors and nurses suggest a relatively stronger link to formal qualifications (especially, engineers) than those for teachers. These other professions can have either generic or specific professional standards, and generally aim for roadmap or semi-roadmap approaches. As for teachers, professional standards for doctors, engineers and

nurses address adaptability, although in different ways: to the patient (doctors), to the patient and of the environment (nurses), through problem-solving (engineers). A shared approach as well is that support and quality assurance tools for these professions seem aimed to assess the professionals in their context of practice. There is also a focus on continuous appraisal in practice that allows providing continuous feedback for improvement ("real-time feedback") that seems clearer in some of these frameworks. It calls the attention that some of these frameworks have support tools to help appraisers in this process.

I. A "knowledge wall of teachers": clarifying concepts and components as a starting point

14. Teachers face increasingly complex demands along their professional lives, due to factors such as: an increased focus on learning outcomes; a more diversified student population (*e.g.* immigrant or special needs); increasing external demands from parents, employers, media, advocacy groups and other stakeholders; evolving cross-curricular contents or new uses of technology, among others (OECD, 2005a; OECD, 2013b).Teacher frameworks are seen by some as tools that can help teachers cope with these new challenges.

15. Teacher frameworks (and specifically, qualifications and competence frameworks) provide a unique window into how countries are defining the knowledge-base of teachers. The capacity of the profession to define, evaluate and certify high quality teaching is key to promote student learning, but also to place greater value on teaching in substantive ways, such as providing competitive salaries, or attractive career paths (Ingvarson and Rowe, 2007). This understanding can also facilitate identifying how to better support teachers, schools and local governments to help teachers improve their practice. There is still nevertheless a debate regarding what these frameworks are, and their effects in improving teaching and learning.

16. This part will "set the stage" to discuss teacher frameworks. It will tackle why it is important to analyse teacher frameworks, will define some key concepts to be used later in the document, and will discuss as well some of the available evidence on their effectiveness.

1.1. Defining the "knowledge wall": qualifications and competence frameworks.

17. What is a "teacher's framework"? The dictionary defines a framework as "a structural plan or basis of a project", or "a structure or frame supporting or containing something". But literature about teachers refers to different kinds of frameworks. For example, in a survey carried out by the Finnish Institute for Educational Research (2009), 21 countries reported having definitions of knowledge and skills for teachers either at national or local levels. In the OECD review of Evaluation and Assessment for Improving Learning Outcomes, 10 countries reported having "standards" for teacher appraisal. Furthermore, a report produced for the International Labour Organisation (Allais, 2010) identified about 100 countries that were implementing, developing or considering adopting national qualifications frameworks.

18. Additionally to this variety of frameworks, the meaning of some related key concepts can also differ, such as qualifications, skills, competences or competencies, despite existing international coordination efforts, such as the Common European Principles for Teacher Competences and Qualifications, the European Qualifications Framework or the European Higher Education Area ([EDU/CERI/CD(2012)2]; Brockmann, Clarke and Winch, 2008; FIER, 2009; Bourgonje & Tromp, 2011). The literature shows that it is sometimes not easy to find a common language to analyse or compare these frameworks. As described by Allais (2010) in the case of qualifications frameworks:

19. "These definitions are not empirically derived, but describe what people hope qualifications frameworks *should be* and *should do*. To make matters more complicated, although the terminology used in creating and describing qualifications frameworks is very similar in different countries—including terms such as 'learning outcomes', 'competence', 'standards', 'validation', and even, 'qualification'—in fact, these terms often refer to very different things."

20. It is not clear either how different kinds of frameworks relate among each other. For example, how do qualifications and competence frameworks interact with each other within an education system? How do these frameworks, separately and together, shape the role of teachers as professionals within an

education system? If "standards" exist in both kinds of frameworks, do they mean the same thing for both frameworks and what is their role?

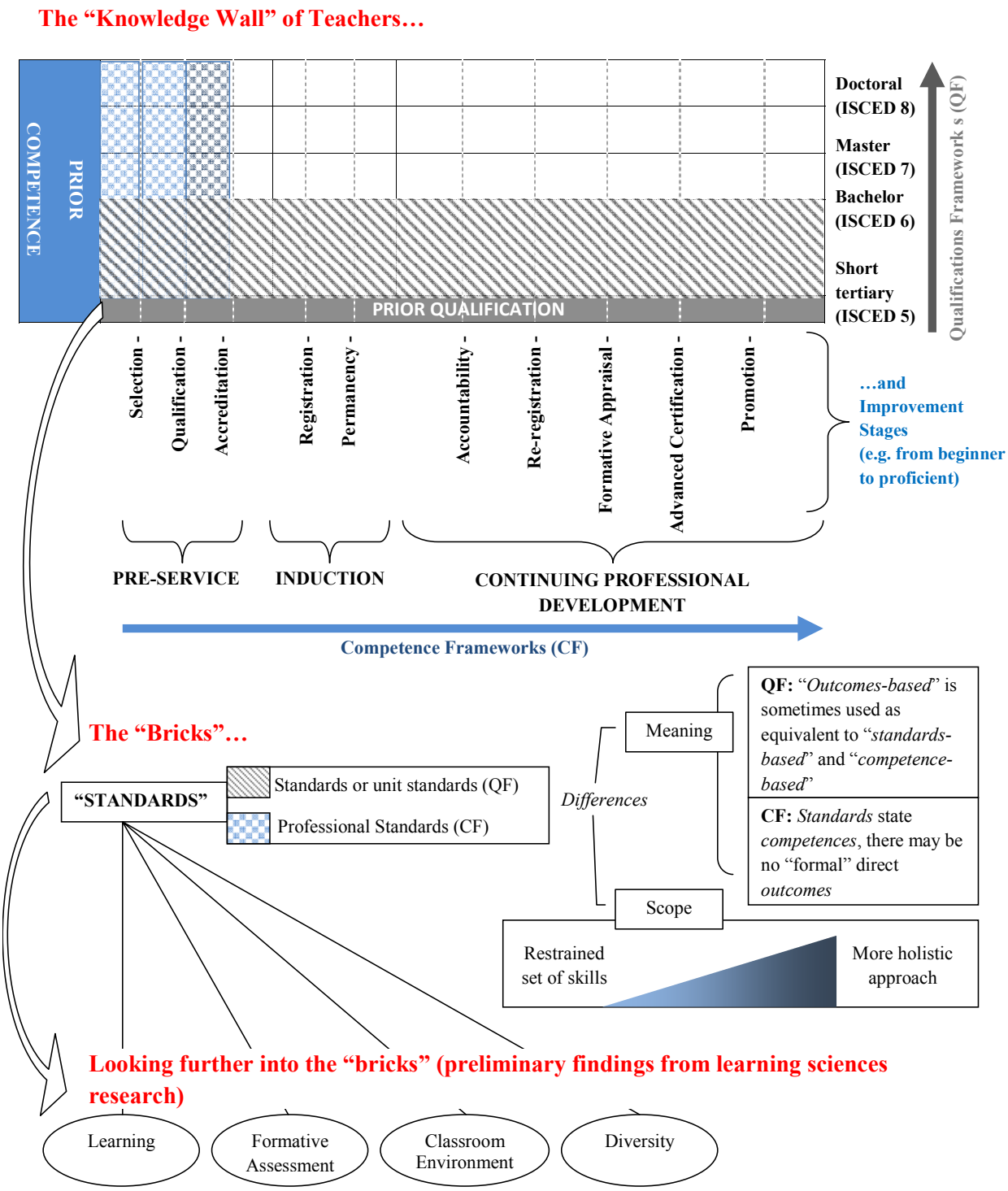
21. Based on different OECD and non-OECD literature, this section will discuss some of these concepts and will use the analogy of a teacher's "knowledge wall" (Figure 1), to compare qualifications and competence frameworks (the concepts adopted in this section are highlighted in bolds). The section will provide a general description of their basic elements, how they are used to define the teaching profession in a country, and how they interact together. This analysis will also explore some associated concepts like "standards" (the "bricks" of this wall), outcomes and competences, which are also important to understand this diversity.

22. Qualifications and competence frameworks can help promote teacher life-long improvement, but achieving a common understanding of the definition and scope of key concepts related to them is a challenge they share. Qualifications frameworks talk about formally acquired knowledge in principle (*e.g.* bachelors, masters or doctoral degree) (OECD, 2007a). Competence frameworks can address on-going improvement of knowledge and skills (*e.g.* from beginner to proficient) that may eventually lead or not to formal outcomes in a teacher's career (*e.g.* pre-service, induction, continuing professional development). In the continuum of a teacher's professional career, competence frameworks can complement the qualifications acquired in formal teacher education programmes and provide more flexibility to manage teacher improvement in a country. They may also allow shaping further the teachers' knowledge profile at different stages of their careers and experience according to the needs of the education system. From these different perspectives, both contain information on the aspirations of education systems on what their teachers' *knowledge base* should be as *knowledge professionals*.

23. We can use the example of a teacher to explain how these frameworks translate into a teacher's professional career. Figure 1 shows a possible interaction between a qualifications framework (vertical axis) and a competence framework (horizontal axis) in a "theoretical" country. A teacher in this country has been awarded with an initial teacher education diploma at the bachelor level (corresponding standard in diagonal lines). Depending on the country's policy, this teacher may have passed a selection and a qualification process, and could now be following an accreditation process (corresponding standard in dark checkers). The standards are the "bricks" that guide the teacher and the education system on the "competences", "outcomes" or "skills" that are expected from teachers, and define the vertical/horizontal movement of a teacher in the knowledge wall. After completion of initial training, the progress in one framework may not necessarily imply progress in the other one. This will depend on a country's teacher policy.

24. As shown in the example above, **qualifications frameworks** can help clarify the specific formal qualifications that a teacher (or another occupation or profession) can receive within that education system in relation to other professions. A **"qualification"** is defined by the OECD as **the formal outcome (or award) of an accreditation or validation process that an individual has learned the knowledge, skills and/or wider competences according to specific standards.** It confers official recognition of value in the labour market and in further education and training. Hence, a "qualifications framework" is understood by this organisation as an "instrument for the development and classification of qualifications according to a set of criteria of levels of learning achieved (OECD, 2007b; 2010)." Qualifications frameworks are considered mainly "outcome-based" (and in some contexts, "standards-based"), since they provide information about the learning outcomes against which learners' performance can be assessed in an assessment process.

Figure 1. The 'knowledge wall' of teachers' national qualifications and competence frameworks



25. The development of qualifications frameworks is relatively recent, with some of the first national qualifications frameworks created in the 1980s and 1990s in Scotland, New Zealand and Malaysia (Allais, 2010), and their scope has gradually expanded. For example, national qualification frameworks initially covered only Vocational Education and Training, but with the years, they have started covering as well academic education (OECD, 2010). In some countries such as Spain, Greece, the Czech Republic and

Japan, their focus is still primarily associated with VET education. In other countries, national qualification frameworks refer to all education (Ireland) or all except higher education (United Kingdom, where this is the task of the Framework of Higher Education Qualifications - FHEQ) (Forsyth *et al*, n.d.; Tuck, 2007; OQER, n.d.). In the same way, to encourage life-long learning, it has recently been considered that countries may need to adopt a broader view of qualifications that goes beyond a formal diploma or award. It is considered that this new, more dynamic approach should allow covering the new abilities obtained in a day to day basis at work, and through peer learning (OECD, 2007a).

26. Since the creation of the first qualifications frameworks, these frameworks can still differ largely across countries in their coverage, internal structure, as well as their supporting and quality assurance tools used. In general, qualifications frameworks are organised as a rank order of qualification levels, where each qualification is assigned to a specific rank according to a set of criteria for levels of learning achieved. Despite their various forms and functions, qualification frameworks have four basic "generic" aims (Coles and Werquin, 2009):

1. Establishing national "standards" (here, understood as "common references") of knowledge, skills and wider competences;

2. Promoting the quality of education and training provision through regulation;

3. Coordinating and comparing qualifications by relating qualifications to each other, and;

4. Promoting access to learning, transfer of learning and progression in learning.

27. For the purpose of this paper, **qualifications frameworks will therefore be defined as instruments that support the development and classification of qualifications according to a set of criteria of levels of learning achieved, and based on specific quality requirements. These instruments can allow, among others, a common understanding of the quality and content or outcome of an award achieved, comparability among qualifications and a certain transferability of knowledge and skills across professions.**

28. Qualifications frameworks can vary depending on who developed them (centrally, by an agency, or by stakeholders), their main objective (prescriptive or communicative of main guidelines), or how detailed they are (covering all qualifications, or only some in the system) (OECD, 2007b; Tuck, 2007). In the same way, countries do not necessarily define qualifications for teachers at the national level, according to available research. For example, several OECD countries (at least 14) tend to have only broad descriptions of initial teacher education (TE) at the national/sub-national level, with more detailed descriptions at local levels. However, a few either centralise this task (at least 4 countries), while a few others fully decentralise it, and consider it optional (at least 3 countries) (Table 1).

