Can mastery of Teacher Competences Determine Student Teachers' Readiness for the Job?

Zulaikha Mohamed[a]*, Martin Valcke[a], Bram De Wever[a]

* Corresponding author: Zulaikha Mohamed, zmohamed1@gmail.com

[a] Ghent University, Ghent, Belgium, zmohamed1@gmail.com, +32 (0)9 264 8664

Abstract

This study looks into finding the level of "readiness-for-the-job" in student teachers about to graduate from teaching programmes, through exploring their mastery of the teacher competences that are presumably employed in teacher education. By conducting surveys and using questioning techniques like Likert scale, MSQ and vignette, 226 student teachers were invited to identify and reflect on their perceived and attained mastery of 11 international teacher competences, based on their personal experiences and individual views. Primarily, the study addresses the problem with the current curriculum of teacher education in many teacher colleges around the world where the emphasis on the practical component of their teaching programmes has resulted in a fragmented readiness-for-the-job. Thus, teachers are becoming quite competent in the practical divisions of teaching, such as managing the learning environment, and critically less competent in the knowledge of the subject per se and similar domains.

1. Introduction

It is quite established that teaching is a complicated profession. In part, this judgement is attributed to the very unique nature of teaching where the novices are expected to have a similar job outcomes and performance as the veterans (Darling-Hammond & Hammerness, 2005; F. A. J. Korthagen, 2004). Although this problem is in the core of teaching, it has become more critical in the past few years with the massive revamp of teacher education and the entire school system. In today's teaching, the "unreasonable" demands have drastically escalated the reality shock that new teachers have already been encountering for several decades (Cochran-Smith, 2005; F. Korthagen, 2010; Liston, Whitcomb,

& Borko, 2006; Tait, 2008). In response, many teacher education colleges took remedial actions so that their graduates are better prepared for the job, and more satisfied with it. These actions include; pursuit of core teacher competences (TCs) during teacher education, incorporating advanced technology in teaching and training, restructuring the practical experiences, introducing entry assessment to select the top candidates, and partnering with schools (Brouwer & Korthagen, 2005; Cochran-Smith, 2005; Darling-Hammond & Hammerness, 2005; Day, 2010; Mayer, 2009; Zeichner, 2002).

Not far from that, a number of initiatives called for new knowledge and skills to cater for the teaching roles in the 21st century. Such knowledge and skills are labelled as teacher competences or teaching standards ((CEPPE), 2013; OECD, 2013; Swabey, Castleton, & Penny, 2010). What is particularly promising about developing teacher competences is that they can serve as a point of reference for job-entry and professional development throughout teachers' career, and as a vital component of teacher education. With the correct set of competences and the right measurement tools, teacher competences have the potential to determine student teachers' (STs) readiness for the job ((CEPPE), 2013; Hayes, 1997; Ronfeldt & Reininger, 2012; Swabey et al., 2010). Importantly, new teachers ought to reach a sufficient mastery level of these competences to be competent and ready-for-the-job.

In this study we inspect student teachers' readiness-for-the-job through outlining their mastery level of core teacher competences. To find out what STs perceive to be critical competences for the job readiness and what competences they obtained in teacher education, both dimensions of mastery; perceived and attained are studied. Also, we are interested to see if the perceived mastery can determine the attained mastery. A framework of 11 international teacher competences (ITCs) is specifically designed for this study to assess a large sample of female student teachers from four government teacher education colleges. In substance, the context of teacher education in the United Arab Emirates (UAE), where the study took place, is explored in terms of the employment of the teacher competences, and to what extent STs mastered these competences.

1.1 Conceptual framework

1.1.1 Readiness-for-the-job

Teacher education often relate to the process through which the university-level learners' are educated to become teachers as the "preparedness" of student teachers for the teaching profession ((NCATE), 2008; O'Neill & Stephenson, 2012; Swabey et al., 2010). Though, a different term has quite recently been endorsed to specify such process, which is "readiness". Readiness can be used to demonstrate student teachers' competence with job-performance in general or with parts of the job in particular (Winterton, Deist, & Stringfellow, 2006). In this paper, we use student teachers' perceived and attained mastery of core teacher competences to define the variable "readiness-for-the-job".

