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### Teacher identity and professional identity tensions among primary student teachers

*A focus on theory, measurement, and longitudinal associations*

Hanna, F.

**Publication date**

2020

**Document Version**

Other version

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**Citation for published version (APA):**

Hanna, F. (2020). *Teacher identity and professional identity tensions among primary student teachers: A focus on theory, measurement, and longitudinal associations*.

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# DOMAINS OF TEACHER IDENTITY: A REVIEW OF QUANTITATIVE MEASUREMENT INSTRUMENTS

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## CHAPTER II

This study provides an overview of components of teacher identity that are found in quantitative measurement instruments; and reports on the psychometric quality of these measurement instruments. Our search included studies that assessed components of teacher identity published in English-written, peer-reviewed journals between 2000 and 2018. We analyzed a total of 59 components in 20 studies. After we categorized the components on the basis of a substantive analysis, six main domains of teacher identity became apparent: Self-image, Motivation, Commitment, Self-efficacy, Task perception, and Job satisfaction. Whereas the overall psychometric properties of the measurement instruments used in the different studies were acceptable to good, our systematic overview revealed several conceptual and methodological issues that need to be resolved. The results may contribute to the further operationalization of the complex construct of teacher identity.

## INTRODUCTION

MANY STUDIES have highlighted the importance of supporting the development of teacher identity (e.g., Beauchamp & Thomas, 2009; Beijaard, 2009; Bullough & Baughman, 1997; Korthagen, 2001; Mayer, 1999; Nias, 2002; Olsen, 2008; Wideen, Mayer-Smith, & Moon, 1998). Evidence shows that a strong and stable professional identity is positively related not only to emotional well-being (Zembylas, 2013) but also to the quality of teaching in the classroom (Agee, 2004; Beijaard, 2009). A well-developed professional identity can also improve teachers' confidence in their decision to work in education, and also their commitment to the profession (Rots, Aelterman, Devos, & Vlerick 2010).

Reviews on teacher identity show that most research on the subject has been conducted in secondary education with student teachers, teachers starting their career, or experienced teachers (Beauchamp & Thomas, 2009; Beijaard, Meijer, & Verloop, 2004; Izadinia, 2013); and that teachers' identity has thus been related to context variables such as the subject in which the class is given (such as math, science, and history), or school and student characteristics (Gleeson, O'Flaherty, Galvin, & Hennessy, 2015; März & Kelchtermans, 2013). Most studies can also be characterized as either theoretical (e.g., Korthagen, 2004; Rodgers & Scott, 2008) or qualitative (e.g., Hamman, Coward, Johnson, Lambert, Zhou, & Indiatsi, 2013; Walkington, 2005). The qualitative studies have used various methodologies such as drawings (e.g., Beltman, Glass, Dinham, Chalk, & Nguyen, 2015; Runhaar, Gulikers, & Hendricks, 2016); interviews (e.g., Lee, 2013; Xu, 2013); observations (e.g., Gao, 2012); and document analysis (e.g., Anspal, Eisenschmidt, & Löffström, 2012; Darby, 2008).

Very little quantitative research has operationalized and measured the construct of teacher identity (cf. Avraamidou, 2014; Beauchamp & Thomas, 2009; Beijaard et al., 2004; Izadinia, 2013; Izadinia, 2014; van Lankveld, Schoonenboom, Volman, Croiset, & Beishuizen, 2017). Whereas this lack has been attributed to a conviction (e.g., Kelchtermans, 2009; Lortie, 1975; Nias, 2002) that quantitative methods are unproductive and do not interfere with the narrative, hybrid, and various characteristics of teacher identity (development), a more plausible cause may lie in the absence of an instrument for measuring teacher identity (Avraamidou, 2014; Izadinia, 2013; Izadinia, 2014). This would explain the increasing advocacy for research into the development, testing, and validation of such an instrument (e.g., Avraamidou, 2014; Beijaard, Verloop, & Vermunt, 2000; Canrinus et al., 2011; Hasinoff & Mandzuk, 2005; Li, 2016). If a quantitative instrument existed, it would support the testing

and further elaboration of developmental models obtained on the basis of qualitative data, such as that described by Nias (2002). Repeated quantitative measurements, for example, can be used in large-scale studies to reveal patterns in teacher-identity development in relation to various independent variables (Avraamidou, 2014; Li, 2016, Rodgers & Scott, 2008). Ultimately, a more empirical understanding of the developmental process of teacher identity is important to the provision of more personalized support not only to student teachers and those starting their career, but also to experienced teachers (Nias, 2002; Susam, 2014; Vloet, 2015).

Although some reviews have examined teacher identity (Avraamidou, 2014; Beauchamp & Thomas, 2009; Beijaard et al., 2004; Carrillo & Flores, 2017; Izadinia, 2013; Izadinia, 2014; Martin & Strom, 2016; Swennen, Jones, & Volman, 2010; van Lankveld et al., 2017), there has been no systematic review on instruments to measure teacher identity. Existing reviews have focused on student teachers (Izadinia, 2013); university teachers (van Lankveld et al., 2017); veteran teachers (Carrillo & Flores, 2017); teacher educators (Izadinia, 2014; Swennen et al., 2010); teachers of English learners (Martin & Strom, 2016); teacher identity—or its development—in science teachers (Avraamidou, 2014); the relationship between teacher identity and the “self” (Beauchamp & Thomas, 2009); and specific theoretical issues such as conceptualizations of teachers’ professional identity (Beijaard et al., 2004).

The main objective of this review was to analyze studies that have developed and or modified quantitative instruments for measuring teacher identity. By assessing the content and psychometric quality of these measurements, we hoped to gain insight into the differences and similarities between existing measurement instruments. We trust that our critical overview of these instruments will contribute to future quantitative research into teacher identity and its development. Our review is guided by the following two questions: which components of teacher identity are operationalized and measured, and, what are the psychometric properties of the measurement instruments available?