Table 1. Locus of the definition of knowledge and skills in TE in some OECD countries.

Level	Method	Country
Definition at the national/regional level (4 countries)	Definition strictly regulated, and carried out centrally by the government, the Ministry, or a government body.	**Estonia**, **Germany**, Slovenia, United Kingdom
Broad definition at the national/regional level, adapting at a local level (14 countries)	A broad framework defines Teacher Education competences, but specific skills and competences to be acquired during training are not specified. Universities or Teacher Education institutions decide if they include competences and skills in their curricula and other specifications on the content, or whether they just provide a syllabus that includes the subjects' names, length and number of credits granted for each.	Austria, **Belgium**, **Denmark**, France, Hungary, Ireland, Italy, Luxembourg, the Netherlands, Poland, Portugal, Slovak Republic, Spain, **Sweden**
Definition at a lower level (3 countries)	There may be some definition by universities or Teacher Education institutions but this is also voluntary	Czech Republic, Finland, Greece

Note: The countries highlighted in bolds have a quite comprehensive list of skills and competences required for teachers at either the national or sub-national levels, possibly because competences are defined by separate Teacher Education institutions with more freedom to plan and implement.

Source: Based on FIER (2009), Education and Training 2010: Three Studies to support school policy Development: LOT 2: Teacher Education Curricula in the EU, University of Jyväskylä.

29. The starting point and attainment of qualifications during a teacher's career can also differ depending on the country. In the European Union, for example, aspiring primary, lower secondary and upper secondary teachers generally follow an initial teacher education at ISCED 5A or ISCED 5B level (FIER, 2009). [i] The TALIS survey (OECD, 2009) identified the educational attainment (combination of pre-service training and additional qualifications acquired in-service) of lower secondary teachers in 23 countries participating in its first survey (2007-08)[ii]. **About 52% of teacher respondents in TALIS had attained a bachelor degree (ISCED 5A), while 30% had a master (ISCED 5A),** and less than 1% had attained education above this level (ISCED Level 6). Similarly, 13% had a short cycle tertiary education attainment (ISCED Level 5B) and 3% of the survey respondents reported not having received at least some tertiary education.

30. Qualifications frameworks can also be regional (across countries, also known as "meta-frameworks"), such as the European Qualifications Framework (EQF), the Framework of Qualifications for the European Higher Education Area (EHEA), or the efforts to map qualifications frameworks across APEC economies. Some OECD countries such as Denmark, Estonia, France, Germany, Ireland, Portugal, the Netherlands, or the United Kingdom have referenced their national qualifications framework to the European Qualifications Framework. Other OECD countries who have a national qualifications framework or were developing them are Australia, New Zealand, Chile, Mexico and Korea (EU, 2013; Burke *et al*, 2009).

31. To function adequately, qualifications frameworks need occupational standards (mainly for Vocational Education and Training, where these are also known as "unit standards"), or other measures of learning, or information systems that clarify qualifications, pathways, providers and expected performance (Coles, 2006; ILO, 2006). It is considered desirable that qualifications frameworks have a "competence-based" (sometimes equivalent as "outcome-based") approach to establish the outcomes and levels of the programmes, but in practice this is sometimes difficult to achieve within one occupation, or to compare

different occupations. As a result, many national qualification frameworks sometimes include input measures to compare qualifications (*e.g.* number of years of study, or number of hours of instruction) (Coles, 2006; OECD, 2010). Still in the definition of "outcome-based" criteria, a challenge seems to persist in avoiding too narrow or vague definitions, or that are based on mistaken understandings of the nature of knowledge and skills (Allais, 2010).

32. Achieving meaningful definitions of knowledge objectives is also a challenge for **Competence Frameworks**. Competence frameworks have a competence-based approach by definition, but the lack of a generally accepted operational definition of "competence" is usually acknowledged (Kouwenhoven, 2009). The definitions of "competence" vary from a restrained set of abilities to perform specific tasks, to a more holistic and more recent conception which refers to the capacity of combining skills, knowledge, attitudes and values to achieve specific objective.

33. Despite a lack of consensus of what "competence" means, international scholar literature is recently converging towards a more "holistic" view of competences as a combination of different kinds of knowledge. It is considered that if the conception of competences is too narrow, this can hinder education and training, as it could be used for a superficial "checklist approach" (Bourgonje & Tromp, 2011). This focus on competence highlights learning as a continuum, with an emphasis on the process that leads to a specific goal, rather than on the goal itself (unlike qualifications frameworks, where the focus is on the formal award) (Bourgonje & Tromp, 2011; Allais, 2010; Caena, 2011; Coles, 2006; Sultana, 2008). From this perspective, competences are also classified as *cognitive* (use of theory, concepts and tacit knowledge gained through experience), *functional* (skills or know-how, what a person should be able to do when working in a certain area), *personal* (knowing how to conduct in a specific situation) and *ethical* (possessing certain personal and professional values) (Rychen and Salganik, 2003; OECD,2005b; Coles, 2006).

34. The term "competency" is also central in literature. In some contexts, it is used as a synonym of competence, while in others it is used as a separate concept, such as human resource management (Teodorescu, 2006). In its DeSeCo report, the OECD refers to "competencies" as the "ability to meet complex demands, by drawing and mobilising psychosocial resources in a particular context" (Rychen and Salganik, 2003; OECD, 2005b). The term "competence" appears to be used as a synonym of competency. In an analysis of 40 definitions of "competence/competency", Mulder (2008) provided an empirical distinction between competence, competency and, in a certain way, a qualification (the license):

35. "In an educational context, competence is the general capability of persons (or organisations) to perform (such as an activity, a task, solve a problem) that is developing, and if a programme is successfully completed, the candidate receives a licence. A competency is a part of competence".

36. In the same way, the term **"skills"** is understood in different ways across literature. Ananiadou and Claro (2009) acknowledge that this term is sometimes used as equivalent of "competence", or as a distinct term. A skill can be defined as "the ability to *perform tasks and solve problems*", while a competence is understood as the "ability to *apply learning outcomes adequately in a defined context*" (Cedefop, 2008 in Ananiadou and Claro, 2009). This understanding seems to have evolved in the OECD, where "skills" is now understood in a broader, more complex sense, and is used in current projects as a synonym of "competencies" (OECD, 2013c).

37. Therefore, in the context of this paper, **"competences" will be defined as the on-going and progressive ability to meet complex demands in a defined context, by mobilising holistic psychosocial resources (cognitive, functional, personal and ethical) as needed to accomplish these demands. "Competencies" can be defined as components (also composed of multiple psychosocial resources) of this competence.**

38. This definition of competence as a dynamic, process-oriented concept, is key to the analysis of competence frameworks. The competence frameworks (horizontal axis in Figure 1) seem, at least in principle, more related to this more "holistic", progressive approach of professional improvement and career progression. As noted above, these frameworks can refer to specific stages of a teachers' professional career, such as those identified by Ingvarson (2002): *pre-service preparation* (selection, qualification and accreditation), *induction* (registration and permanency) and *continuing professional development* (accountability, re-registration, appraisal, advanced certification and promotion), or proficiency stages (starting from beginner to proficient).

39. The components, extension and scope of both competence and qualifications frameworks can vary depending on the goals of the framework (Tuck, 2007). There are two main ways of understanding "competence frameworks". In some cases, "competence frameworks" are seen as equivalent to "professional standards frameworks". One example is the Competency Framework for Teachers of Western Australia (Department for Education and Training, 2004), where it is stated that "Competency frameworks describe professional standards for teaching". In other cases, competence frameworks are broader frameworks that contain other elements in addition to professional standards (See Table 4 in Part II). For example, "reference standards" can contain professional standards, along with a school improvement plan, annual activity plans, school regulations, or sets of general and professional duties for teachers (including job descriptions) (OECD, 2013b). This paper will follow this second understanding.

40. Competence frameworks are produced for two main purposes. The first is accountability (identifying competences in ways that enable the assessment of performance in relation to professional standards). The second is formative, providing a guide for formative evaluation (by the professional and other appraisers), self-development and the design and provision of training possibilities (Sultana, 2008). It is considered desirable that teacher's competence frameworks support the development of strong subject matter knowledge, pedagogical skills and the capacity to work effectively with students, other teachers and pedagogical staff at the school, and parents; and contribute to the school and the profession, and the capacity to continue developing, since "a clear, well-structured and widely supported teacher profile can be a powerful mechanism for aligning the elements involved in developing teachers' knowledge and skills, and for providing a means of assessing whether teacher development programs are making a difference." (OECD, 2005a)

41. In the context of this paper, **competence frameworks** will therefore be defined as **frameworks developed for formative or accountability purposes, with a possible focus on "holistic" progression in professional proficiency and/or career progression. They are composed by a set of competence-based standards (also known as "professional standards"), along with other possible support elements aligned to these professional standards that clarify: the expectations of achievements, how they will be measured and the support tools available for this.**

42. From this dynamic perspective of progressive improvement, competence and qualifications frameworks can be an important influence in shaping the opportunities and incentives to follow informal, non-formal and formal continuous training. Based on Musset (2010), the characteristics of adequate initial and continuous training systems can be summarised as follows:

- Context-specific responsive: taking into account the character, status, attitudes and political and administrative relations in education systems

- Envisaging teacher education as a continuum: providing different types of knowledge to teachers (e.g. subject matter and pedagogical knowledge

- Flexible: catering to and adequately training teachers with different profiles, but also candidates from other professional backgrounds that could enter the profession

- Capitalising on collegial learning: through mentors or peer review for systematic feedback

- Combining learning sources: including field experience in schools in addition to academic learning

- Evaluating alternative pathways: it is desirable that the duration of initial teacher education is not shortened, but if a system reduces initial teacher education to attract teachers, it would need mechanisms to ensure teacher quality (though training and evaluation) at other stages of teachers' professional careers.

43. In the TALIS survey, 89% of teachers reported engaging in some kind of professional development, and it would seem that many (European) countries are now transitioning from systems where graduates from a school may enter the profession once they are hired by a school, to a system where permission to exercise (licensure) is provided for a limited amount of time, and it is necessary to renew this permission (OECD, 2009; Stern, 2012). As shown in Table 2, about 40% of OECD countries (13 countries) have credential/license or continuing education requirements for teachers at different stages of their professional careers, such as for initial or full registration as teachers. Therefore, it is essential for governments to ensure the correspondence between new requisites facing teachers to remain in the profession, and the training opportunities and types of training.

Table 2. Countries with additional requirements to TE at different teaching career stages.

Requirements at different stages of a teacher's professional career	Pre-primary education	Primary education	Lower secondary education	Upper secondary education
Credential or license, in addition to the education diploma, required **to start teaching**	England, Ireland, Israel, Japan, Scotland, United States **(6 countries)**	Australia, Canada, England, Germany, Ireland, Israel, Japan, New Zealand, Scotland, Switzerland, United States **(11 countries)**	Australia, Canada, England, Germany, Ireland, Israel, Italy, Japan, New Zealand, Scotland, Switzerland, United States **(12 countries)**	Australia, Canada, England, Germany, Ireland, Israel, Italy, Japan, Mexico, New Zealand, Scotland, Switzerland, United States **(13 countries)**
Credential or license, in addition to the education diploma, required **to become a fully qualified teacher**	Ireland, Israel, Japan, Korea, Scotland, United States **(6 countries)**	Australia, Canada, Germany, Iceland, Ireland, Israel, Japan, Korea, New Zealand, Scotland, United States **(11 countries)**	Australia, Canada, Germany, Iceland, Ireland, Israel, Italy, Japan, Korea, New Zealand, Scotland, United States **(12 countries)**	Australia, Canada, Denmark, Germany, Iceland, Ireland, Israel, Italy, Japan, Korea, New Zealand, Scotland, United States **(13 countries)**
Compulsory requirement for continuing education **to maintain employment in the teaching profession**	Belgium (Fr.), England, Estonia, Finland, France, Israel, Japan, Luxembourg, Netherlands, Scotland, United States **(10 countries)**	Belgium (Fr.), England, Estonia, Finland, France, Hungary, Iceland, Israel, Japan, Luxembourg, Netherlands, Scotland, United States **(13 countries)**	Belgium (Fr.), England, Estonia, Finland, Hungary, Iceland, Israel, Japan, Luxembourg, Netherlands, Scotland, United States **(12 countries)**	Belgium (Fr.), England, Estonia, Finland, Hungary, Iceland, Israel, Japan, Luxembourg, Netherlands, Scotland, United States **(11 countries)**

Source: OECD (2012), Education at a Glance 2012: OECD Indicators, OECD Publishing.