1.2 Teacher Competences as a Reference Point to Indicate Readiness-for-the-job

Given that "competence" is a broad concept and fairly new to education, it is still used as an equivalent to standards ((CEPPE), 2013; Markowitsch & Plaimauer, 2009). Generally, competence is conceptualised in almost every profession (Haigh, Ell, & Mackisack, 2013). In the educational domain,

it has steadily gained a growing popularity in different school and university systems and has been endorsed where such systems aspire to prove that their graduates are competent and adequately ready for the next level of education or for taking the first professional job (e.g., O'Reilly, Cunningham, & Lester, 2013; Walther & Radcliffe, 2007). Some conceptual differences between competence and competency do exist in the literature, nonetheless, they are still being used interchangeably (Haigh et al., 2013). Throughout this paper, we adhere to using competence and adopt the definition given by (Tigelaar, Dolmans, Wolfhagen, & Vleuten, 2004): "an integrated set of personal characteristics, knowledge, skills and attitudes that are needed for effective performance in various teaching contexts" (p. 255). It is hard to question that teachers need to have sufficient capacity of what they should do and also how to do it, for it is beneficial for quicker gains such as developing job-performance and improving self-confidence, as well as broader gains such as maintaining a better rate of teacher-retention (Rots, Kelchtermans, & Aelterman, 2012).

In many countries, teacher competences are constituted at local levels, however, most competence profiles are being constantly revised to conform with the international competences that are exemplified by some of the top organisations in this domain (e.g., OECD, 2004, 2013; Tatto et al., 2012; UNESCO, 2015). Along with the international competences, regional competences are also important to address the particularities of different contexts (e.g., "Competency Framework for Teachers," 2004; "Supporting the Teaching Professions for Better Learning Outcomes," 2012). For this study, we decided to build up a teacher competence framework that is compatible to the ones currently implemented in the sampled programmes, with an international perspective. Therefore, we scrutinised existing frameworks of several countries from the Far East through North America (See Appendix.1).

Building on these frameworks as well as the strategies presented in a recent OECD study ((CEPPE), 2013), we formed a list comprising of 11 international competences;

- C1. Knowledge of curriculum and subject matter,
- C2. Instructional planning and strategies,
- C3. Effective use of teaching materials and technologies in facilitating students learning,
- C4. Commitment to promoting the learning of all students,
- C5. Managing students and learning environment,
- C6. Knowledge of diverse students, including special needs, and how they learn,
- C7. Adapt teaching to respond to the strengths and needs of all pupils,
- C8. Effective collaboration with colleagues and partnering with parents, social services and the community,
- C9. Professional growth and development,
- C10. Willingness to try new ideas and strategies, and
- C11. Exercising personal integrity and legal responsibilities.

The list was then used in designing the teacher competence framework, implemented in this study.

2. Methodology

2.1. Research Questions & instruments

To find out if student teachers' mastery of the core teacher competences can determine their readiness-for-the-job, as a start, we study their perceived and attained mastery aside from one another. To achieve this, we put two research questions;

– What is student teachers' perceived mastery of core teacher competences?

– What is student teachers' attained mastery of core teacher competences?

To increase the reliability of the data, we examined STs' perceived mastery in two different questions and the same is true for their attained mastery. By using surveys, firstly, a question was introduced to the participants to ensure that the 11 ITCs are actually dealt with in the context of their teaching programmes, and to indicate their perceived mastery of these competences. Through this question, participants were given statements to indicate their level of agreement against a 5-points Likert scale; 1- Totally disagree-, 2- Disagree-, 3- Neither agree/disagree-, 4- Agree-, and 5- Totally agree- (See Appendix.2). Participants were asked to fill in a sentence about their perceived readiness-for-the-job in a straightforward multiple-choice style with six options; "totally ready"; "ready"; "partially ready"; "not sure if I'm ready"; "not ready"; and "totally not ready".