## METHOD

To comprehensively identify and analyze quantitative instruments of teacher identity, we followed four steps of systematic review (cf. Cronin, Ryan, & Coughlan, 2008; Moher, Liberati, Tetzlaff, & Altman 2009).

## LITERATURE SEARCH

Table 1 lists the inclusion and exclusion criteria. Because Beijaard et al.'s (2004) review literature between 1988 and 2000 did not produce relevant research for this study, we restricted our search to empirical studies conducted from 2000 onwards. We only selected studies that explicitly have indicated that, for instance, self-efficacy is considered a construct of teacher identity or that teacher identity is operationalized in terms of self-efficacy. Following the search advice of Cronin et al. (2008), we then formulated different keywords with the same meaning: "teacher identity" \* instrument; "teacher identity" \* measure; "teacher identity" \* scale; "teacher identity" \* quantitative; and "teacher identity" \* questionnaire. The extension of professional to "teacher identity" did not result in other or extra hits (Izadinia, 2014).

We searched the following electronic databases: ERIC institute of Education Sciences, PsycINFO, ScienceDirect, and Google Scholar. In the first three, the search was limited to English peer-reviewed studies. In Google Scholar, the search was limited by selecting an option that commands to search studies that at least contain "teacher identity" in the title.

TABLE 1. *Inclusion and exclusion criteria.*

Inclusion criteria	Exclusion criteria
Publications in English	Non-English publications
Teachers and student teachers	Outside the area of education
Peer-reviewed articles published from 2000 onwards	Conference papers and dissertations
Empirical quantitative and mixed-method studies	Discussions, qualitative and theoretical studies.
Instruments explicitly measuring teacher identity	Self-efficacy, self-image, beliefs, motivation studies
No restrictions on how teacher identity is conceptualized	Open-ended questions

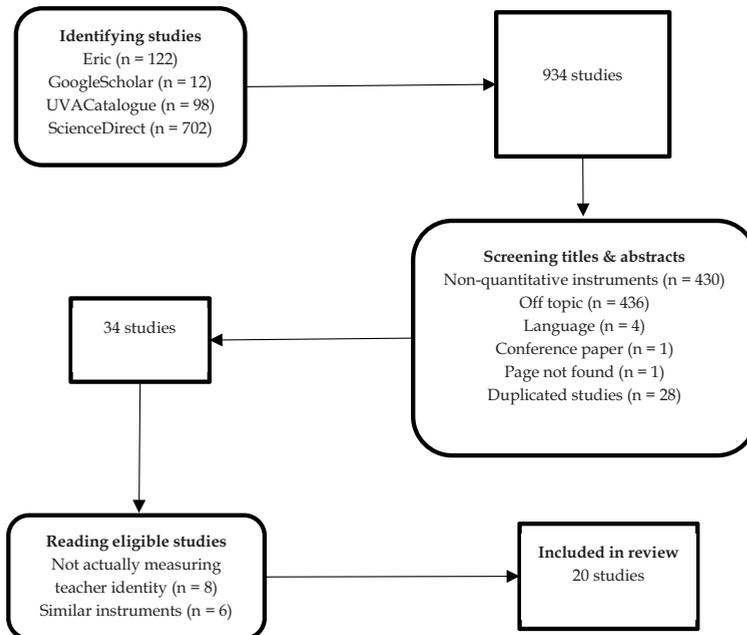
## DATA EVALUATION

Our search was conducted from 6 October 2016 to 10 January 2018 and resulted in 934 studies. After screening the abstracts of these studies on the basis of the inclusion and exclusion criteria, we removed 872 studies for two main reasons: the lack of (a) an exclusive focus on teacher identity, and (b) of any quantitative measurement regarding the components of teacher identity. Most mixed-method studies were removed as they measured teacher identity only qualitatively (e.g., through open-ended questions or interviews). However, we included two mixed-method studies that measured teacher identity quantitatively (Chong & Low, 2009; Fletcher, Mandigo, & Kosnik, 2013). Finally, twenty-eight duplicate copies of studies were excluded. This selection process resulted in the inclusion of 34 studies in our review.

## DATA ANALYSIS

We subjected the data to a qualitative analysis consisting of three steps (cf. Izadinia, 2013; van Lankveld et al., 2017). First, to obtain an understanding of the studies and their instruments, the first author read the full texts. Second, the sections relevant (mainly theoretical framework and methodology) to this study were reread and summarized. Third, the summaries were discussed with the other three authors until consensus was reached on the inclusion of studies. This step led to the removal of another eight studies that did not actually measure domains of teacher identity. For example, we excluded the study conducted by Rus, Tomsa, Rebege, and Apostol (2013); rather than measuring the concept of teacher identity, their instrument explored how teachers describe it.

FIGURE 1. *Flowchart of the selection process.*



These three steps produced 26 studies, 20 of which identified unique instruments for measuring teacher identity, either ones that had been newly developed or modifications of ones that already existed. Given the aim of our review, we decided (a) to focus on the 20 studies that identified unique instruments, and, where necessary, (b) to seek additional information in the nine studies that had used the same instrument (e.g., Arpacı & Bardakci, 2015; Hooge, Honingh, & Langelaan, 2011). Figure 1 shows the flow chart of the selection process. Thereby we adopted the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines (see Moher et al., 2009). Appendix A lists the included studies, providing necessary information on the context, their description of instruments, and the theory used.

## RESULTS

The 20 studies describing unique measurement instruments had been developed in fourteen different countries (see Appendix A), with four in the USA and three in China. Eleven measured the professional identity of student teachers, and nine concentrated on the teacher identity of beginning and experienced teachers. In one study, the measurement focused on the professional identity of faculty members (see Table 2). No single instrument specifically targeted teacher identity of elementary teachers and elementary student teachers. Although the study by Fletcher et al. (2013) involved elementary education, it focused mainly on teachers' identity regarding physical education.