44. It also needs to be considered whether enough complementarity between qualifications' demands and other continuing professional development activities is being achieved for different teacher profiles. TALIS (OECD, 2009) found that less qualified teachers (*i.e.* those with bachelor or below bachelor level education) also reported less participation in professional development activities (about 17 days), compared to teachers with at least a master level (about 20 days). These findings were consequent with previous OECD findings that more highly educated adults in the general population are more likely to participate in professional development activities (OECD, 2009). The main reason reported by teachers for not participating in them was conflict with their work schedule, but lack of suitable development opportunities was also reported as a factor. The study found as well that the type (such as individual and collaborative research or qualifications programmes) and content (such as teaching special learning needs students or ICT teaching skills) of continuing professional development activities considered by teachers as of most impact for their practice where not those where they most engaged.

45. In some European countries with a "side-entrance" to the profession from academic backgrounds other than teaching degrees, the continuing professional development requirements seems to be the same as for professionals with previous initial teacher education studies (Stern, 2012). Also, the most common link with continuing professional development requirements is at the beginning of a teacher's professional career (induction) and typically consist of a minimum number of hours for all teachers at all stages of their careers, with a distinction of the education level taught, as shown in the figure above.

46. To summarise, this section discussed how teacher frameworks, such as qualifications and competence frameworks, can come together to support teacher improvement in a country, by using the metaphor of a "knowledge wall". Teachers face increasing accountability and formative demands from education systems. Adequate, evidence-based training opportunities (non-formal, informal or formal) need to be provided as well, to match these demands. Some challenges remain for countries to: a) reach a common evidence-based understanding of the meaning and scope of key concepts related to these frameworks; b) use this understanding to ensure adequate accountability and formative processes for teachers. How do competence and qualifications frameworks address these challenges? The next section will explore the definition of "standards", which are the "bricks" in the knowledge wall of teachers.

1.2. Defining the "bricks": "standards" and some related evidence.

47. The previous section discussed the "knowledge wall of teachers", which is composed by competence and qualifications frameworks. In this wall, "standards" tend to play the role of "bricks", as they are important elements in both frameworks. However, their meaning and scope may vary across frameworks. This section will discuss their meaning, and will focus on the standards contained in competence frameworks (also known as professional standards).

48. The literature often refers to the double definition of the word *standards* as a "flag" and a "measure". "Standards" can therefore be understood in a broad sense as "statements about what is valued" (Ingvarson, 2002), but can comprise different things depending on the framework. Qualifications frameworks sometimes understand "standards-based" as equivalent to "outcome-based" in the sense that it provides information about the expected learning outcomes, or to the process of verifying learning outcomes through quality assurance procedures (OECD, 2007b; Tuck, 2007; Coles, 2006). For competence frameworks, professional standards generally refer more to a progressive approach of improvement and/or career progression that may lead to an outcome, rather than mainly an *outcome*, even if different "professional standards" can serve specific purposes across a teacher's professional career. Research has identified three basic questions that good teaching professional standards should answer (Ingvarson and Kleinhenz, 2003; Kleinhenz and Ingvarson, 2007; Ingvarson and Rowe, 2007). These questions are:

1. What is good teaching? Defining what is to be measured;

2. How will good teaching be assessed? Deciding the rules and developing methods to gather relevant evidence about practice, or how teaching will be measured, and;

3. How good is good enough? Identifying what counts as meeting the standards.

49. This paper will focus on professional standards from competence frameworks. **Bringing together the previous definition of competence and competency, this paper will define standards from competence frameworks as documents, or sets of documents with different extensions and scope that state what is valued in a profession, how this will be assessed and how good is good enough, through a competence-based approach.**

50. As competence and qualifications frameworks, professional standards can have many structural differences, such as the level of coherence, extension and detail of the text, or the contexts within which

they were developed or their purpose. They can also vary in the way in which they describe objectives. For example, they can be organised as extensive lists of competences, or as more generic statements. They can be part of a framework with different possible balances between the formative and summative functions. As with competence and qualifications frameworks, the different contexts and uses that education systems give to professional standards seem to have a defining influence on how these are structured and used (Ingvarson and Kleinhenz, 2003; FIER, 2009; OECD, 2013b).

51. There is some evidence however that shows some convergence in the content of professional standards. Ingvarson and Kleinhenz (2003) identified that most sets of professional standards today share common structural features, such as their articulation at taxonomical levels of specificity. Also, some countries (*e.g.* some states and districts in the United States, Chile, or the province of Quebec in Canada) have used the Framework for Good Teaching developed by Charlotte Danielson as an example to develop their own professional standards (OECD, 2013b; Danielson, 2013). This framework has four key components (Planning and preparation, Classroom environment, Instruction, Professional responsibilities), and each of these components describes four progressive levels of proficiency (unsatisfactory, basic, proficient and distinguished).

52. A paper prepared by CEPPE (forthcoming) found too, in a comparative analysis of 12 sets of professional standards that all of the cases analysed required teachers to plan, implement and assess teaching and learning. It also found an important convergence of countries in issues related to pedagogical practice, such as: developing high order critical thinking and skills; knowing how to teach disciplinary content; creating and maintaining an environment that encourages learning; understanding and using knowledge about how students learn, among others. Conversely, very few of the cases analysed required teachers to show administrative skills; or valuing and being concerned about students.

53. The number of countries with competence frameworks containing professional standards has increased over the years. At the international level, UNESCO is currently developing a generic competence framework based on national competence frameworks [Documentation pending]. Table 3 below shows that almost half of OECD countries use professional standards for teacher appraisal. The most common purposes for which professional standards are used are regular appraisal and probation. They are used in combination with professional goals, school or personal development plans, or school internal regulations.

Table 3. OECD countries that use professional standards for teacher appraisal (2011-12).

		Australia	Belgium (Fl.)	Canada	Chile	France	Germany	Israel	Japan	Netherlands	New Zealand	Slovak Republic	Sweden	United Kingdom (England)	United Kingdom (Scotland)	United States
Reward scheme					■				■							■
Performance management	**Promotion**							■								■
	Regular appraisal	■	■		■	■	■	■	■	■	■	■		■	■	■
	Registration	■									■		■		■	
Probation		■		■		■	■	■		■	■		■	■	■	■

Source: Taken from: OECD (2013), Teachers for the 21st Century: Using Evaluation to Improve Teaching, OECD, Paris.

54. As part of the development of professional standards across an increasing number of countries, an important amount of literature has discussed their effects, and the research is not conclusive. For example, some evidence shows that professional standards for teachers can lead to better student outcomes, and can help identify effective teaching practice when used for certification purposes (Darling-Hammond, 2000; Darling-Hammond *et al,* 2012; Kleinhenz and Ingvarson, 2007). At the same time, there is concern that professional standards may restrain teachers' practice, or that their use may actually enlarge learning gaps between students if these are not accompanied with the necessary resources to help teachers in socially disadvantaged contexts (Muller, 2009; Caena, 2011). As pointed out by on-going ITEL work (EDU/CERI/CD/RD(2013)4), research has tried to conceptualise and measure teacher quality through proxies, such as whether teachers have "certification", the "qualifications" they possess or their years of experience. But what do these proxies mean? To be effective indicators of education quality, they need to reflect the actual competences underlying teaching itself.

55. To summarise, this section discussed some understandings of the term "standards". The next parts will focus on selected competence frameworks for teachers and other professions, and how these frameworks conceptualise knowledge and improvement. They will also explore the possible interactions with qualifications frameworks, from the point of view of competence frameworks. This analysis aims to understand how knowledge is codified in professional standards, and how this compares across countries and with other professions.

II. A critical analysis of teacher competence frameworks.

56. This part will critically analyse competence frameworks for teachers and will explore further how these two kinds of frameworks relate. To this end, first, it will analyse some wide-ranging characteristics of selected teacher competence frameworks in different countries. Second, it will use elements from the on-going work by ITEL on findings from neuroscience research to analyse how these elements are contained in the professional standards contained in competence frameworks.

2.1. The general characteristics of teacher competence frameworks.

57. This section will analyse some wide-ranging characteristics of competence frameworks for teachers, based on relevant literature. The selected cases for analysis are Australia, England and Scotland (the United Kingdom), the competence framework developed by the National Board of Professional

Teaching Standards (the United States) and Ontario (Canada). These cases were selected because their professional standards have different extensions (*e.g.* the NBPTS vs. Ontario), they seem widely used within their system (England, Scotland and Ontario), and have served as examples for the development of professional teacher standards in other countries (*e.g.* Ontario, the NBPTS, England), or have recently adopted or revised professional standards (Australia and Scotland in 2013; England, 2012; the NBPTS, yearly revisions). Also, these countries also tend to have frameworks with professional standards for other professions, which will be analysed in Part III. In all the selected cases in this study, other documents or instruments besides professional standards complement the framework (Table 4).

Table 4. Main elements composing the competence frameworks selected for analysis.

Country	Name	Components
Australia	Australian Professional Standards for Teachers	Professional teaching standards, supported by the Self-Appraisal tool (SAT) and the Australian Charter for the Professional Learning of Teachers and School Leaders (continuous professional development). Some videos illustrate the practice in real life, and there is other supporting material that informs on the accountability requirements for teachers at different career stages (initial teacher education, registration, teacher performance and development and certification), among others.
Ontario *(Canada)*	Professional standards	Standards of practice, ethical standards and the professional learning framework (continuous professional development). There is also a Member's Handbook, the Casebook Guide for Teacher Education, the Cases for Teacher Development: Preparing for the Classroom.
England *(United Kingdom)*	Teachers' Standards	Teachers' Standards, divided into two parts: 1) Teaching and 2) Personal and Professional Conduct. A Guidance to accompany the Professional Standards for Qualified Teacher Status and Requirements for Initial Teacher Training completes the framework. A Master teacher standard (for advanced teachers) has been discussed as a possibility.
Scotland *(United Kingdom)*	Professional standards for teachers	Standards for Registration (provisional registration at the end of TE, and full registration), the Standard for Career-Long Professional Learning, and the Standards for Leadership and Management (Middle Leadership and Headship). There is also a Code of Professionalism and Conduct.
United States[iii]	National Board of Professional Teaching Standards	25 sets of standards, organised according to the student's developmental level and the subject area of the teacher. Among the supporting documents is the Guide to the National Board Professional Standards' Certification. Other sets of standards are being developed to address the teacher career continuum.

58. Research and the frameworks analysed have helped identify some general desirable characteristics of professional competence frameworks to promote good teaching (CEPPE, forthcoming; Ingvarson, 2002; Ingvarson and Kleinhenz, 2003; Ingvarson and Rowe, 2007; OECD, 2013a). These general characteristics can be summarised into three categories: coverage and purpose, internal structure, quality assurance tools.

Coverage and purpose:

59. According to the literature, competence frameworks should provide a common basis to organise the key elements of the teaching profession, such as initial teacher education, teacher registration, teacher's professional development, career advancement and teacher appraisal. These elements should be aligned to signal a logical improvement process of teachers at different career stages (OECD, 2005a; CEPPE, forthcoming; Bourgonje & Tromp, 2011). ***Coverage* and *purpose* refer to how the professional standards in a competence framework establish pathways for professional learning.** Based on the literature and the professional standards analysed, these can be classified as follows:

60. Coverage (types of teachers): According to whether they identify different types of teachers or not, they can be classified as:

- *Generic* (same professional standards for all the profession's branches) or
- *Specific* (distinctions among the profession's branches, such as grade level or subject taught).

61. Purposes (career or proficiency levels): They can distinguish by career stages (*e.g.* registration, certification), and also possible proficiency stages (*e.g.* beginner, intermediate, advanced) levels as:

- *Basic core* (one set of competences for all career or proficiency stages),
- *Roadmap* (distinction from most basic to most advanced career stages),
- *Semi-roadmap* (covers some professional stages only: typically registration and continuous development).

62. This classification can help analyse the link with qualifications frameworks. Qualifications frameworks can provide clarity on the courses, or other types of professional development activities that aspiring teachers may take to enter the profession and continue improving. For example, a biology or mathematics lower secondary teacher looking for opportunities of professional development may find useful to know what university level courses can help them to update or enlarge their knowledge in specific curriculum aspects related to their subject, or adolescent psychology (OECD, 2011a). These general characteristics can be summarised into three categories: a) coverage and purpose, b) internal structure and, c) support and quality assurance tools. These categories will guide the analysis, through analytical questions contained in Annex 1.