Secondly, student teachers' attained mastery was sourced from two open-ended questions inviting them to; 1) reflect on their learning experience to identify some teacher competences in a standardised teaching case- vignette-, and 2) compose a list of teacher competences that are important for the readiness-for-the-job and should be developed in every student teacher. The vignette was collated from professional teachers from Ontario College of Teachers ("Living the Standards," 2007), reflecting on real life professional experiences with living the standards of teaching in the daily practice. The sample was rewritten to reflect the voice of one teacher only, stating how she applies different competences in her teaching. The sample was then reviewed and approved by the participating college heads to ensure it is a relevant case to the studied contexts.

2.2 Participants: Student Teachers (STs)

Four teacher education colleges were contacted to nominate approximately 50 of their student teachers- at bachelor level- to take part in this study. The colleges invited a total of 226 participants to answer the survey in regular classroom settings. There were no specific prerequisites for individual participants to be enrolled in the study once the institutions were included, except for being enrolled in a teacher education programme. It is important to mention that government teacher colleges in the UAE only enrol female candidates. Hence, the whole sample consists of female students.

2.3 Procedure

Data were primarily gathered through a paper-survey. The medium of instruction at all participating colleges was English, therefore, the survey was conducted in English. To answer the vignette-based question, participants were informed that there were five ITCs embedded in the vignette- some explicitly and some implicitly-, and that they were expected to extract at least four of them. To compose a list of the ITCs that are important for readiness-for-the-job, participants were asked to

suggest as many competences as they deem necessary for any student teacher to become ready-for-the-job. To answer these two questions, participants were encouraged to reflect on their individual learning experiences at the colleges and placement schools.

2.4 Analysis

Responses to Likert scale were analysed using SPSS 21, by running frequencies tests to indicate the level of agreement to each of the 11 ITCs. Responses to the open-ended questions were analysed following Miles & Huberman model throughout the five stages of analysis of the results; narrative, coding, interpretation, confirmation and presentation (Miles & Huberman, 1994). All codes were developed prior to data analysis in accordance with the 11 ITCs.

To answer the main research question, responses to the first question on the perceived mastery of the competences were used in the final part of the analysis. This is because it is consistent with the other four statements on the Likert scale, and is directly linked to the ITCs, whereas the MSQ was introduced to cross-check the responses from the first question.

3. Results and Discussion

This study answered two research questions on student teachers' readiness-for-the-job by examining a possible relation between perceived and attained mastery of 11 international teacher competences as an indicator of the readiness.

3.1 The ITCs in teacher education

Responses to the Likert scale show that at least two-thirds of the participants (Approx. n= 192) acknowledge that all of the 11 ITCs are employed in teacher colleges. 44.4% of STs chose "Agree" and 32.9% chose "Strongly Agree" for each of the competences, forming a combined agreement level of 73.3% (Figure. 1). This score means that the majority of student teachers perceive the ITCs to be introduced explicitly in lessons –taught-, covered in the curriculum, practised at placement schools, and modelled by teacher educators. More importantly, this corroborates the rationale to examine STs' perceived and attained mastery of the ITCs.
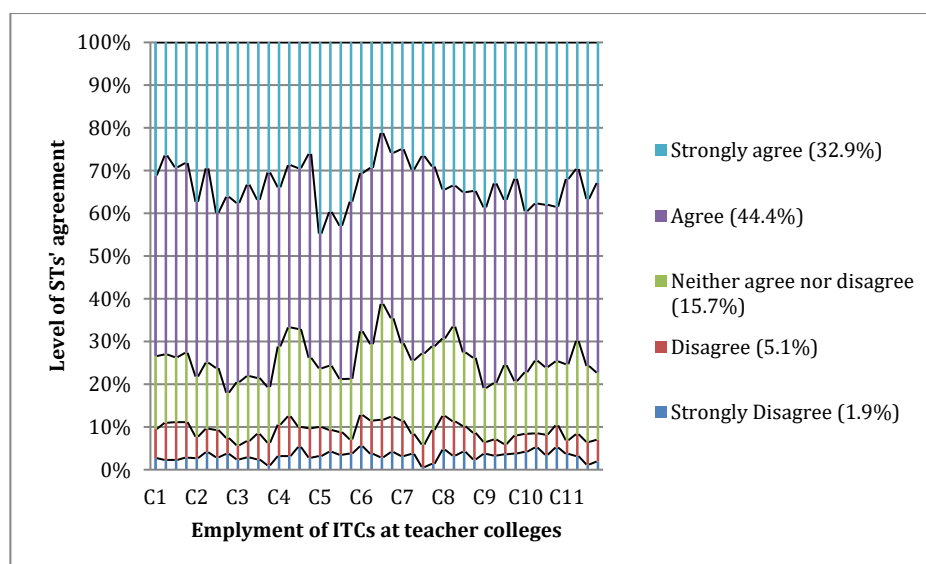
Figure 1. Distribution of agreement level on the employment of each of the 11 competences at teacher education