TABLE 2. *Overview of the components of teachers' identity derived from quantitative studies and categorized by domain. Per study, we list the labels and/or sub-labels, the number of items and their scale reliability.*

Domain	Component label	Sub-labels	N of items	$\alpha$	Study
Self-image (9)	Self-related identity		9	.94	Abu-Alruz & Khasawneh (2013)
	Role anticipation		6	.69	Hasinoff & Mandzuk (2005)
	Self-expectation		5	NM	Kao & Lin (2005)
	Teacher identity		17	.87	Friesen & Besley (2013)
	Perception as teacher		5	NM	Isbell (2008)
	Self-perception as teacher		5	NM	Isbell (2008)
	Perception as musician		6	NM	Isbell (2008)
	Global teacher identity		4	.86	Starr et al. (2006)
	Belonging to a group of teachers		4	.88	Starr et al. (2006)

TABLE 2. (Continued)

Domain	Component label	Sub-labels	N of items	$\alpha$	Study
<b>Motivation (7)</b>	Intrinsic interest value		7	.80-.90	Hong (2010)
	Feeling intrinsic satisfaction		4	.81	Starr et al. (2006)
	Receiving rewards for teaching		4	.58	Starr et al. (2006)
	Feeling responsibility to teach		4	.78	Starr et al. (2006)
	Intrinsic value identity		5	.88	Zhang et al. (2016)
	Extrinsic value Identity		5	.78	Zhang et al. (2016)
	Volitional behavior identity		5	.75	Zhang et al. (2016)
<b>Commitment (7)</b>	Work-related identity		5	.91	Abu-Alruz & Khasawneh (2013)
	Occupational commitment	Commitment	10	.83	Canrinus et al. (2011)
		Responsibility	12	.80	
	School issues domain		6	.86	Cheung (2008)
	Role commitment		8	.77	Hasinoff & Mandzuk (2005)
	Commitment	Student teachers	8	.80-.93	Hong (2010)
		Teachers	8	.80-.93	
	Commitment to teaching		10	.72	Lamote & Engels (2010)
Teaching commitment		10	.77	Schepens et al. (2009)	
<b>Self-efficacy (8)</b>	Skill-related identity		5	.89	Abu-Alruz & Khasawneh (2013)
	Student-related identity		7	.92	Abu-Alruz & Khasawneh (2013)
	Classroom and school self-efficacy		21	.92	Canrinus et al. (2011)
	Teachers' self-efficacy		12	.80-.93	Hong (2010)
	Instructional skills and knowledge		4	NM	Kao & Lin (2015)
	Teachers' self-efficacy	Class management	3	.78	Lamote & Engels (2010)
		Teaching skills	6	.69	
	Teacher efficacy		12	.78	Schepens et al. (2009)
Knowledge and skill about teaching		4	.62	Starr et al. (2006)	
<b>Task perception (11)</b>	Subject matter experts		5	.62	Beijaard et al. (2000)
	Didactical experts		6	.58	Beijaard et al. (2000)
	Pedagogical experts		6	.68	Beijaard et al. (2000)
	How I feel about teaching		44	NM	Chong & Low (2009)
	Identity for teaching PE		4	.81	Fletcher et al. (2013)
	Teachers' duties		3	NM	Kao & Lin (2015)
	pedagogy		4	NM	Kao & Lin (2015)
	Task orientation; educational	Personal and social career development	6	.73	Lamote & Engels (2010)
			4	.79	
	Task orientation; pedagogical	Discipline	4	.63	Lamote & Engels (2010)
		Involvement	3	.66	
Task orientation; instructional	Emphasis process	4	.60	Lamote & Engels (2010)	
	Emphasis product	3	.31		

TABLE 2. (Continued)

Domain	Component label	Sub-labels	N of items	$\alpha$	Study
<b>Task perception</b> (11)	Professional orientation	In-service learning cooperation	6	.62	Lamote & Engels (2010)
	Professional orientation		6	.65	
	Believing that being a doctor means being a teacher		12	.72	Schepens et al. (2009)
			4	.51	Starr et al. (2006)
<b>Job satisfaction</b> (2)	Job satisfaction	Job satisfaction	22	.89	Canrinus et al. (2011)
		Salary satisfaction	6	.81	
	Emotions		14	.80-.93	Hong (2010)
<b>Unknown</b> (15)	[Unclear]		48	.89	Alaee (2015)
	Student needs domain		7	.89	Cheung (2008)
	Personal growth and development		6	.83	Cheung (2008)
	Sense of professional identity		4	.65	Chong et al. (2011)
	Micropolitics		16	.80-.93	Hong (2010)
	External influential factors		3	NM	Kao & Lin (2015)
	Citizenship behavior		3	NM	Kao & Lin (2015)
	The sense of the role		6	.72-.86	Lei et al. (2012)
	The behavioral tendency		5	.72-.86	Lei et al. (2012)
	Occupational values		4	.72-.86	Lei et al. (2012)
	Sense of belonging		3	.72-.86	Lei et al. (2012)
	[Unclear]		8	NM	Masoumpanah & Zarei (2014)
	Teachers' professional identity		25	.85	Guangwen & Shuhua (2007)
	Desired outcomes		5	.76	Starr et al. (2006)
	Sharing clinical expertise		4	.61	Starr et al. (2006)

Note.  $\alpha$  = coefficient alpha; NM = not mentioned.

The 20 instruments were used in studies with group sizes ranging from 47 to 1214. The number of items per instrument ranged from 4 to 99. Thirteen of the 20 instruments used a 5-point Likert scale, usually ranging from "strongly agree" to "strongly disagree". Data collected with the 20 instruments were subjected to various types of statistical analysis: analysis of variance (8), correlational analysis (5), structural equation modelling (2), Rasch analysis (1), regression analysis (1), and analysis of frequency (2). One study did not further specify or discuss the data analysis.