63. Under this classification, England and Ontario have both "generic/basic core" professional standards addressed to all teachers without distinction of proficiency or career stage. In both countries, new teachers must demonstrate meeting the professional standards to gain a Newly Qualified Teacher Status (England) or an annual Certificate of Qualification and Registration (Ontario). The link between professional standards and the qualifications framework in Ontario is made through this certificate, since any additional qualifications (AQ) acquired by teachers will appear on their certificate the following year. The Ontario Institute for Education in Toronto has declared that all the additional qualifications courses they provide aim to be aligned to the teacher standards (OISE, 2013). England counts with a specific qualifications framework for teachers, which is produced by the College of Teachers and aligned to the Framework of Higher Education Qualifications - FHEQ. This competence oriented qualifications framework for teachers comes along with a catalogue of teacher training courses from below degree to doctoral level. However, there are also other routes that aspiring teachers and registered teachers can take to enter or make progress in the profession, such as different university or school level training opportunities, for example (The College of Teachers, 2013). In both Ontario and England, the recognition to advanced teachers is either very recent (Ontario), or has not been decided (England) (The College of Teachers, 2011).

64. Australia and the United States follow a "roadmap" approach that specifies (or will specify) the different career and proficiency stages for teachers, although there is also a varied link to qualifications frameworks. Australian professional standards target all teachers (generic), align improvement and career progression, and specify learning expectations at different career stages, starting from graduate teacher (accreditation/provisional registration) until highly accomplished and lead teacher (certification). In Australia, teachers aiming to obtain registration must complete at least 4 years of higher education or equivalent, including an initial teacher education programme or equivalent in the Australian Qualifications

Framework (AITSL, 2013a). In the United States, professional standards are promoted at the state level and there are no national or state-level qualifications frameworks. Very recently, the CAEP (Council for the Accreditation of Educator Preparation) published a set of professional teacher standards (CAEP, 2013). The NBPTS professional standards, which are provided by a non-governmental organisation, currently address only teachers aiming to obtain a certificate as advanced teachers and distinguish by subject and grade level taught (specific), but seem to be working to cover the teacher educator continuum (*e.g.* pre-service, novice, professional, accomplished) (NBPTS, 2013).

65. Scotland follows an intermediate approach between basic core and pathway for all teachers (generic/semi-roadmap), and has an explicit link in its professional standards to its national qualifications framework. The revised 2012 professional teacher standards move away from a classification by professional stages (initial teacher education, full registration, chartered teacher and headship) to a simplified classification of proficiency (early phase of professional learning, career long professional learning and headship) (Hamilton and McAra, 2013). The current Standards for Registration are mandatory for all teachers and define the baseline of quality for the profession (GTCS, 2012a). Their aim is to guide teachers on what is expected from them at the end of initial teacher education (provisional registration) and to officially enter the profession (full registration). Teachers willing to develop expertise in Scotland can follow the Standard for Career Long Professional Learning (GTCS, 2012b). These professional standards recommend that the GTC Scotland Recognition Framework for Additional Qualifications is used to identify and provide professional development opportunities for teachers.

66. These examples show that the coverage and purpose of teacher professional standards, as well their link to qualifications frameworks can be very varied across countries. The literature mentioned above points to the preference of producing teacher frameworks that clarify how teachers will improve across the different stages. Some of the cases analysed in this paper follow this approach in their professional standards (most of them, predominantly with "generic" professional standards in the cases analysed). Other cases establish at least a common core of quality for all teachers and guidance for improvement may be addressed through other process-oriented tools composing the framework, as will be explained below.

Internal structure:

67. According to the teachers professional standards' literature (Ingvarson and Rowe, 2007; Bourgonje & Tromp, 2011; Santiago and Benavides, 2009), good teaching standards should: be grounded on clear guiding conceptions of what it means to do; be valid, representing what teachers need to know and do to promote learning; identify the unique features of what a specific teacher should be able to know and do, and; explain how and what teachers should improve with time, providing opportunities for this. Therefore, professional standards should:

- Include domain specific and broader life skills, cultural and socio-emotional competence, as well as values.

- Allow teachers to understand the complexity of competences expected from them (*e.g.* by pointing to large "chunks" of the teachers' work, rather than only describing one task).

- Avoid pointing at "micro-level" competencies or "personality traits", but pay attention however to how personal and contextual factors (societal, school system, and school-level) are related to teachers' performance.

- Clarify objectives, without forcing teachers to follow a specific method. Rather, professional standards should allow for diversity and innovation.

- Stand as "context free" (or context transversal), which means that most teachers working in schools with different characteristics in a same education system should be able to follow them.

- Align competencies from a perspective of gradual improvement that can take place at different stages of a teacher's career.

68. The professional teacher standards analysed **clarify objectives in general**, without describing "personality traits" or "micro-competencies". The statements of what a teacher should be able to do seem to require the use of complex resources that entail cognitive, personal, functional or ethical competences. Most of these professional standards explain what the teacher should be able to do, and are supported by further developments of what these statements are (*e.g.* descriptors, illustrations of practice). Australian professional standards, for example, have developed a series of videos to illustrate how one or more professional standards or descriptors translate into real life practice. The NBPTS professional standards, such as those for Middle Childhood Generalist (NBPTS, 2012a) also include broad explanations of how a specific statement applies to the classroom. Both the professional standards from Scotland and England contain lists of supporting bullet points that elaborate further the professional standards' scope, and are not intended to be considered individually, but as a group of statements that clarify further the complexity of the competence requested (Bourgonje & Tromp, 2011; DfE, 2013; GTCS, 2012a; GTCS, 2012b) (Table 5).

Table 5. Extract from Standards for Registration (Scotland).

3.1.3 Employ a range of teaching strategies and resources to meet the needs and abilities of learners	
Professional Actions Student teachers: • demonstrate that they can select creative and imaginative strategies for teaching and learning appropriate to learners as individuals, groups or classes; • demonstrate that they can select and use a wide variety of resources and teaching approaches, including digital technologies and outdoor learning opportunities; • demonstrate the ability to justify and evaluate professional practice, and take action to improve the impact on all learners.	**Professional Actions** Registered teachers: • consistently select creative and imaginative strategies for teaching and learning appropriate to the interests and needs of all learners, as individuals, groups or classes; • skilfully deploy a wide variety of innovative resources and teaching approaches, including digital technologies and, where appropriate, actively seeking outdoor learning opportunities; • justify consistently and evaluate competently professional practice, and take action to improve the impact on all learners; • create opportunities for learning to be transformative in terms of challenging assumptions and expanding world views.

Source: GTCS (2012a), The Standards for Registration: Mandatory Requirements for Registration with the General Teaching Council for Scotland, GTCS.

69. All the professional standards analysed seem to allow **diversity of practice** in general. Some mention innovation expectations for teachers (although briefly), but do not tend to clarify what is an innovation. This is a more interesting finding if we consider the TALIS 2007-08 survey results, where three-quarters of teachers reported that they would receive no recognition for being more innovative in their teaching (OECD, 2009). The Scottish professional standards request innovation as part of a continuing professional learning process, where Scottish teachers should "lead and collaborate with others to plan innovative curricular programmes" (GTCS, 2012a). In the Australian professional standards, innovation (understood in a broad sense) is encouraged indirectly from the highly accomplished level,

where teachers are asked to "initiate" or "lead" strategies in different areas (AITSL, 2013b). The Ontario and England professional standards do not explicitly address innovation in their content either, but are in general broad enough to allow for diversity in practice, except for a statement in English professional standards, where it says that: "[i]f teaching early reading, demonstrate a clear understanding of systematic synthetic phonics". This statement seems highly specific regarding what teachers should prioritise when teaching early reading (DfE, 2013; OCT, n.d.).

70. There also seems to be **some consistency in what teachers are expected to know as they progress** in their professional careers. For the Australian, Scottish and the NBPTS (Middle Childhood-Generalist) professional standards, the more experienced the teachers, the more adaptable they are expected to be. This is consequent with educational research, which points that challenging novice teachers to make use of their "teacher knowledge" can help them to become increasingly flexible in how they apply their knowledge, transitioning from declarative to procedural knowledge (EDU/CERI/CD/RD(2013)5). The NBPTS professional standards also refer to the adaptability of advanced teachers to different contexts, for example, in the professional standards for middle childhood generalist it says:

71. "Teachers know that unscheduled opportunities can arise during planned learning experiences and that these situations may provide sources of information […] Using a wide variety of strategies and techniques, accomplished teachers design instruction characterized at once by its structure and flexibility, planning, articulating, and coordinating activities to meet the goals.")

72. Also, the Scottish government expressed, that the aim of professional standards is helping the teachers to become critically informed *adaptive* experts. In general, the Scottish professional standards show a logical evolution in what is expected though from Scottish student teachers and registered teachers (Registration Standards). This evolution of teacher competences is less clear when moving from the Standards for Registration to the Career-Long Professional Learning Standards (GTCS, 2012a; 2012b). For example, in Professional Knowledge and Understanding, it may be useful to clarify how the key areas of Career-Long Professional Learning standards (pedagogy, learning and knowledge; curriculum and assessment; enquiry and research; educational contexts and current debates in policy, education and practice; sustaining and developing professional learning; learning for sustainability) relate to those in the Registration standards (curriculum, education systems and professional responsibilities and pedagogical theories and practice).

73. Based on the previous section's discussion, it is of interest to look as well into the **variety of how continuing professional development is aligned to professional standards** in the competence frameworks analysed, which goes from providing main guidelines, to specifying examples of activities. In Australia the professional standards underpin the Australian Charter for the Professional Learning of Teachers and School Leaders, which defines effective teaching as relevant (driven by students' needs), collaborative (using on-going learning approaches) and future focused (to help respond to uncertainties and challenges). This charter does not mention specific activities that teachers or school leaders could follow, but focuses on the learning objectives that should drive professional development, and is evidence-based (AITSL, 2013b). In Scotland, the Career-Long Professional Learning professional standards specify professional actions expected in six key areas (*e.g.* curriculum and assessment, enquiry and research, or learning for sustainability) (GTCS, 2012b). In Ontario, the Professional Learning Framework for the Teaching Profession guides teachers on the professional development opportunities available for them. It emphasises that professional development goes beyond the main provision of courses, and can be embedded in everyday practice through activities such as: academic programmes, research activities, professional networks, professional contributions, mentoring and networking, professional activities, learning through practice and technology and learning. It also provides examples of how to take part in these different kinds of learning. Nevertheless, this document does not specify the benefits that certain kinds of development activities may provide for different teacher needs (OCT, 2006).

74. Therefore, while the professional standards have different structures, they all use a broad competence/competency approach, either through general statements (Ontario), the use of support bullets or statements (England, Scotland and Australia), or broader explanations (NBPTS). Also, they all seem intended to be used across different contexts and in general encourage diversity and adaptability in practice, although innovation seems less addressed. In continuing professional development, the approaches are varied, going from main guidelines to specific examples of activities.

Support and quality assurance tools:

75. Research shows that it is important to combine different kinds of instruments for support and quality assurance, since teachers perform complex tasks that need a variety of competences and skills. Charlotte Danielson points out that a framework of professional standards should be defined with quality assurance tools in mind (Kleinhenz and Ingvarson, 2007). Instruments used can be classroom observation, interviews with the teacher, teacher self-appraisal, student performance data and feedback from parents and students, as well as teacher portfolios containing samples of student work, videotapes recording lessons, among others (OECD, 2013b). This requires capacity-building as well on teachers, school principals and evaluators to understand clearly what competence frameworks to aim for in a teacher's work, and how the success in achieving these tasks should be assessed. It is also argued that the evidence requested from teachers should not entail additional heavy workloads for them. Rather, this should be a "natural harvest" of their daily work in the classroom (*e.g.* samples of student work or class recordings) (OECD, 2005a; Santiago and Benavides, 2009; OECD,2013b).

76. The competence frameworks analysed seem to comply in principle with what the literature notes on the desirable ways of appraising teachers mentioned previously. All competence frameworks analysed request evidence of practice from a variety of sources that draw from the teaching context (*e.g.* portfolios, meetings with appraisers, samples of student work). This evidence is based on professional judgement, and is not necessarily related with how the professional standards themselves are designed. All these countries aim to produce evidence of teacher practice from this "natural harvest" of their work. There is also a variety of actors that can appraise teachers. This is not limited to the school principal, but can include other personnel for the Leadership structure of the school, other teachers or external personnel. Although the samples of student work can be used as part of the variety of evidence, none of the cases analysed mentioned the use of student scores to assess teachers in the documents contained in the framework.