Building on student teachers' responses, it appears that each and every ITC is employed in UAE teacher education. The majority of students perceive the 11 ITCs to be introduced explicitly in lessons –taught-, covered in the curriculum, practised at placement schools, and modelled by teacher educators. In general, students indicated a reasonably good agreement level to the aforementioned approaches in teacher education, ranging between 66% -"C6. Knowledge of diverse students, including special needs and how they learn" – and 79.2%- "C3. Effective use of teaching materials and technologies in facilitating students learning" - with an average of 74.1%. Hence, it seems student teachers were prepared to be evaluated on their mastery of the international teacher competences. Although in this specific context very little variation is shown in students' responses, the framework can be used in different contexts to find out what teacher competences are especially obtained and what are being overlooked.

3.2 Student teachers' perceived mastery of the ITCs

First, responses to the related statement on the Likert scale (n= 214) revealed that three quarters of the participants -75%- feel confident about mastering the ITCs in professional teaching settings by the time they graduate, with 40% participants "Strongly Agree" – point 5 on the scale- and 35% "Agree" – point 4 on the scale- with the statement. On the other hand, only 8% of the students disagreed to this statement (Figure.2). Overall, limited variation is seen within the agreement levels across the 11 ITCs. To support this finding, we present the descriptives table (Table.1).
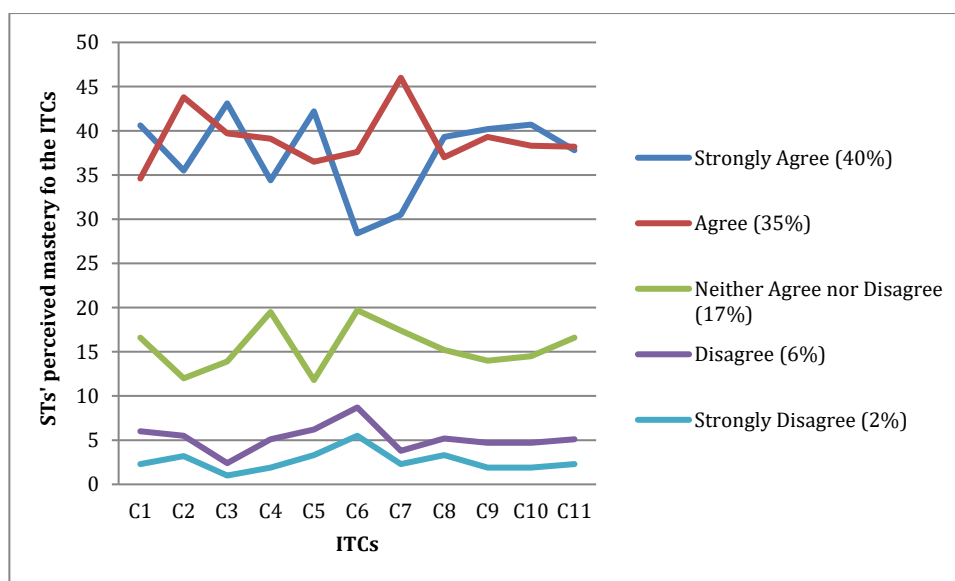
Figure 2. presentation of agreement levels of student teachers, determining their perceived mastery of the 11 competences