Although five of the 20 studies establish an explicit link between instrument development and an existing theoretical framework, these theoretical frameworks are never used in more than one study (see Appendix A). The theoretical frameworks include Erikson's theory of identity development (Friesen & Besley, 2013); Bourdieu's theory of social capital (Hasinoff & Mandzuk, 2005); and the expectancy-value theory (Zhang, Hawk, Zhang, & Zhao, 2016). Eight other studies acknowledge in a general way that their instrument was influenced by the work of others, two examples being Beijaard et al. (2000), who write that they were "inspired by the work of Bromme" (1991, p. 751); and Lamote and Engels (2010) who state that their thinking is in line with that of Puurula and Löfström (2003). Although three of the seven remaining studies state that their instrument was developed after a general review of

the literature, they do not refer to a specific theoretical framework. Hong (2010), for instance, extracts six domains (emotion, knowledge and beliefs, commitment, value, micro-politics, and efficacy) of teachers' identity by referring to the literature in a general sense without specifying particular frameworks or concepts. Finally, four studies make no reference at all to a theoretical framework; nor do they refer to other publications (e.g., Kao & Lin, 2015).

### CATEGORIZING COMPONENTS IN DOMAINS

Whatever the theoretical angle, 17 of the 20 studies developed an instrument to measure teachers' identity as a multidimensional concept. Most instruments thus comprised several components (also referred to as dimensions, categories, elements or indicators). In total, we analyzed 59 components (see Table 2). Despite the use of various conceptualizations in the 20 studies, we noted that similar or closely related components of teachers' identity had been measured. On the basis of the definition provided, and sometimes of close analysis of items, we categorized all 59 components into six inductively-derived domains: Self-image, Motivation, Commitment, Self-efficacy, Task perception, and Job satisfaction. The labels of these domains are derived from common descriptions of components or items in a particular domain in the reviewed studies. For instance, Self-Image as a label name is extracted on the basis of items from that domain. This categorization of components—for which different studies had used different labels—eventually resulted in a general overview (see Table 2).

As the instruments used focused on various components of teacher identity, we allocated some of the studies listed in Table 2 to more than one domain. For instance, Hong (2010) measures components labeled as Motivation, Commitment, Emotion, Micropolitics, and Self-efficacy. Hong's study is thus listed under the various domains in which a particular component is categorized.

Five studies made a further distinction by using sub-labels within certain components. For example, the occupational commitment component discussed in Canrinus et al. (2011) consisted of two subscales, which were labeled occupational commitment and occupational responsibility.

Despite thorough substantive analysis of the definition given or the items used, 15 components could not be assigned to a particular domain. These were designated as "unknown". For instance, Lei et al. (2012) refer to the Chinese-language version of Wei's teachers' professional identity questionnaire (2008), without further explanation and without providing exemplary items in English. Although items were available in three studies (Cheung, 2008; Hong, 2010; Starr et al., 2006), close analysis did not reveal which component

of teacher identity they may belong to. For instance, Cheung (2008) measures the component of personal growth and development by including items such as “Believe all students can learn”, “Commit and dedicate to the profession” and “Collaborate, share and have team spirit” (p. 381). Given these different operationalizations (beliefs, commitment, and collaboration), it was not possible to assign these components to a particular domain of teacher identity. The analysis below does not therefore include the components labeled as “unknown”.

### ANALYSIS OF COMPONENTS WITHIN DOMAINS

In this section, the results of a substantive analysis are given of the way components are conceptualized and operationalized in studies. It also explains how we classified components in the domains in question (see Table 2).

#### SELF-IMAGE

Components in the Self-image domain are conceptualized in the following terms of how and in what way do individuals view and feel as teachers. Nine different components were assigned to this domain on the basis of given definitions, such as that for “role anticipation,” which is defined (cf. Hasinoff & Mandzuk, 2005) as a scale that was developed to measure the degree to which students identify with the role of a teacher. Other components were allocated to this domain on the basis of item analyses. For instance, “global teacher identity” (Friesen & Besley, 2005) is not defined in the study by Starr et al. (2006), but is operationalized with items such as, “I see myself as a teacher” (p. 119). For the same reason, “teacher identity” was added to this domain, as it was operationalized with items, for instance “I feel comfortable identifying myself as a teacher” and “I can see myself working with children, helping them to learn and to develop” (Friesen & Besley, 2013, p. 26).

Two of the six studies in this domain (Hasinoff & Mandzuk, 2005; Isbell, 2008) use a sociological theoretical framework as a basis for conceptualizing the domain. Their focus lies on the importance of interactions and context during the process of becoming a teacher. For instance, Isbell (2008) uses symbolic interactionism to explain the relationship between teachers and significant-other actors (for example parents and mentors), and also to explain the ways in which a teacher’s self-image and identity are constructed. This theory results in a three-component conceptualization of how teachers view themselves and how they are viewed by others.

To underpin their conceptualization of teachers' self-image as a component of teacher identity, the four other studies in this category do not refer to a theoretical framework. Whereas Starr et al. (2006) derive the two components of self-image from Delphi conversations, Abu-Alruz and Khasawneh (2013), Friesen and Besley (2005), and Kao and Lin (2015) all derive their components from a literature review, without mentioning whether or how interactions and/or social context are involved in the development of teachers' self-image.

#### MOTIVATION

This domain contains components conceptualized as the motivation to be or to become a teacher (cf. Watt & Richardson, 2007). Three studies identify seven comparable conceptualizations, two use three components to conceptualize teachers' motivation, and one (Hong, 2010) uses one.

We assigned four components to this domain on the basis of a given definition. For example, Zhang et al. (2016) understand—"volitional behavior identity"—as "teachers behavioral engagement and willingness to join the profession" (p. 4) and "intrinsic value identity" as "how individuals feel about teaching" (p. 4). We categorized three components on the basis of item analyses. The component "Feeling intrinsic satisfaction" (Starr et al., 2006) is operationalized in various ways, including the use of items such as "Teaching makes my job more rewarding" (p. 119).