77. Both Ontario and England's professional standards-based performance indicators and the assessment criteria are defined at the school-level by the school principal (after discussion with the teacher). In Ontario, both beginning and experienced teachers prepare a professional development plan to be reviewed with the school principal as part of this process. This professional development plan is intended as a vehicle for discussion and learning, as well as a means of planning and tracking teacher improvement. A minimum of three appraisal meetings (pre-observation meeting, classroom observation and post-observation meeting) need to take place and there are also summative reports that assess performance and provide feedback. Teacher appraisers in England should consider the nature and scope of the performance criteria, their relevance and appropriateness, as well as the school circumstances, the teacher needs, and whether or not they are discriminatory. The instruments and information sources include an annual review with objective setting, planning and statement review, classroom observation, individual interviews and other evidence selected by appraisers (Santiago and Benavides, 2009). This seems to put considerable weight on the professional judgement and capacity of appraisers. Their adequate training then becomes key to the success of teacher improvement, as well as providing them with support so appraisal takes place in an evidence-based approach of what impacts learning.

78. Australia has also developed some support tools to appraise teachers at different stages of their careers, based on the professional standards. These support tools are the Accreditation of Initial Teacher

Education Programme, the National Consistent Registration of Teachers, the Teacher Performance and Development Framework and the Certification of Highly Accomplished and Lead Teachers (AITSL, 2013b). Appraisal is carried out by different actors, such as teacher professional organisations (registration), or the school principal, members of the school leadership body, supervisors or peer evaluators at the same level (regular appraisal). Classroom observation, dialogue with the teacher, teacher self-appraisal and teacher portfolios are the main instruments and information sources used for regular appraisal and registration (OECD, 2013b). Australia has also recently developed an online Self-Assessment Tool (SAT) to help teachers identify their progress based on the professional standards through an adaptive algorithm that selects questions based on the user's responses (AITSL, 2013a).

79. The NBPTS certification process relies mainly on the preparation of a portfolio, and has produced detailed instructions on how to prepare it, and the criteria used to score them. Specially trained teachers do the scoring of the portfolio. This portfolio contains several sources of evidence, such as class recordings, written commentary about practice or student work samples. The NBPTS encourages that recordings take place during regular teaching practice, and that written contributions (containing, description, analysis and reflection of lessons) also reflect on regular practice. Preparing an NBPTS portfolio can take between 3-15 months (NBPTS, 2012b). There is a clear explanation on how those teachers who did not obtain the certification a previous year can self-assess how to improve in order to obtain the certification in a further attempt. This allows integrating a learning dimension into the appraisal process.

80. Teachers in Scotland follow appraisal procedures based on professional standards for the completion of initial education, registration and certification. For the completion of registration, for example, teachers in Scotland need to complete an online profile during the probation process, under the supervision of a "supporter" (GTCS, 2013c).This online profile contains guidance on resources that could be useful to the candidates, as well as the procedures they need to fulfil. Several actors participate as well in the appraisal of a teacher, such as the school leader, as well as other teachers and members of the management team at the school level

81. As shown in this section, the frameworks analysed show some similarities in their general characteristics, such as: a broad description of competences/competencies, encouraging diversity in practice and, (at least vaguely) addressing innovation in teaching. It also needs to be highlighted that the more expert the teachers, the more adaptable they are expected to be across these frameworks. Besides the professional standards produced by the NBPTS, all professional standards in the competence frameworks target all teachers in general, and the roadmap approach is less common (only Australia has a full roadmap approach as part of a single set of professional standards), but improvement as a continuous process is targeted by all. The approaches to continuing professional development can be varied (from overarching evidence-based objectives to specific examples of training possibilities), but there seems to be a consensus in the framework's documentation on the approach to teacher appraisals, such as: relying on a variety of sources of evidence, aiming to be context-based and depending on the professional judgement of both teachers and appraisers.

2.2. The teacher competence frameworks in the light of the learning sciences' findings.

82. This section will analyse the same teacher competence frameworks as above in the light of the findings from the learning sciences. A significant amount of research is being developed on what impacts student learning based on knowledge of the human brain development. Learning can happen when the brain is able to encode, retrieve and process information, and teachers are the key actors to make this possible for students in the classroom (EDU/CERI/CD/RD(2013)5). Research has shown that the teaching methods that teachers can use are related with the nature and depth of a teacher's understandings of what they are teaching. This is also reflected in student learning outcomes. There is evidence that teachers

become more effective when they gain a better understanding of how students learn the content they teach them (Ingvarson, 2002). Darling-Hammond (2000) points out that there is somewhat strong evidence that a teacher's increased education coursework can improve student achievement more than subject matter knowledge alone. According to this evidence, when teachers have knowledge of how to teach the subject to various kinds of students, subject matter knowledge can bring greater benefits.

83. It is of interest then to understand how education systems are translating this increasing knowledge of how children learn into the teacher's everyday practice. As mentioned earlier, teacher professional standards are a key component of the infrastructure to bring this knowledge into the classroom. To carry out this analysis, this paper will draw from the comprehensive knowledge base of the OECD in learning sciences. Examples of this work are publications such as The Nature of Learning: Using Research to Inspire Practice (Dumont, Istance and Benavides, 2010) or Understanding the Brain: The Birth of a Learning Science (OECD, 2007c). For the analysis in this paper, 15 selected concepts from this extensive work have been organised into four main components: Learning, Formative Assessment, Classroom Environment and Diversity.

84. *Learning* is the central component, and refers to the knowledge of strategies that teachers can have to enhance and facilitate students' learning. This component is supported by *Formative Assessment* and *Classroom Environment*. Formative Assessment refers to the process of diagnosing learning as it is occurring in the classroom. Classroom Environment refers to managing the social nature of learning in the classroom. *Diversity* makes sure that these three components can be applied to foster learning in all students, as it refers to the teachers' capacity to adapt practice (learning strategies, diagnosis and classroom environment), to take into account differences in learning. The main question guiding this section is whether the professional standards integrate these components, and how they do it. The analysis will focus on the professional standards or principles that apply to all teachers within a specific context. Hence, the "Five Core Propositions" from the NBPTS professional standards were selected for this analysis, since they are addressed to all teachers aiming to obtain a certification, regardless of the subject or grade/student age taught (NBPTS, 2012a) (See Annex 2).

Learning:

85. As explained previously, *Learning* refers to the knowledge of strategies for enhancing or facilitating learning and is composed by:

1. Prior knowledge: Learning is facilitated when new information is connected to prior knowledge.

2. Elaboration: Learning is facilitated when new concepts are made explicit using clear language.

3. Self-reflection and meta-cognition: Learning is facilitated when students are given the time to reflect on new learning and connect it to prior knowledge.

4. Attention: Learning is facilitated when students are alert, oriented and sustained on the task (rather than passive recipients).

5. Memory: Learning is facilitated when retention capacities are enhanced (real-life contexts).

6. Rehearsal: Learning is enhanced through rehearsal and practice.

7. Challenging: Learning is enhanced when a student is performing a task that is developmentally-appropriate to the level of cognitive challenge.

8. Transfer (application to real-life contexts): Learning is facilitated when students are engaged in 'problem-based learning' where concepts to be learned are embedded in real-life contexts.

86. From this component, stimulating student's **attention** and **challenging** them are the most common elements that address the professional standards analysed. The **transfer** of learning is also a shared priority among professional standards. Conversely, **self-reflection and meta-cognition** and **rehearsal** are less present. In the same way, all professional standards analysed address the importance of teacher's knowledge on how students learn and avoid referring to any specific strategies that could constrain practice. The Ontario professional standards, for example, mention that teachers "…are sensitive to factors that influence student learning", or "they understand and reflect on student development, learning, theory, pedagogy, curriculum, ethics, international research…"

87. The professional standards analysed do not provide a definition of **attention**, but overall, they consider that students' *attention* can be enhanced through strategies such as adequate lesson design, use of learning materials and classroom communication. Australian professional standards request teachers to stimulate students' attention through the teacher's capacity to plan, structure and sequence learning programmes, use effective classroom communication, as well as support student participation and manage classroom activities. In Scottish professional standards, attention is addressed through the teachers' capacity to "use, design and adapt materials for teaching and learning which stimulate, support and challenge students". English teachers are also expected to engage students' attention through the planning and teaching of well-structured lessons that "promote love of learning and children's intellectual curiosity".

88. Indeed, as shown above, **attention** seems related in professional standards with **challenging** students, but some professional standards (such as those from Australia and Scotland) also address the teachers' need to challenge students as a priority in itself. Establishing challenging learning goals is the first statement in Australian professional standards, which tackles how teachers should plan and implement teaching and learning. Australian graduate teachers should at least "set learning goals that provide achievable challenges for students", while accomplished teachers should "develop a culture of high expectations". Scottish teachers are also expected to have high expectations for all learners, which can translate into more specific actions, such as identifying effectively the barriers to learning, or seeking advice in relation to learners' needs when required. Furthermore, the NBPTS professional standards five core propositions, for example, ask teachers not only to challenge students, but also to teach them how they can challenge themselves, by learning how to pose and solve challenging problems.

Formative Assessment:

89. Formative Assessment refers to the process of *diagnosing* learning as it is occurring, and is composed by:

1. Feedback: Learning is facilitated when students are given implicit or explicit direction as to how to correct their errors, so students know how to improve their performance the next time.

2. Questioning: Learning is enhanced when students are asked high-level complex questions, given time to reflect before answering and guided through additional questions to find the right answer by themselves.

90. All standards analysed address the importance of assessment, and providing **feedback** to students is an important component in English, Australian, NBPTS five core propositions and Scottish standards. For example, English professional standards expect teachers to provide feedback to their students, help them reflect on their performance and encourage pupils to respond to feedback. An interesting feature in

Scottish professional standards is that teachers are also expected to enable the student's self-evaluation and peer-assessment. Therefore, students would also become their own motors of assessment. In the same way, only Scottish professional standards ask teachers to **question** students as part of a learning process, with varied questioning strategies that tackle the different learning needs of students.

Classroom Environment:

91. Classroom environment refers to *managing* the social nature of learning, and is composed by:

1. Emotions: Learning is facilitated when students are motivated, emotionally supported, and not stressed.

2. Social: Learning is facilitated through social interaction among students, such as face-to-face group work or discussions.

3. Active learning: Learning is facilitated when students are active participants in learning experiences.

4. Classroom management: Learning is facilitated in a well-organised, structured classroom where students are kept engaged.

92. These elements are present in all professional standards, at least in general, with different emphases. Student **emotions**, for example, are addressed across all of them, with more specific mentions on the emotional development of the student in professional standards from Ontario, and the NBPTS five core propositions. In Ontario, ethical standards for teachers have a specific component of *Care*, which requests teachers to commit to students' well-being and learning through positive influence, professional judgement and empathy in practice. The NBPTS five core propositions request teachers to foster students' self-esteem, motivation and character, among others. The Scottish professional standards mention student's emotions as part of the learning contexts. Australian professional standards relate well-being more with physical safety, and references to students' emotions are more indirect, such as through the knowledge expected from teachers on "social and intellectual" development of students, for example.

93. All professional standards mention the importance of engaging students. The **social interactions** encouraged more explicitly seem to be those between the teacher and the classroom (known as "direct instruction"). The Ontario professional standards, for example, talk about "learning communities", without specifying who is involved in these (regarding teachers, students, or both). There are also some examples requesting to construct learning interactions among students as well in the Australian and Scottish professional standards. In Australia, a proficient teacher should be able to establish and implement "inclusive and positive interactions" to engage and support all students. According to Scottish professional standards, all teachers should create opportunities to stimulate learner participation in debate. Indeed, these Scottish professional standards seem to address directly all the elements in this component (emotions, social, active learning and classroom management).

94. **Active learning** is another element more indirectly addressed in most of the professional standards analysed, and this can be from the teacher, the student or both. Scottish professional standards, for example, address active learning from the perspective of what the student should be doing: they expect student engagement for the planning and enhancement of their own learning programmes. Australian professional standards address active learning from the perspective of what the *teacher* should be doing: identifying strategies to support inclusive student participation and engagement in classroom activities. English professional standards do both: To promote good progress and outcomes from pupils, teachers should encourage pupils to take a "responsible and conscientious attitude to their own work and study (an action the student should perform)". Whereas, to ensure a good and safe learning environment, teachers

should use approaches that address students' needs in order to involve and motivate them (this action is more centred on the teacher).

95. **Classroom management** can have different objectives across professional standards, such as: student discipline and involvement (England), ensuring adequate physical conditions of the learning environment (Scotland and NBPTS core propositions), or supporting student participation, with discipline, safety and good use of ICT (Australia). The challenge in these professional standards seems to be balancing the expectation for teachers to shape environments were students are treated with respect, but engaging students at the same time to participate in learning. The teacher is generally seen as the main generator of this environment.