Table 1. presents descriptives of STs' perceived mastery of the 11 competences

ITCs	Mean	SD
C1	4.05	1.01
C2	4.03	1
C3	4.22	.84
C4	3.99	.96
C5	4.08	1.04
C6	3.75	1.13
C7	3.99	.92
C8	4.04	1.03
C9	4.11	.94
C10	4.11	.95
C11	4.04	.98
Average	*4.04*	*.98*

Second, responses to the multiple-choice question echoed the results of the first question. However, a small difference is seen where the number of participants feeling "totally ready" for the job by the time they graduate being reduced to 30.3% (Table.2).

Table 2. presents different levels of student teachers' perceived readiness-for-the-job, with number and percentage of students per readiness level

Readiness level n (%)						Student teachers
Totally ready	Ready	Partially ready	Not sure if I'm ready	Not ready	Totally not ready	
						224
68 (30.3)	85 (37.9)	42 (18.7)	24 (10.7)	4 (1.8)	1 (.4)	

3.3 Student teachers' attained mastery of the ITCs

First, in reflecting on the standardised case where participants provided responses to "What competence(s) are demonstrated in this statement?"; 205 (90.7%) participants mentioned a total of 463 competences that are compatible with the 11 ITCs, in addition to 97 competences that are marginally compatible or incompatible with the ITCs. Thus, on average, each of the 205 participants mentioned only 2.25 of the 5 competences embedded in the statement (Table. 3).

Table 3. presents the teacher competences in a given vignette as reflected by student teachers, in an ascending order starting with the most explicit competence. n= 205

Correct order	STs' order	International Teacher Competences (ITCs)	Count
1	*1.5*	C1. Knowledge of curriculum and subject matter	112
2	*5*	C4. Commitment to promoting the learning of all students	69
3	*4*	C7. Adapt teaching to respond to the strengths and needs of all pupils	97
4	*3*	C6. Knowledge of diverse students, including special needs, and how they learn	73
5	*1.5*	C2. Instructional planning and strategies	112

Second, in STs' personal views and individual opinions where they provided responses to "In your opinion, what are the teacher competences that have to be developed in every student teacher?"; 204 participants (90.3%) suggested a total of 415 competences that are compatible with the 11 ITCs, in addition to 33 competences that are marginally compatible or incompatible with the ITCs. On average, each of the 204 participants suggested roughly 2 of the 11 ITCs. Interestingly, only three competences counted for more than 60% of all the suggested competences (Table. 4).

Table 4. presents the perceived important competences for readiness-for-the-job, in an ascending order starting with the highest reported competence by student teachers. n= 204

STs' Rank	International Teacher Competences (ITCs)	Count
1	C9. Professional growth & development	111
2	C5. Managing students and learning environment	78
3	C4. Commitment to promoting the learning of all students	65
4	C11. Exercising personal integrity and legal responsibilities	40
5	C2. Instructional planning and strategies	34
6	C10. Willingness to try new ideas and strategies	29
7	C6. Knowledge of diverse students, including special needs, and how they learn	20
8	C1. Knowledge of curriculum and subject matter	14
9	C3. Effective use of teaching materials and technologies in facilitating students learning	12
10.5	C7. Adapt teaching to respond to the strengths and needs of all pupils	6
10.5	C8. Effective collaboration with colleagues & partnering with parents, social services & the community	6

3.4 Student teachers' perceived & attained mastery as an indicator of readiness-for-the-job

To find out if the perceived mastery of the ITCs can determine the attained mastery, the two indicating perceived and attained readiness-for-the-job respectively, only completed responses on both dimensions- perceived and attained- were included in this part of the analysis. Meaning, when individual participants responded to the related statement on the Likert scale and to the vignette at the same time, or they responded to the same statement and also suggested competences. Thus, the sample

was reduced to 188 STs for the first part and 190 STs for the second part. Participants were grouped into 11 clusters of perceived mastery according to their response to the statement on the Likert scale, at an ascending order where the higher the number, the higher is the perceived mastery level. With reference to Mastery learning standard of 80% (Zimmerman & Dibenedetto, 2008), 8.8 is considered a minimal level of mastery. Next, responses to the open-ended questions were assigned to each cluster, resulting in Tables.5a and 5b. The two tables present student teachers' perceived readiness-for-the-job, along with their attained readiness-for-the-job.