Of the three studies, Zhang et al. (2016) discuss a theoretical framework. This combines the identity-based motivation of Oyserman (2009) with the possible-selves theory (Hamman et al., 2010) to justify the three underlying motivational components as part of teachers' identity. Whereas identity-based motivation argues that the motivation for becoming a teacher results from the desire to become one, the possible-selves theory suggests that the degree of motivation to become a teacher depends on the extent to which a person imagines being a teacher in the near future. The two other studies do not refer to a specific framework. Hong (2010) refers in a general sense to a literature review; Starr et al. (2006) used Delphi conversations.

#### COMMITMENT

In this domain, we listed components of teacher identity conceptualized in terms of commitment and/or dedication to becoming a teacher. Seven similar conceptualizations were found in seven studies (see Table 2). For instance, Abu-Alruz and Khasawneh (2013)

operationalize “work-related identity” with item questions focusing on teachers’ commitment, such as “I am committed and dedicated to the profession” (p. 435) and “I am committed to the university’s mission, vision and goals” (p. 435). To operationalize teachers’ commitment, five of the seven studies use and/or modify a validated questionnaire. Schepens et al. (2009) and Lamote and Engels (2010) both adopt a 10-item questionnaire developed by Van Huizen (2000) that measures the affective side of commitment in items such as “as a teacher one has a key role in society” (Lamote & Engels, 2010, p. 10).

Canninus et al. (2011) operationalize commitment slightly differently, commitment consisting not only of the affective part, but also of continuance and normative parts. They use an 18-item questionnaire developed by Meyer, Allen, and Smith (1993), in which an item question on affective commitment is “I’m proud to be in the teaching profession” (p. 122) and a normative commitment is “I do not feel any obligation to remain in the teaching profession” (p. 122). Hong (2010) adopts the Vocational Exploration Commitment scale (Blustein, Ellis, & Devenis, 1989) for student teachers and the Work Commitment Index (Blau, Paul, & St. John, 1993) for in-service teachers. Finally, the study by Hasinoff and Mandzuk (2005) modifies item questions from a validated instrument by Jackson (1981). One example of an item question is “I am strongly committed to being a good teacher” (p. 245).

None of the seven studies uses theory to explain why commitment can be seen as a component of teacher identity. Neither do they use theory for further conceptualization. Although two studies (Abu-Alruz & Khasawneh, 2013; Hong, 2010) report that the components were extracted from the literature, neither specifies how the literature was reviewed. Cheung (2008) acknowledges being influenced by the work of Enyedy, Goldberg, and Welsh (2005), but provides no further explanation. Three studies which note their selection of commitment as domain on the basis of previous studies. Two studies (Canninus et al., 2011; Schepens et al., 2009) do not make it clear why the concept of commitment had been selected as an important component of teacher identity.

#### SELF-EFFICACY

This domain is conceptualized as teachers’ belief in their capability to organize and perform their daily teaching activities effectively (Bandura, 1997). On the basis of the definitions provided by the authors of seven studies, we identified eight components that fit into this domain. Six studies use one component to conceptualize self-efficacy; the seventh distinguishes two components (Abu-Alruz & Khasawneh, 2013).

Four of seven studies use validated measurement instruments to assess teachers' self-efficacy. Three (Hong, 2010; Lamote & Engels, 2010; Schepens et al., 2009) use the Teachers' Sense of Efficacy Scale - short form (Tschannen-Moran & Hoy, 2001); and one (Canrinus et al., 2011) retrieves item questions from the Classroom and school context teacher self-efficacy scale (Friedman & Kass, 2002). Two studies (Abu-Alruz & Khasawneh, 2013; Starr et al. 2006) develop new items for measuring self-efficacy, such as "I feel skilled as a teacher of students, and/or residents" (Starr et al., 2006, p. 119). In one study (Kao & Lin, 2015) nothing was stated about how the items were developed.

None of the seven studies makes reference to a theory that explains why self-efficacy is a relevant domain of teacher identity. A literature review in three studies (Abu-Alruz & Khasawneh, 2013; Hong, 2010; Kao & Lin, 2015) leads to the inclusion of self-efficacy; in a fourth (Starr et al., 2006) self-efficacy was added on the basis of Delphi conversations. The remaining three studies do not mention why self-efficacy is considered to be an important domain of teacher identity.

#### TASK PERCEPTION

The task perception domain categorized components that conceptualize beliefs about what a teacher considers to be good teaching (cf. Hermans, van Braak, & van Keer, 2008). Eleven comparable conceptualizations were found in seven studies.

We assigned six of the eleven components to this domain on the basis of the authors' definitions. Chong and Low (2009, p. 65), for instance define their component "How I feel about teaching" as "statements about perceptions/beliefs about the teaching profession." After close item analysis, the other five components were also assigned to this domain. For example, "teachers' duties" (Kao & Lin, 2015, p. 73) is operationalized with items such as "I believe that being responsible for society is one of my professional duties." As it refers to beliefs about education and the "teachers' duties" component, we assigned this item question to task perception.

Among these studies, one study (Fletcher et al., 2013) adopts a theory to explain why teachers' beliefs are part of teacher identity. Although other authors refer to the theory of planned behavior as the underlying framework, they do so without providing any further elaboration. Three studies (Beijaard et al. 2000; Lamote & Engels; Schepens et al., 2009) acknowledge that the thinking of other researchers had influenced the conceptualization of teachers' beliefs, but do not explain how. Starr et al. (2006) conceptualizes teachers' beliefs on the basis of Delphi conversations with experts. Two studies (Chong & Low, 2009; Kao & Lin,

2015) do not specify the framework upon which their assessment of teachers' beliefs is based. Finally, two studies use validated instruments and refer to relevant literature. Lamote and Engels (2010) and Schepens et al. (2009) both operationalize their components by using a 13-item scale developed by Jongmans and Beijaard (1997); the former also includes the "views on education" scale developed by Denessen (1999).