Diversity:

96. Diversity refers to adapting practice to take into account the students' differences in learning, and is composed by:

15. Differentiated instruction: Learning is facilitated when teaching is modified to account for student's prior knowledge, abilities, and past experiences which affect the efficiency with which individual students will learn and retain new information (includes issues of equity due to language, culture, and socio-economic status).

97. **Diversity** is the only component directly addressed in all the professional standards analysed. The emphasis is nevertheless different, as some emphasise more *the means* to address student diversity (Ontario and Scotland), others emphasise the *different kinds* of student diversity (NBPTS core propositions, Australia), while another refers to *both* the kinds of student diversity and means to address it (England). Some examples are included below:

- **Ontario (the means):** They refer to the teachers' capacity to use "appropriate pedagogy, assessment and evaluation, resources and technology in planning for and responding to the needs of individual students and learning communities".

- **Scotland (the means):** They refer to a range of teaching strategies and resources to meet the needs and abilities of students, such as: strategies appropriate to the needs of learners as individuals, groups and classes; innovative resources (from ICT to outdoor learning opportunities), professional practice evaluation, transformative learning that challenges assumptions and expands world views.

- **NBPTS- five core propositions (kinds of diversity):** They state that "teachers adapt their practice, as appropriate, on the basis of observation and knowledge of their students' interests, abilities, skills, knowledge, family circumstances and peer relationships."

- **Australia (kinds of diversity):** They also address adaptability through knowledge, design of activities or the teacher's capacity to lead other teachers in strategies to cater to differences such as: diverse linguistic, cultural, religious and socioeconomic backgrounds; the different student's learning abilities; or the specific case of the Aboriginal and Torres Strait Islander people.

- **England (both)**: They also refer to the capacity to "adapt teaching to respond to the strengths and needs of all pupils" through an ability to know when to differentiate; understand the factors that inhibit learning; awareness of physical, social and intellectual development of children; and awareness of their different kinds of needs (*e.g.* special needs, high ability, non-English native speakers).

98. To summarise, the analysis carried out in this section shows that differentiated instruction, engagement and challenge, student feedback and classroom management are the aspects most shared across the teacher professional frameworks analysed. Other elements that are less addressed (or indirectly) are self-reflection and meta-recognition, rehearsal, questioning or a ctive learning. It is noticeable that differentiated instruction is the only element present across all the professional standards analysed. It requests from the teacher to adapt practice and the environment to the various ways in which students can be different (socio-economically, culturally, in achievement, having special needs, etc.). This is consequent with the findings from the previous section, where the expected capacity of adaptability increases as the teacher gains experience. This suggests an important emphasis on equity issues in the definition of teacher competence in the frameworks analysed.

III. A critical analysis of different professions' competence frameworks.

99. Based on the analysis above, this Part will analyse frameworks for doctors, engineers and nurses. As pointed out by the OECD (2005a), "much of the data and research used in teacher policy formulation is largely self-referential, and comparative information on other careers would help provide a perspective on trends and findings in regard to teachers – as well as ideas for change." However, other authors point out as well that a challenge remains in research to systematically identify occupations that represent proper comparison groups to teaching (Allegretto, Corcoran and Mishell, 2004; Findlay, Findlay and Stewart, 2012). Moreover, the cultural perception of comparability of teaching to other professions can also vary depending on the country. For example, the Global Teacher Status Index (Dolton and Marcenaro-Gutiérrez, 2013) found that teachers are considered comparable to social workers among respondents in the majority of the countries surveyed (*e.g.* New Zealand, Spain and the Netherlands), while teachers are found comparable to doctors in China, to nurses in France and Turkey, or to librarians in the United States.

100. Doctors, engineers and nurses are the selected occupations for comparison with teachers in this review. These occupations are classified by the ISCO (International Standard of Classification for Occupations) as part of the same occupational group as teachers (Group 2: Professionals)[iv] (ISCO, 2013). Doctors and engineers have been recognised as a profession for a long time by ISCO. Professional recognition of nurses is more recent (2010), but research has identified similar levels of skills among nurses and teachers (Bruschi and Coley, 1999; Allegretto *et al*, 2004; Findlay *et al*, 2012). Also, a comparison by ISCED level shows that the starting degree for these professions in all countries tends to be Bachelor level or equivalent (ISCED Level 6), except for Doctors, where initial education is at Master level or equivalent (ISCED Level 7). For teachers, the level of initial teacher education is varied, and can be Bachelor or Master levels in some countries (See Part I).

101. At the same time, it should be considered that the approach to professional standards may vary depending on the profession in a country, as show the available cases identified. Scotland and England have each specific professional teacher standards, but share the same professional standards for doctors, engineers and nurses, as part of the United Kingdom. Also, Canada does not have national professional teacher standards, but has national professional standards for doctors, as well as national and provincial professional standards for nurses. Australia has national professional standards for nurses, engineers and doctors, and recently launched national professional teacher standards, as previously these existed only at the sub-national level. In the United States, there are some recent on-going efforts to provide national-wide professional standards for teachers (see previous section), while there are national professional nurse standards produced by the American Nursing Association, but not for engineers and doctors. However, the framework for engineers (EC2000) issued by the Accreditation Board of Engineering and Technology (ABET) seems to be used largely by initial engineer training institutions, which has served as example for other countries (OECD, 2011b). At the international level, engineers have an international framework, issued by the International Engineering Association, but doctors, teachers and nurses do not seem to have one.

3.1. The general characteristics of other professions' competence frameworks.

102. Based on the findings of Part II for teachers, this section will analyse some wide-ranging characteristics of the selected frameworks for doctors, engineers and nurses in the same selected countries as for teachers. The categories of analysis are the same when possible as for teachers, to gain insight into the main characteristics of these frameworks, and how these can compare to those of teachers (See Annex 3 for the analytical questions guiding this analysis).

Coverage and Purposes:

103. As for teachers, the competence frameworks for doctors, engineers and nurses available for analysis have generic or specific professional standards that can follow a basic core, roadmap or semi-roadmap approach (Table 6). Some professions have a stronger link with qualifications frameworks than teachers in two ways: a) by using specific qualifications as evidence that the professional has certain competencies, although experience in the field can also be recognised in processes such as registration or certification; b) by relying mainly on accreditation standards (for institutions) to provide guidance on professional expectations. Also, while these professions have documents to which they refer as "standards", some of these are actually more similar to guidelines and do not seem competence-based.

Table 6. Approaches followed in professional standards across selected professions.

Countries	Teachers[1]	Nurses	Engineers	Doctors[2]
Australia	Generic Roadmap	Generic Semi-roadmap	Specific Roadmap	Specific Semi-roadmap
Canada (Ontario)	Generic Basic Core	Generic Semi-Roadmap		Specific Semi-roadmap
United Kingdom	Generic Basic Core (England)	Specific Roadmap	Generic Roadmap	Specific Semi-roadmap
	Generic Semi-roadmap (Scotland)			
United States	Specific Semi-roadmap		Generic Basic Core	
International			Specific Roadmap	

1: The teachers' professional standards are not addressed in this section.2: The doctors' professional standards in Canada and the United Kingdom are currently under revision.

104. The competence frameworks analysed for engineers have both generic and specific professional standards, written as roadmaps for most cases, and they all have links to formal qualifications. The *Engineering Criteria (EC2000) for the Accreditation of Engineering Education Institutions* (United States) and the *Graduate Attributes and Professional Competencies* international standards (International Engineering Alliance, IEA) are based on formal qualifications programmes. In the United States, the EC2000 guides institutions, employers and students on the content of initial training courses for engineering at bachelor level (OECD, 2011b). The IEA professional standards show both the "graduation attributes" and the "professional competency profiles" for three lengths of Engineer training programmes: two years (Dublin Accord Graduate), three years (Sydney Accord Graduate) and four years (Washington Accord Graduate). These professional standards also define three types or "ranges" of engineering programmes (engineer, engineering technologist and engineering technician) and three professional stages

(accredited educational qualification, professional registration and possibly, the international register) (IEA, 2013).

105. Professional engineer standards in Australia and the United Kingdom have a more flexible, but still clear link to qualifications frameworks. Australia has defined the *Australian Engineering Competency Standards for Entry to Practice* (Phase 1) and for chartered membership and registration (Phase 2). This second phase also identifies proficiency levels (developing, functional, and proficient) (Engineers Australia, 2011; 2012). These voluntary professional standards set a common ground of competences for recognition of qualifications for both phases (*e.g.* unaccredited Australian engineering qualifications or engineers trained abroad). The *UK Standard for Professional Engineering Competence* (Engineering Council, 2013) addresses three career stages for all engineers (Engineering Technicians, Incorporated Technicians and Chartered Technicians). These professional standards describe competences and how these evolve, and provide examples of actions or qualifications that could demonstrate having acquired the competence, but field experience is also recognised as a source of evidence (See Annex 4).

106. Most of the competence frameworks for doctors analysed have specific/semi-roadmap professional standards that cover initial training and specialisation, and are directly linked to formal qualifications. The United Kingdom has professional standards for undergraduate and postgraduate medical education and training (GMC, 2013a; GMC, 2013b) which establish professional responsibilities and expected outcomes during these stages. The professional standards at undergraduate level, *Tomorrow's Doctors*, identify three main roles for future doctors (scholar and scientist, practitioner, professional), while professional standards at postgraduate level are more similar to guidelines. Additionally, the G*ood Medical Practice* sets out expectations for all registered doctors (GMC, 2013c)), for revalidation of registration every five years, and for their yearly appraisals. In Canada, the *CanMeds 2005 Physician Competency Framework* identifies seven roles for doctors (medical expert, communicator, collaborator, scholar, health advocate, manager, professional), and the professional standards for all areas of residency education aim to be aligned to the CanMeds (RCPSC, 2005).

107. In Australia, the competence focus is less evident for doctors in the frameworks analysed. Australia has developed frameworks for registration (individuals) and accreditation (institutions) of doctors. The registration standards seem actually more similar to input-oriented guidelines, but there are some "outcome-oriented" documents for accreditation, such as the *Accreditation Standards for Primary Medical Education Providers and their Programme of Study and Graduate Outcome Statements* (AMC, 2012). It was also possible to identify the professional training standards *Becoming a Competent and Proficient Surgeon*, which are intended for doctors with at least two years of postgraduate experience training to become practising specialists (RACS, 2012).

108. Most of the competence frameworks for nurses analysed contain specific/roadmap or semi-roadmap professional standards. All contain numerous documents, which are sometimes more similar to "input-oriented" guidelines (sometimes, also called "standards"). As for doctors, Australian nurses have standards for registration (input-oriented) and accreditation, such as the *Standards and Criteria for the Accreditation of Nursing and Midwifery Courses Leading to Registration, Enrolment, Endorsement and Authorisation in Australia—with Evidence Guide* (ANMC, 2009*)*. In Ontario, nurses at all stages and areas of practice follow the *Professional Standards Revised 2002* (CNO, 2002), but there are as well specific entry-level professional standards for registered nurses and registered practical nurses that are competence-based. These documents are the *National Competencies in the Context of Entry Level Registered Nurse Practice* (CNO, 2008) and the *Entry-to-Practice Competencies for Registered Practical Nurses* (CNO, 2011). As for Doctors, the professional standards for registered practical nurses in Ontario explain what a nurse is expected to do when covering different roles (in this case, nursing, administrator, educator and researcher). The United Kingdom has created a framework that caters to different career stages and areas of nursing practice, such as pre-registration, prescribers, specialist community public health nurses, but not

all of these stages seem to count with competence or outcome-based professional standards. From this framework, the *Standards for Pre-Registration Nursing Education* (NMC, 2010) differentiate by nursing branches (adult nursing, children's nursing, learning disabilities and mental health nursing), and are organised into four domains (professional values; communication and interpersonal skills; nursing practice and decision-making and; leadership, management and team working).

Internal structure:

109. The analysis of these frameworks' internal structure shows some differences in the professional standards depending on the profession (*e.g.* focus on innovation or problem-solving), as well as some continuing professional development approaches that are compatible with those of the teaching profession, such as the doctors and nurses' training in practice, as explained below.

110. The frameworks in most professions include professional standards with a generally "broad **competence/competency**" approach, that includes seemingly clear, concise and action-oriented statements in general. As for teachers, the medical profession seems to be living an "outcomes movement" where "there is a renewed emphasis on preparation for practice, not for intellectual or medicine sake, but for optimal outcomes for patients and society" (RCPSC, 2005). Professional standards for doctors and nurses seem however to present in some cases statements that point to micro-level competences or personality traits than the professional teacher standards analysed. The professional doctor standards in Canada, for example, have included (based on a broad consultation) ethics throughout the professional standards in their revised version, referring to elements such as: empathy; capacity for compassion, trustworthiness, integrity; or [capacity of] breaking bad news, as well as "delivering information *in a humane* manner" (italics added).