In general, the number of participants across different mastery clusters greatly varied- second column-, resulting in large differences between the responses of each cluster- third column-, however, there is no significant difference between the average response of each cluster- fourth column-. Thus, indicating that perceived mastery does not determine attained mastery.

Table 5a. presents the responses to the standardised case at every cluster of perceived mastery

Clusters of mastery of 11ITCs	Total STs per Mastery level	Total ITCs per Mastery level	ITCs/ST (Row average)
1	3	9	3
2	4	10	2.5
3	3	7	2.4
4	7	18	2.6
5	12	23	1.9
6	8	22	2.8
7	16	42	2.6
8	21	51	2.4
9	22	55	2.5
10	33	71	2.2
11	61	143	2.3
Mean	*17.27*	*41*	*2.473*
SD			*.293*

Table 5b. presents the responses to the question on suggesting teacher competences at every cluster of perceived mastery

Clusters of mastery of 11ITCs	Total STs per Mastery level	Total ITCs per Mastery level	ITCs/ST (Row average)
1	3	4	1.4
2	3	4	2
3	3	10	3.4
4	8	17	2.1
5	10	28	2.8
6	8	16	2
7	16	43	2.7
8	22	48	2.2
9	22	48	2.2
10	34	69	2
11	59	123	2.1
Mean	*17.09*	*37.27*	*2.264*
SD			*.527*

In the survey given to student teachers, the concept of readiness-for-the-job was explicitly associated with the mastery of the 11 international teacher competences. Students have already been at

placement schools, where they have been observing practices of professional teachers as well as practicing to teach in both public and private schools. Therefore, it is likely that they have acquired enough experience to develop a preliminary picture of real life teaching. Nevertheless, when students were directly asked about their readiness-for-the-job, both on the scale and the "fill-in" sentence, they indicated a relatively "unrealistic" good level of readiness. Unfortunately, this perceived readiness-for-the-job was not equally shown in their actual attainment of the ITCs, although they perceived the competences to be comprehensively employed in their teacher education.

In responding to the standardised case, student teachers were not very successful in transforming their perceived mastery of the ITCs into a meaningful and relevant response. Nearly 20% of their responses were mismatched to the ones embedded in the case, while the majority of students indicated less than half of the correct competences. Moreover, it appears that students have actually indicated the competences that are more related to the context of their own learning experience than to that of the teacher's in the case. Half of the participants overlooked the most explicit competence in the case- "C1. Knowledge of curriculum and subject matter"-. Another half indicated a competence that was partly implicit; "C2. Instructional planning and strategies" as the most relevant competence. Similar results were found in STs' responses in regards to the important competences for every new teacher. Although in many cases students provided some reasonable rationale for the competences they have mentioned, suggesting that there is no or limited randomness in their response, the majority of students provided only two competences. The average response is measured at 2.5, which is far below the minimal mastery level of 8.8. It is noteworthy that a large proportion of these responses centred on 3 competences; "C9. Professional growth and development, "C5. Managing students and learning environment", and "C4. Commitment to promoting the learning of all students". Conversely, as few as only six students found two ITCs important; "C7. Adapt teaching to respond to the strengths and needs of all pupils", and "C8. Effective collaboration with colleagues & partnering with parents, social services & the community". To sum up, student teachers have a basic knowledge of the core teacher competences, though a poor mastery level of these competences, warning that they may not be sufficiently ready-for-the-job. Also, building on students' response to the standardised case, it seems they to need to learn how to think independently to make decisions that fit the needs of different situations, not only those been dealt with during student teaching.