#### JOB SATISFACTION

In this domain of teacher identity, we categorized components conceptualized in terms of how teachers feel about the school or institution they work for. Components that match this conceptualization were found in two studies. The first is Canrinus et al. (2011), who define "job satisfaction" as "attitude based on an evaluation of relevant aspects of the work and work situation" (p. 594), and who use a 22-item questionnaire developed by van der Ploeg and Scholte (2003) containing items such as "in this work, I feel valued by my directors" (p. 598). We added the other component, "emotions", to this domain on the basis of item analysis.

The second study was by Hong (2010), who operationalizes "emotional burnout" with a 14-item questionnaire, the Maslach Burnout Inventory (Maslach & Jackson, 1986). This uses items such as "I feel emotionally drained by my work" to measure the extent to which teachers feel emotionally exhausted (p. 1534).

#### PSYCHOMETRIC PROPERTIES OF MEASUREMENT INSTRUMENTS

We analyzed all 20 studies—as far as possible—on the basis of two criteria adopted from the work of Blalock, Lichtenstein, Owen, Marshall, and Toepperwein (2008). For instance, seven studies reported the percentage of missing data (e.g., Beijaard et al., 2000; Hasinoff & Mandzuk, 2005; Lamote & Engels, 2010; Zhang et al., 2016); and four reported a test of the assumptions necessary for the specific statistical analyses (e.g., Abu-Alruz & Khasawneh, 2013; Alaei, 2015). First, we detected and evaluated the reported reliability of the measurements used, including internal consistency and test-retest. Second, we examined the validity of the instruments.

#### RELIABILITY OF INSTRUMENTS

Our analysis showed that four of the 20 studies reported no information on reliability scores (Guangwen & Shuhua, 2007; Kao & Lin, 2015; Masoumpah & Zarei, 2014). The 16 remaining studies reported reliability scores of their measurements with Cronbach's alpha. Measurements of most components had sufficient reliability scores (see Table 2).

Five of the 16 studies present alpha scores between 0.60 and 0.80, indicating that the reliability ranged between questionable and good (e.g., Chong et al., 2011; Hasinoff & Mandzuk, 2005). Nine of the 16 studies – such as Abu-Alruz and Khasawneh (2013;  $\alpha$  between 0.89 and 0.94) and Friesen and Besley (2013) – even presented measures with good to excellent reliability ( $\alpha > 0.80$ ).

Two studies noted alpha scores lower than 0.60, thus indicating poor reliability. Although Beijaard et al. (2000) reports poor reliability for the “didactical expert” component ( $\alpha = 0.58$ ), other studies that used the instrument of Beijaard et al. report higher reliability scores. For instance, Hooge, Honingh, and Langelaan (2011) report a Cronbach’s alpha score of 0.74 for the same component. Among all these studies, the study by Starr et al. (2006) calculated test-retest reliability scores (between 0.62 and 0.92), by correlating the measures taken from 40 respondents with those taken from 26 respondents two months later.

#### VALIDITY OF INSTRUMENTS

Thirteen studies report information about instrument validity (see Appendix A), nine of them providing information on construct validity (see Table 3). Eight of these nine studies used an explorative factor analysis (EFA). One of these nine studies (Schepens et al., 2009) explored both EFA and confirmatory factor analysis (CFA), but on the same data set.

TABLE 3. *Information on factor analysis reported in studies.*

Study	Type of analysis	Retention method	Rotation method	Factor loadings
Abu-Alruz & Khasawneh (2013)	EFA	KC	O	.61 - .91
Canrinus et al. (2011)	EFA	KC	NM	NM
Cheung (2008)	EFA	KC, SP	V	.55 - .76
Chong et al. (2011)	EFA	KC	V	NM
Friesen & Besley (2013)	EFA	SP	NM	.39 - .72
Hasinoff & Mandzuk (2005)	EFA	KC, SP	O	.53 - .72
Isbell (2008)	EFA	KC	P	.43 - .91
Lamote & Engels (2010)	EFA	KC, SP	NM	NM
Schepens et al. (2009)	EFA/CFA	KC	NM	NM

*Note.* EFA = explorative factor analysis; CFA = confirmatory factor analysis; KC = Kaiser Criterion; SP = Scree plot; O = Oblique; V = Varimax; P = Promax; NM = no information available.

Table 3 also shows that two studies use a varimax rotation method (Cheung, 2008; Chong et al., 2011) and two an oblimin rotation method. In the same nine studies, the Kaiser eigenvalue criteria and/or scree test function as a way of retaining factors. Five studies report factor loadings, two of them providing tables with significant and non-significant factor

loadings (e.g., Isbell, 2008). All nine studies determine the significance of factor loadings by the rule of thumb that loadings must be greater than 0.30. In most cases, the loadings range from 0.39 to 0.91. These moderate to high loadings suggest that items provide a moderate to strong contribution to the underlying construct. Four studies do not report any factor loadings (e.g., Canrinus et al., 2011; Lamote & Engels, 2010). The one study that also conducted a CFA (Schepens et al., 2009) presents model-fit indices (RMSEA, GFI, CFI, and the Chi-Squared test), designating a good fit.

Information on face and content validity are provided in five of the 21 studies (Abu-Alruz & Khasawneh, 2013; Cheung, 2008; Isbell, 2008; Guangwen & Shuhua, 2007; Starr et al., 2006). For instance, Abu-Alruz and Khasawneh (2013) stated that experts were consulted to assess face and content validity. However, none of these authors state how the input of experts added to the validation process. One of the five studies (Starr et al., 2006) described in detail how they developed their measurement instruments (i.e., by conducting a Delphi method, cognitive interviews and focus groups).