111. It is interesting to contrast how the different professions **address innovation and diversity of practice**. As mentioned above, professional teacher standards tend to be more general about innovation, and sometimes do not mention it specifically. Standards for doctors and nurses highlight critical thinking and their role as researchers (for example, the Canadian doctor standards), but the priority in these professions seems to be more on ensuring a common compliance for the patient's security. In contrast, professional standards for engineers address rather explicitly the concept of innovation, generally clarifying what it is, or how to measure its attainment. Professional engineer standards in Australia, for example, address "Creativity and innovation", and provide specific indicators of attainment as shown below for experienced professional engineers (Table 7):

Table 7. Extract from Professional Standards for Experienced Professional Engineers (Australia).

Element of competence-professional engineer	What this competence means in practice	Indicators of Attainment Refers to only as many indicators of Attainment as you need to demonstrate the Element of Competence
15. Creativity and innovation	means that you develop creative and innovative solutions to engineering problems	• apply your knowledge of materials and physical and abstract objects to work out how to rearrange them so they perform the required function • develop the most effective ways to create value for sponsors, clients, end users and investors in products, projects, processes or systems that have agreed aesthetics, level of performance or properties • select and use fundamental principles to meet requirements economically, possibly reusing or modifying existing componentry • develop concepts to meet requirements and specify, document, build, test, verify, validate, measure and monitor engineering products or processes • review opportunities in work portfolio for enhancing products, processes, systems and services, assesses viability and initiate actions • apply the benefits of continuous technical change and innovation to enhance the outcomes delivered • apply and advance research-based education practice to course design, delivery and assessment

Source: Engineers Australia (2012), Australian engineering competency standards stage 2 - experienced professional engineers, Engineers Australia.

112. The professional standards for doctors and engineers have comparable structures to those for teachers (*e.g.* the organisation in taxonomical categories, with some defining progressive proficiency levels and/or career stages), also with **efforts to illustrate the complexity of practice**. The College of Surgeons of Australia and New Zealand, for example, was designed to assess a trainee's performance in the workplace following a "chunk" approach (Ingvarson and Rowe, 2007). Under this approach, there is a short definition of each of the nine competences (medical expertise, judgement, technical expertise, professionalism and ethics, health advocacy, communication, collaboration and team work, management and leadership and scholarship and teaching), followed by a description of hypothetical situations in which this competence would be needed. After this description, there is an explanation of different aspects in which the competence applies, and how it would be demonstrated by surgeons with different levels of proficiency (pre-vocational, novice, intermediate, competent and proficient) (RACS, 2012, see Annex 5).

113. The expected capacity of professionals to **adapt their practise** is also generally addressed in the frameworks for all professions, although with different emphasis. Professional doctor standards in general address their capacity to adapt their practice *to the patient* by using communication-related competences for diagnosis and treatment purposes, such as: selecting appropriate investigative methods and adapting practise to new knowledge, establishing therapeutic relations, being aware and responsive to non-verbal cues; gathering information about a disease, as well as about the patient's beliefs, concerns, expectations and experiences; seeking out information from other sources like family, caregivers and other professionals; delivering information in a way that is clear to patients and families (RCPSC, 2005; GMC, 2013b; RACS, 2012). Professional nurse standards refer to the importance of adapting practice *to the patient*, as well as adapting *the environments* of practise. The Ontario professional standards for nurses, for example, point to how nurses should identify their own values, beliefs and experiences and use this self-

awareness in their practice, and; promote safe environments for clients and others, to address the unique needs of clients in the context of care.

114. Ontario's professional nurse standards also refer directly to the different **practice environments** in which nurses may provide their services in either large urban or small rural settings. An interesting point of comparison with the professional teacher standards analysed is that professional nurse standards address the importance of promoting supportive practice environments for nurses, and the shared responsibility of governments, employers, nurses, nursing organisations and postsecondary educational organisations to help this happen, such as (CNO, 2008):

- Providing initial working experiences in environments similar to those of practise (populations, type of facility) to consolidate knowledge as skills.
- Promoting an environment that encourages registered nurses to pose questions, engage in reflective practice and ask for assistance without being criticised.
- Identifying and informing entry-level registered nurses of the resources available to support their practice consolidation and development (e.g. mentorship, documentation).
- Providing on-going constructive feedback and formal evaluation processes.

115. Professional teacher standards address the importance of adapting practice and environments to students for student learning, but none referred to the "shared-responsibility" with other actors for creating positive teaching and learning environments, or how this can be beneficial to the teachers' own professional learning as well.

116. Professional engineer standards seem to place stronger emphasis on **problem-solving** than professional standards from other professions. Professional standards for Australian engineers address their capacity to engage with relevant community and stakeholders to influence perceptions and negotiate acceptable outcomes in the interest of the community. They also need to identify, assess and manage risks (Engineers Australia, 2011). In the same way, the Engineering Standards produced by the IEA (2013) contain a detailed classification of the difficulty level of problems and activities, from:

- well-defined (least complex, manageable by two-year long training programmes graduates);
- broadly defined (average complex, manageable by three-year long training programmes graduates), to;
- complex (highly complex, manageable by four-year long training programmes graduates).

117. There is also a classification of the main attributes of these problems (*e.g.* depth of knowledge and analysis required, range of conflicting requirements, familiarity of issues, stakeholder involvement and interdependence with other problems). Depending on the complexity of an engineering activity, these professional standards identify the range of resources needed, the level of interactions with stakeholders, the capacity of innovation, the consequences to society and the environment and the kind of familiarity with the issue. Apparently, this type of "problem-solving" skills provides professional mobility to engineering graduates, who use their engineering education as an entry into other professions such as law, medicine, finance services, non-engineering management, policy-making or political roles (OECD, 2011b).

Support and quality assurance tools:

118. As explained above, all professions seem to provide varied supporting tools for professionals as part of their frameworks, with nursing as the profession with the most extensive variety of documents comprising them. These documents can cover very varied aspects of nursing and are not necessarily competence-based. In Ontario, for example, the competence framework for nurses can cover aspects such as: the nurse's criminal history, infection prevention and control, a decision tree to apply medication, decisions about procedures and authority, guiding decisions about end of life care, or performing tele-practice. In Australia, the continuing professional development standards explain training requirements for nurses, such as the number of hours of continuous professional development courses per year.

119. Among the large variety of documents for nurses, the United Kingdom has created as well the *Standards to Support Nurse Learning and Assessment in Practice* (NMC, 2007). These professional standards are addressed to nurses, but also to mentors, practice teachers and teachers in the profession. They provide guidance on the assessment process, with a formative approach focused not only on the nurse assessed, but also on how mentors, practice teachers and teachers can improve in their role. The extract below, for example, explains the requirements for mentors, and includes general statements of how they can fulfil their role (Table 8):

Table 8. Extract from the Standards to Support Nurse Learning and Assessment in Practice (UK).

NMC Requirements	Guidance
Most assessment of competence should be undertaken through direct observation in practice.	Students must normally demonstrate their competence in the practice setting. However, where experience is limited, e.g. basic life support skills, simulated experience or OSCEs may be used. The majority of assessment should be through direct observation.
Mentors should be involved wherever possible, when competence is assessed through simulation.	Summative assessment using simulation may occur where opportunities to demonstrate competence in practice are limited. Mentors should be involved in designing, using and evaluating such assessment strategies.
Mentors should consider how evidence from various sources might contribute to making a judgement on performance and competence.	The NMC recognises that the total assessment strategy would include assessment through various means i.e. direct care, simulation, OSCEs and other strategies.
Mentors should seek advice and guidance from a sign-off mentor or a practice teacher when dealing with failing students.	Inexperienced mentors may require support from a sign-off mentor or practice teacher when faced with a failing student to help them to communicate concerns, identify action and evaluate progress.

Source: NMC (2007), Standards to Support Nurse Learning and Assessment in Practice: Standards for Mentors, Practice Teachers and Teachers, NMC.

120. Surgeons in Australia also have a guide designed to help appraise surgeons in practice. This guide contains instructions for appraisal, and examples of good and poor behaviours, along with grading lists (poor, marginal, good, excellent and unable to rate). For moderation purposes, this guide also clarifies some possible sources of bias that the appraiser should avoid, such as (RACS, 2012):

- *Halo effect* - one particular positive aspect is overemphasised and enhances the ratings for other patterns of behaviour

- *Horns effect* - one particular negative aspect is overemphasised and diminishes the ratings for other patterns of behaviour
- *Leniency* - tendency to give favourable (higher) ratings
- *Severity* - tendency to give unfavourable (lower) ratings
- *Primacy* - remembering better/over-weighting behaviours that were observed first
- *Recency* - remembering better/over-weighting behaviours that were observed last

121. From the evidence available, it seems that formal education, professional judgement and portfolios are among the most common tools used to assess performance across these professions. While formal education (through degrees, courses or workshops) can provide an easier link to national qualifications frameworks, these are complemented to different extents by other kind of evidence of practice. In the United Kingdom, for example, the minimum requirements for a doctor's revalidation entail participation in an annual appraisal, as well as: continuing professional development, quality improvement activities, significant events, feedback from colleagues and patients and reviews of complaints and compliments. At the post-graduate level, this process is supported by the *Standards for Curricula and Assessment Systems* (GMC, 2010).

122. While not all of this evidence may address the "natural harvest" approach, the documents analysed aim for a variety of evidence of performance, combined with guidance of how to do a continuous (or real-time) assessment in practice (with guidance for appraisers for this). This is an aspect less addressed in teachers' frameworks, where sources of evidence, despite aiming generally in the documents to be context-based, are more "retrospective" and seem to provide less feedback to teachers on real time (e.g. assessment of classroom recordings, written critical reflections on their work, or samples of student's work).

123. To summarise this section, the competence frameworks analysed suggest a relatively stronger link to formal qualifications (especially, engineers) than those for teachers. These other professions can have either generic or specific professional standards, and generally aim for roadmap or semi-roadmap approaches. As for teachers, professional standards for doctors, engineers and nurses address adaptability, although in different ways: to the patient (doctors), to the patient and of the environment (nurses), through problem-solving (engineers). As for teachers, support and quality assurance tools for these professions seem aimed to assess the professionals in their context of practice, although courses and qualifications seem more used as sources of evidence in the frameworks analysed. Nevertheless, there is also a focus on continuous appraisal in practice that allows providing continuous feedback for improvement.

3.2. The "components of professional knowledge" for different professions.

124. This section will analyse the "professional knowledge components" for teachers, doctors, engineers and nurses, based on the competence frameworks analysed. "Professional knowledge" refers to the specific knowledge expected from a professional. As Hall (2005) argues, "having a unique body of knowledge is one of the things that define a profession in a society". Hence, the "professional knowledge components" are the different kinds of knowledge that professional standards identify as needed by the professional to be successful. This paper has identified two preliminary common components of professional knowledge based on a preliminary analysis of related literature and of the selected professional standards for teachers, engineers, nurses and doctors (Sultana, 2008; French, 2007; Rata, 2012):

1. Specific content knowledge (or declarative knowledge, *know that*)

2. Application knowledge (or procedural knowledge, *knowing how to*)

125. *Specific content knowledge* refers to the disciplinary or epistemic knowledge of the sciences, arts, humanities and social sciences (Rata, 2012). *Application knowledge* refers to the knowledge that helps translate the specific content knowledge into the context of the profession. It is continuously gained and improved by training in practice or experience, and is specific, detailed, concrete and integrated, since it is developed to respond to specific problems or situations found during practice (French, 2007; Hiebert, Gallimore and Stigler, 2002). It can also inspire the acquisition of new specific content and application knowledge to solve specific issues.

126. This classification of knowledge components can also correspond to the different types of competences identified in Coles (2006) mentioned in Part I. Using this classification, it could be hypothesised that **specific content knowledge** includes *cognitive* competences (use of theory, concepts and tacit knowledge gained through experience), while **application knowledge** includes *functional* competences (know-how, what a person should be able to do when working in a certain area), *personal* competences (knowing how to conduct in a specific situation) and *ethical* competences (possessing certain personal and professional values)

Specific content knowledge

127. [TO BE COMPLETED]

Application knowledge

128. [TO BE COMPLETED]

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[i] A comparative study in the European Union by the University of Jyväskylä (2009) found that initial teacher education for pre-primary and primary level teachers tends to be in the non-university sector (*e.g.* TE colleges and polytechnics). Teacher education for lower and upper secondary teachers tends to be at the tertiary and university levels. For primary teachers, initial teacher education is at university level (ISCED 5A) in most countries, but is non-university tertiary level (ISCED 5B) in 5 countries. In about 20 countries, it lasts four years or less, and it lasts five years in only 7 countries. Teacher education for upper secondary teachers is at the university level (ISCED 5A) in all member states. It lasts five years or more in 23 member states, and less than 5 years in ten member states. For lower secondary teachers, teacher education is at tertiary level institutions (ISCED 5) and leads in most countries to a university level qualification (ISCED 5A) except in two countries (BE and AT, where it leads to an ISCED 5B qualification). It lasts at least 5 years in 12 member countries and less than 5 years in 13 member countries.