The aforementioned findings, however alarming, yield a number of insightful information and important implications for teacher education. To begin with, the data reflect a clear distinction between student teachers' perceived and attained readiness-for-the-job, suggesting that it is possible to identify-and-bridge the gap between theory and practice, at least within a concise part of teaching. Furthermore, it seems that the huge emphasis on the practical aspects of teacher education, which is seen in many teaching programmes nowadays, has led student teachers to perceive the pedagogy of teaching certain subjects less crucial or at best, of secondary importance to the practical parts of the job. However, it is critical that new teachers know what they are teaching, beside knowing how to teach it.

Acknowledgements

References

(CEPPE), C. o. S. f. P. a. P. i. E. (2013). Learning Standards, Teaching Standards and Standards for School Principals: A comparative study *OECD Education Working Papers* (Vol. 99).

(NCATE). (2008). *Professional Standards for the Accreditation of Teacher Preparation Institutions*. 2010 Massachusetts Avenue, NW, Washington, DC: National Council for Accreditation of Teacher Education.

Brouwer, N., & Korthagen, F. (2005). Can Teacher Education Make a Difference? *American Educational Research Journal, 42*(1), 153-224.

Cochran-Smith, M. (2005). The New Teacher Education: For Better or for Worse? *Educational Researcher, 34*(7), 3-17. doi: 10.3102/0013189x034007003

. Competency Framework for Teachers. (2004). Australia Department of Education and Training.

Darling-Hammond, L., & Hammerness, K. (2005). The Design of Teacher Education Programs *Preparing Teachers for a Changing World: What Teachers Should Learn and Be Able to Do*. USA: Jossey Bass.

Day, C. (2010). Teachers in the Twenty-first Century: Time to renew the vision. *Teachers and Teaching, 6*(1), 101-115. doi: 10.1080/135406000114771

Haigh, M., Ell, F., & Mackisack, V. (2013). Judging teacher candidates' readiness to teach. *Teaching and Teacher Education, 34*, 1-11. doi: 10.1016/j.tate.2013.03.002

Hayes, D. (1997). Teaching competences for qualified primary teacher status in England. *Teacher Development, 1*(2), 165-174. doi: 10.1080/13664539700200015

Korthagen, F. (2010). How teacher education can make a difference. *Journal of Education for Teaching, 36*(4), 407-423. doi: 10.1080/02607476.2010.513854

Korthagen, F. A. J. (2004). In search of the essence of a good teacher: towards a more holistic approach in teacher education. *Teaching and Teacher Education, 20*(1), 77-97. doi: 10.1016/j.tate.2003.10.002

Liston, D., Whitcomb, J., & Borko, H. (2006). Too Little or Too Much: Teacher Preparation and the First Years of Teaching. *Journal of Teacher Education, 57*(4), 351-358. doi: 10.1177/0022487106291976

Living the Standards. (2007). from https://www.oct.ca/common/search-results?searchStr=living%20the%20standards

Markowitsch, J., & Plaimauer, C. (2009). Descriptors for competence: towards an international standard classification for skills and competences. *Journal of European Industrial Training, 33*(8-9), 817-837. doi: 10.1108/03090590910993652

Mayer, D. (2009). *Trends in professional education programs for teachers: Navigating in educational contexts: identities and cultures in dialogue*. Paper presented at the ISATT 2009, Finland.

Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis: an expanded sourcebook* (2nd ed.). London, UK: Sage.

O'Reilly, D., Cunningham, L., & Lester, S. (2013). *Developing the Capable Practitioner: Professional Capability Through Higher Education*. London UK: Routledge.

O'Neill, S., & Stephenson, J. (2012). Does classroom management coursework influence pre-service teachers' perceived preparedness or confidence? *Teaching and Teacher Education, 28*(8), 1131-1143. doi: 10.1016/j.tate.2012.06.008

OECD. (2004). *OECD Handbook for Internationally Comparative Education Statistics: Concepts, Standards, Definitions and Classifications*: OECD publishing.

OECD. (2013). Education at a Glance 2013: OECD indicators.