## DISCUSSION

To the best of our knowledge, this review is the first to provide an overview of studies that have quantitatively measured the construct of teacher identity. To do so, we identified which components of teacher identity were used by researchers, and categorized the components in six inductively-derived domains. We also analyzed the reliability and validity of the measurement instruments.

In this section, we discuss the findings that emerged in response to our two research questions: which components of teacher identity are operationalized and measured, and, what is the psychometric quality of the measurement instruments available?

### DOMAINS OF TEACHER IDENTITY

The vast majority of the studies we reviewed adopted instruments that measure various components of teacher identity. Different studies had labeled the same components differently; after close inspection, we were able to categorize them under six domains—Self-image, Motivation, Commitment, Self-efficacy, Task perception, and Job satisfaction—that can be seen as important and relevant demarcations of teacher identity. Breaking teacher identity into various domains is in accordance with the idea that, as a construct, teacher identity is multidimensional and inherently complex (Beauchamp & Thomas, 2009). It also shows that

teacher identity cannot simply be perceived directly (Carrinus et al., 2011; Schepens et al., 2009), but must be measured from a broad perspective.

To some degree, the domains of teacher identity we identified seem to be consistent with findings in previous review studies. To take three examples, Motivation (e.g., Carrillo & Flores, 2017), Self-efficacy (van Lankveld et al., 2017), and Self-image (e.g., Avraamidou, 2014) have been indicated to be important domains of teacher identity. Our findings also seem to be consistent with qualitative research in teacher education, such as that on the self-understanding model of Kelchtermans (2009), which discusses and labels five different categories of teacher identity, some of which correspond to the domains we categorized above.

At the same time, there are discrepancies in the conceptualization of teacher identity between our findings and those of previous reviews (e.g., Beijaard et al., 2004; Izadinia, 2014) and those of qualitative research (cf. Kelchtermans, 1994; Lortie, 1975; Nias, 2002). An obvious reason for these discrepancies involves the various periods in which teacher identity has been defined and the paradigms that have pertained at different times. Like previous reviews—such as those by Beauchamp and Thomas (2009) and Beijaard et al., (2004)—our review shows that teacher identity is not a fixed construct. In the late 1980s, for example, researchers did not see commitment as a component of teacher identity (Kelchtermans, 1994; Nias, 2002). But since the leading publication by Hasinoff and Mandzuk (2005), it has generally been viewed as relevant, even though a clear relation between commitment and teacher identity has not been found in the reviewed studies.

Whereas our review also reveals that some domains of teacher identity have been operationalized across studies more than others, we should not interpret this as meaning that certain domains are more important or relevant than others. One reason a particular domain is chosen over another may lie in the availability of a certain measurement instrument. In our research field, for instance, commitment has been well assessed, and over the years many psychometrically sound instruments have been developed. Even though the relevance of the underlying construct can be questioned (cf. Kelchtermans, 1994; Nias, 2002), it is therefore unsurprising that researchers have preferred to use such validated instruments.

## PSYCHOMETRIC PROPERTIES OF MEASURES

Overall, the studies we reviewed varied considerably according to their description of the psychometric properties of the measurement instruments. Most studies provided information on reliability and validity criteria. With a few exceptions, the reliability scores of the measures

they reported were acceptable to good. Remarkably, however, components categorized in the domain of Task perception were more often measured by scales with low reliability. A close analysis of number of items, type of instrument and sample size of the concerned studies did not provide an overall explanation. However, it may be that researchers lacked a suitable and highly reliable measure for this domain and therefore may have produced scores that are less precise reflections of respondents' true score of task perception. For instance, Lamote and Engels (2010) used Denessens' instrument (1999) that initially was developed to measure general educational beliefs among ordinary people and consisted of scales with reliabilities ranging between 0.60 and 0.80.

With regard to the criteria for validity, almost all studies relied mainly on exploratory factor analysis (EFA). In this respect, four methodological issues seem particularly relevant. The first is that the number of underlying factors of teacher identity may have been overestimated, as none of the studies used the more accurate parallel analysis (PA) to retain the number of factors (Ledesma & Valero-Mora, 2007). The second is that most of the reviewed studies determined the significance of factor loadings without taking account of sample size. This may have led the wrong number of factor loadings to be interpreted (Stevens, 2012). A third methodological issue is that most instruments are validated and used in isolated studies. More specifically, each study reviewed used different instruments to measure various components of teacher identity. As the reliability and validity of measures also depend on the characteristics of the samples used (Stevens, 2012), the replicability and application of these measures may be limited. If longitudinal research is used to explore the relationships between patterns of teacher identity development and various independent variables, it is especially important to design and validate measurement instruments whose results can be generalized across teaching contexts and the career stages through which teachers pass (Avraamidou, 2014; Li, 2016, Rodgers & Scott, 2008). As stated above, such longitudinal research can contribute to a better underpinned understanding of the developmental process of teacher identity (Nias, 2002; Susam, 2014; Vloet, 2015). The ultimate importance of such understanding is that it makes it possible to provide more personalized support, not only for student teachers but also for beginning or even experienced ones.

A final methodological comment concerns the observation that none of the studies we reviewed seemed to have taken a systematic approach to developing instruments, even though this is a highly recommended procedure, even for slightly modifying questionnaires (Connelly, 2008). Following such procedural guidelines is regarded as an important step to optimizing an instrument's psychometric properties (Collins, 2003; DeVon et al., 2007;

Fonseca, Costa, Lencastre, & Tavares, 2013). We attribute this absence of an extensive description of the development, validation, and piloting process to most studies' lack of focus on developing an instrument. This lack of rigor may have been due to the fact that the main focus of the studies we reviewed lay on measuring the construct of teacher identity and linking it to other concepts.

#### IMPLICATIONS FOR FUTURE RESEARCH

Our findings raise several implications for educational researchers and practitioners. Due to a large number of measures and the multitude of operationalizations and labels, it is difficult to get a firm grasp on the construct of teacher identity. As each study seemed to focus on slightly different components of teacher identity, it is hard to compare and make proper distinctions. Together with the sometimes questionable psychometric quality of the measurement instruments, this may impede the development of the research area.