[ii] The countries that participated in the first round of the Teaching and Learning International Survey (TALIS) in 2007-08 are: Australia, Austria, Belgium (Flemish Community), Denmark, Hungary, Iceland, Ireland, Italy, Korea, Mexico, Norway, Poland, Portugal, Slovak Republic, Spain, Turkey, Brazil, Bulgaria, Estonia, Lithuania, Malaysia, Malta and Slovenia.

[iii] The United States has only recently developed a set of national standards (the Council for the Accreditation of Educator Preparation), but several states have developed their own standards (e.g. California, Colorado, Illinois, New York, Texas, Virginia, Washington, Wisconsin). The *National Board of Professional Teaching Standards* is an NGO that has developed standards for certification as advanced teachers.

[iv] According to the ISCO-08, the tasks of members of Group 2 (Professionals) usually include: "conducting analysis and research, and developing concepts, theories and operational methods, and advising on or applying existing knowledge related to physical sciences including mathematics, engineering and technology, and to life sciences

including the medical and health services, as well as to social sciences and humanities; teaching the theory and practice of one or more disciplines at different educational levels; teaching and educating handicapped persons; providing various business, legal and social services; creating and performing works of art; providing spiritual guidance; preparing scientific papers and reports. Supervision of other workers may be included." ISCO-08 Group Definitions Final Draft : http://www.ilo.org/public/english/bureau/stat/isco/isco08/index.htm

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ANNEX 1. ANALYTICAL QUESTIONS: PROFESSIONAL TEACHER STANDARDS

The following questions draw from the literature on desirable general characteristics of professional standards reviewed in Part I (Cox and Meckes, forthcoming; Ingvarson, 2002; Ingvarson and Kleinhenz, 2003; Ingvarson and Rowe, 2007; OECD, 2013).

a) What is the framework's key objective?

1. Do the frameworks provide a common basis to organise the key elements of the teaching profession, such as initial teacher education, teacher registration, teacher's professional development, career advancement and teacher appraisal? What kind of evolution can we identify across the frameworks compared?
2. Is this framework organised into generic standards (for all teachers), or specific standards (organised by grade level taught and/or career stage)?
3. Is there a clear link between the professional standards and the national qualifications framework?

b) What is requested from teachers, and how is it explained?

4. Structure, coherence and conceptualisation of "growth and development": How are achievement statements operationalised? Are these in different hierarchical levels? Do these levels show a logical progressive improvement? Are statements, clear, concise and action-oriented? What key elements can we identify?
5. How are proficiency and career stages organised? Is each stage of proficiency equivalent to a career stage (e.g. Australia)? Or, are there different levels of proficiency for each career stage?
6. Do professional standards point to broad competences/complex sets of skills involved in one task, or do they point rather to "micro-level" competences or "personality traits"? Which ones can we identify?
7. Context free (or context transversal): Do they describe practice that teachers at a same level should be able to achieve, regardless of the school in that education system? What can we identify?
8. Non-prescriptive: While the professional standard should clarify objectives, does it allow for diversity and innovation? How does it do it?

c) How is this evaluated?

9. Do professional standards respond clearly to the questions: what will be evaluated, how will it be evaluated and how good is good enough? What responses to these questions do we find?
10. Is evidence of the work a "natural harvest" of the teacher's work, rather than creating significant additional workloads? What are the most common elements valued by countries as evidence, and what can we infer from this?
11. Are the support tools used to help teacher improvement clear in the standards? Which ones can we identify?

ANNEX 2. PROFESSIONAL STANDARDS AND LEARNING SCIENCES' FINDINGS

Components and elements that impact student learning	Australia	Ontario (CAN)	Scotland (UK)	England (UK)	NBPTS* (USA)
I. Learning: refers to the *knowledge of* strategies for enhancing or facilitating learning and is composed by:					
1. Prior knowledge: Learning is facilitated when new information is connected to prior knowledge.					
2. Elaboration: Learning is facilitated when new concepts are made explicit using clear language.					
3. Self-reflection and meta-cognition: Learning is facilitated when students are given the time to reflect on new learning and connect it to prior knowledge.					
4. Attention: Learning is facilitated when students are alert, oriented and sustained on the task.					
5. Memory: Learning is facilitated when retention capacities are enhanced.					
6. Rehearsal: Learning is enhanced through rehearsal and practice.					
7. Challenging: Learning is enhanced when a student is performing a task that is developmentally-appropriate to the level of cognitive challenge.					
8. Transfer (application to real-life contexts): Learning is facilitated when students are engaged in 'problem-based learning' where concepts to be learned are embedded in real-life contexts.					
II. Formative assessment: refers to the process of *diagnosing* learning as it is occurring, and is composed by:					
9. Feedback: Learning is facilitated when students are given implicit or explicit direction as to how to correct their errors, so students know how to improve their performance the next time.					
10. Questioning: Learning is enhanced when students are asked high-level complex questions, given time to reflect before answering and guided through additional questions to find the right answer by themselves.					
III. Classroom Environment: refers to *managing* the social nature of learning, and is composed by:					
11. Emotions: Learning is facilitated when students are motivated, emotionally supported, and not stressed.					
12. Social: Learning is facilitated through social interaction among students, such as face-to-face group work or discussions.					
13. Active learning: Learning is facilitated when students are active participants in learning experiences, rather than passive recipients.					
14. Classroom management: Learning is facilitated in a well-organised, structured classroom where students are kept engaged.					
IV. Diversity: refers to *adapting* practice (learning strategies, diagnosis and classroom environment), to take into account differences in learning, and is composed by:					
15. Differentiated instruction: Learning is facilitated when teaching is modified to account for student's prior knowledge, abilities, and past experiences which affect the efficiency with which individual students will learn and retain new information (includes issues of equity due to language, culture, and socio-economic status).					

ANNEX 3. ANALYTICAL QUESTIONS: OTHER PROFESSIONAL STANDARDS

a) What is the framework's key objective?

1. Do the frameworks provide a common basis to organise the key elements of the career of this profession?
2. Is this framework organised into generic standards (for all), or specific standards (organised by grade level taught and/or career stage)?
3. Is there a clear link between the professional standards and the national qualifications framework?

b) What is requested from other professions, and how is it explained?

4. Structure, coherence and conceptualisation of "growth and development": How are achievement statements operationalised? Are these in different hierarchical levels? Do these levels show a logical progressive improvement? Are statements, clear, concise and action-oriented? What key elements can we identify?
5. How are proficiency and career stages organised? Is each stage of proficiency equivalent to a career stage? Or, are there different levels of proficiency for each career stage?
6. Does the framework point to broad competencies/complex sets of skills involved in one task, or do they point rather to "micro-level" competencies or "personality traits"? Which ones can we identify?
7. Context free (or context transversal): Do they describe practice that all professionals at a same level should be able to achieve? What can we identify?
8. Non-prescriptive: while the framework should clarify objectives, does it allow for diversity and innovation? How does it do it?

c) How is this evaluated?

9. Does the framework respond clearly to the questions: what will be evaluated, how will it be evaluated and how good is good enough? What responses to these questions do we find?
10. Is evidence of the work a "natural harvest" of the professional's work, rather than creating significant additional workloads? What are the most common elements valued by countries as evidence, and what can we infer from this?
11. Are the support tools used to help improvement clear in the framework? Which ones can we identify?

ANNEX 4. EXTRACT FROM THE UK STANDARD FOR PROFESSIONAL ENGINEERING COMPETENCE

THE CHARTERED ENGINEER STANDARD

Chartered Engineers are characterised by their ability to develop appropriate solutions to engineering problems, using new or existing technologies, through innovation, creativity and change. They might develop and apply new technologies, promote advanced designs and design methods, introduce new and more efficient production techniques, marketing and construction concepts, or pioneer new engineering services and management methods. Chartered Engineers are variously engaged in technical and commercial leadership and possess effective interpersonal skills.

The Competence and Commitment Standard for Chartered Engineers.	Guidance – These are examples of activities which could demonstrate that you have achieved the CEng criteria.
Chartered Engineers must be competent throughout their working life, by virtue of their education, training and experience, to:	
A Use a combination of general and specialist engineering knowledge and understanding to optimise the application of existing and emerging technology.	
A1 Maintain and extend a sound theoretical approach in enabling the introduction and exploitation of new and advancing technology and other relevant developments. This could include an ability to: • Identify the limits of own personal knowledge and skills • Strive to extend own technological capability • Broaden and deepen own knowledge base through research and experimentation.	Engage in formal post-graduate academic study. Learn and develop new engineering theories and techniques in the workplace. Broaden your knowledge of engineering codes, standards and specifications.
A2 Engage in the creative and innovative development of engineering technology and continuous improvement systems. This could include an ability to: • Establish users' needs • Assess marketing needs and contribute to marketing strategies	Lead/manage market research, and product and process research and development. Cross-disciplinary working involving complex projects.

Source: Engineering Council (2013), The UK standard for professional engineering competence, Engineering Council

ANNEX 5. EXTRACT FROM BECOMING A COMPETENT AND PROFICIENT SURGEON (RACS)

Health Advocacy: Health Advocacy involves responding appropriately to the health needs and expectations of individual patients, families, carers and communities.

The patient is a 76 year old Maori man from a distinguished local family. He has mild dementia, hypertension, type II diabetes, chronic obstructive airways disease and mild chronic renal failure. He continues to smoke and uses alcohol inappropriately at times. He has a critically ischaemic left leg with rest pain and ischaemic ulcers. He comes to the clinic with his family. They include a daughter who is a leading expert on health law and a grand daughter who is in third year at medical school. MRA has disclosed a segment of his popliteal artery that is stenosed although run off is satisfactory.
When you arrive your Set1 Trainee (Dr. A) has introduced himself with the Set 4 Trainee (Dr. B.) watching proceedings. A does well, putting the patient at ease and ensuring that the consultation will proceed at a comfortable pace for the patient and his family. He has already calmed the anxiety of the granddaughter by telling her that no definite decision about ongoing management has been made and that it his role to explain the clinical situation in as much detail as they wish.
He proceeds to discuss treatment options with the patient and family. He covers the possibilities of arterial reconstruction and its attendant risks, the distinct chance of limb loss and the need for carefully managed medical and anaesthetic input into his care before any surgical intervention is carried out.
He senses the families anxiety when the possibility of amputation is raised and quickly assures them that he is well aware of traditional Maori beliefs on this point (that the limb should returned to the place where it is likely the patient will eventually die and be buried).
Dr B recognises the uncomplaining nature of the patient and correctly determines that he is suffering considerable rest pain but is not letting on to his family. B arranges effective pain relief for him, sets up appointments for a medical consult and anaesthetic appraisal and gives them a firm outpatient appointment in two days to allow them time to consider all the options that have been presented to them.
Both A and B demonstrate care and sensitivity with the patient's reduced cognitive function but they also note that the daughter and granddaughter seem quite unaware of this deficit in their father/ grandfather.

Health Advocacy: Patterns of Behaviour and Behavioural Markers
Provide care with compassion and respect for patient rights

Pre-vocational	- Sensitive to the private and confidential issues of information provided in a clinical setting - Is courteous and compassionate to all patients without discrimination - Recognises that culture and beliefs affect patients and their expectations
Novice	- Recognises the limits of patient information that is able to be divulged in a clinical setting - Informs patients as to their options - Copes with the challenges presented by different value systems
Intermediate	- Adapts patient care according to their concerns and expectations - Assists patients to consider options and make decisions - Advises patients about relevant available support services - Consistently deals with the challenges presented by different value systems
Competent	- Communicates with patient's family, friends and other interested parties in an empathic way whilst respecting patient confidentiality - Can lead an end of life discussion with patient, family and carers - Organises appropriate settings to disclose confidential information - Arranges referrals and second opinions when requested
Proficient	- Can teach others to lead an end of life discussion with patient, family and carers - Adapts practices and care of patients from diverse backgrounds according to their culture and beliefs

Source: RACS (2009), Becoming a Competent and Proficient Surgeon: Training Standards for the Nine RACS Competencies, RACS.