Ronfeldt, M., & Reininger, M. (2012). More or better student teaching? *Teaching and Teacher Education, 28*(8), 1091-1106. doi: 10.1016/j.tate.2012.06.003

Rots, I., Kelchtermans, G., & Aelterman, A. (2012). Learning (not) to become a teacher: A qualitative analysis of the job entrance issue. *Teaching and Teacher Education, 28*(1), 1-10. doi: 10.1016/j.tate.2011.08.008

. Supporting the Teaching Professions for Better Learning Outcomes. (2012): EUROPEAN COMMISSION.

Swabey, K., Castleton, G., & Penny, D. (2010). Meeting the standards? Exploring preparedness for teaching. *Australian Journal of Teacher Education, 35*, 29-46.

Tait, M. (2008). Resilience as a Contributor to Novice Teacher Success, Commitment, and Retention. *Teacher Education Quarterly, Fall 2008*, 57-75.

Tatto, M. T., Schwille, J., Senk, S. L., Ingvarson, L., Rowley, G., Peck, R., . . . Reckase, M. (2012). *Policy, Practice, and Readiness to Teach Primary and Secondary Mathematics in 17 Countries: Findings from the IEA Teacher Education and Development Study in Mathematics (TEDS-M)*. Amsterdam: International Association for the Evaluation of Educational Achievement (IEA).

Tigelaar, D. E. H., Dolmans, D. H. J. M., Wolfhagen, I. H. A. P., & Vleuten, C. P. M. V. D. (2004). The development and validation of a framework for teaching competencies in higher education. *Higher Education, 48*, 253–268.

UNESCO. (2015). Strategy on standard-setting instruments in the field of education.

Walther, J., & Radcliffe, D. (2007). The competence dilemma in engineering education: Moving beyond simple graduate attribute mapping. *Australasian Association of Engineering Education, 13*(1).

Winterton, J., Deist, F. D.-L., & Stringfellow, E. (2006). *Typology of Knowledge, Skills and Comeptences: clarification of the concept and prototype* (S. Burkart Ed.). Office for Official Publications of the European Communities, Luxembourg: Cedefop.

Zeichner, K. (2002). Beyond Traditional Structures of Student Teaching. *Teacher Education Quarterly*, 59-64.

Zimmerman, B. J., & Dibenedetto, M. K. (2008). Mastery learning and assessment: Implications for students and teachers in an era of high-stakes testing. *Psychology in the Schools, 45*(3), 206-216. doi: 10.1002/pits.20291

Appendices

Appendix 1. Representation of individual TCs frameworks of the sampled 10 contexts

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
Japan	*		*			*	*	*	*	*	*
Singapore	*		*	*	*			*	*	*	*
Australia	*	*		*	*	*		*	*		
Oman	*	*	*	*	*	*	*	*	*	*	*
Jordan	*	*	*		*		*	*	*	*	*
Egypt		*	*	*	*	*	*		*		*
Turkey	*	*		*				*	*	*	*
EU	*	*	*	*	*	*	*	*	*		*
UK	*	*		*	*	*	*	*	*		*
USA	*			*	*			*	*	*	

Appendix 2. The ITCs framework used in surveying the study sample

Student teachers survey (2)

Student teachers' perception of teaching competences; significance to teaching, compatibility and mastery

Please indicate your level of agreement to every statement in relevance to teaching competences that are displayed at the most left column by choosing a number from 1 to 5. TE refers to teacher education.

1 - Strongly disagree, 2 - Disagree, 3 - Neither agree or disagree, 4 - Agree, 5 - Strongly agree

	I'm being trained to master this					This is dealt with in theory as part of TE					This is dealt with in practice as part of TE					Teacher educators model this during TE activities					I feel confident mastering this in professional teaching setting				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
1. Knowledge of curriculum and subject matter	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
2. Instructional planning and strategies	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
3. Effective use of teaching materials and technologies in facilitating students learning	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
4. Commitment to promoting the learning of all students	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
5. Managing students and learning environment	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
6. Knowledge of diverse students, including special needs, and how they learn	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
7. Adapt teaching to respond to the strengths and needs of all pupils	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
8. Effective collaboration with colleagues and partnering with parents, social services and the community	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
9. Professional growth and development	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
10. Willingness to try new ideas and strategies	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O
11. Exercising personal integrity and legal responsibilities	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O	O