Despite this, however, the domains of teacher identity we categorized provide a useful basis for future research into the assessment and development of teacher identity. For example, drawing on identity theory (e.g., Burke & Stets, 2009), each domain may function as a *set of meanings* that represent a part of what teacher identity might be and therefore each domain has the potential to guide—positively or negatively—teacher behavior. Whether these domains are theoretically and empirically relevant for teacher identity should be investigated in future research. For instance, researchers could apply factor analysis and acknowledged methods for scale development to examine the construct validity of these domains collectively (e.g., Collins, 2003; DeVon et al., 2007; Fonseca, Costa, Lencastre, & Tavares, 2013). Exploring the relevance of the domains can especially contribute to the development of a psychometrically sound measurement instrument that systematically covers the different domains of teacher identity.

As this would enable researchers to interpret results more precisely, it would also help researchers and teacher educators to improve their understanding of how domains of teacher identity develop. Better understanding the development of teacher identity is a precondition for elaborating educational policies and providing additional support to students and their teachers.

None of the studies we reviewed simultaneously measured and evaluated all six domains (Self-image, Motivation, Commitment, Self-efficacy, Task perception, and Job satisfaction). So far the study by Canrinus, Helms-Lorenz, Beijaard, Buitink, and Hofman (2012) came close to examining these mutual relationships. Whereas they examined the

relevance of job satisfaction, occupational commitment, self-efficacy and change in the level of motivation to teachers' identity, they did so—like Schepens et al. (2009)—using PCA and confirmatory factor analysis (CFA) on the same data set. Although it is attractive to subject a data set first to an EFA/PCA and to use the same data set for other analysis, such as structural equation modelling (SEM), it is well known that this “recycling approach” (Matsunaga, 2010, p. 101) capitalizes on chance. If similar factor structures are obtained across different data samples, it thus provides stronger evidence for supporting the solution extracted (Matsunaga, 2010).

In relation to the above, an important question for future research concerns the question of whether the various domains are actually separate constructs of teacher identity. And, in the same connection, it is also the question whether other domains can be distinguished besides the six we have identified here, which were distinguished inductively solely on the basis of quantitative studies. Of course, other important domains may have been excluded from the quantitative studies we reviewed, as no good tools were available yet, or because it proved difficult to develop valid and reliable measures. Another possibility is that certain domains may not yet have received any attention in quantitative research as they have not yet been distinguished or defined.

A specific problem that has been identified in this review concerns the way a particular domain is measured. More specifically, our findings show that the various studies sometimes used different instruments and/or items to measure corresponding components within a domain. When developing a psychometrically sound measurement instrument that systematically covers the various domains of teacher identity, it is not easy to choose from all the options and items available, especially because a further theoretical distinction can be made in dimensions within a domain. For instance, Table 2 makes it apparent that, within studies, different components of self-efficacy are measured (e.g., Lamote & Engels, 2010), all of which can be captured under the same domain, but that various dimensions can be discriminated when comparing them at an item level. When selecting domains and dimensions within domains, researchers must determine the extent to which they are theoretically and empirically relevant to explaining outcomes such as teachers' wellbeing (Spilt, Koomen, Thijs, & van der Leij, 2011), agency (Heikonen, Pietarinen, Pyhältö, Toom, & Soini, 2016), or professional identity tensions that may mark the beginning of a vicious cycle of stress and burnout that could eventually lead teachers to leave the profession (Pillen et al., 2013).

For teacher education programs, the results of this study provide a list of six main domains of teacher identity, which can be used as a checklist for the assessment of student teachers' professional development. Moreover, the list may also be used as a guideline for designing course content that stimulates teacher identity development. Additionally, teacher educators can use this list as a tool to guide conversations and reflective writing assignments with and among student teachers. A good example of using this list of domains is by explicitly concentrating on questions that tackle issues such as the motivation to become a teacher and to what extent a student teacher views oneself as a teacher as well. Previous studies advocate that doing so stimulates student teachers' professional identity development (e.g., Bullough & Baughman, 1997; Friesen & Besley, 2013).

### LIMITATIONS

Our findings should be interpreted in the context of three main limitations. First, there is a risk that we overlooked studies or failed to acknowledge their relevance. This may have been the case with studies that did not meet the inclusion and exclusion criteria, or it may have been due to search engines' unique algorithms and ranking strategies.

Second, it is possible that our inductive approach unconsciously influenced the ways in which the components were interpreted and categorized. For instance, for the purpose of conceptual parsimony in this review, the motivation to become a teacher consists of both motivation and antecedents of motivation (e.g., future time perspective; cf. Peetsma, 2000). If we had chosen a deductive approach—on the basis of the self-understanding model of Kelchtermans (2009), for example—we may have been led to a slightly different categorization.

Finally, despite having taken great care to sort components systematically into domains on the basis of given definitions and/or item analysis, we should acknowledge the risk of interpretation bias. Although we sought consensus on categorization through discussion, this strategy may also have produced bias effects, such as personality traits and seniority.

### CONCLUSION

In this review, we aimed to identify and categorize domains of teacher identity, and also to evaluate the psychometric qualities of the instruments that were available for measuring components of teacher identity within these domains. Our review of these instruments reveals

six main domains of teacher identity. Although most of these instruments are of sufficient quality, our findings also identify several conceptual and methodological challenges that need to be resolved. As well as emphasizing theoretical and qualitative research, this review on quantitative studies of teacher identity may constitute the first step towards further empirical research on the specific domains underlying this complex construct. Such research has the potential to bring about the development of a systematic measurement instrument that not only covers the various domains of teacher identity, but can also be administered on a large scale in longitudinal studies that thus go beyond the developmental models that have previously been acquired qualitatively.

APPENDIX A. Table of reviewed studies.

Author(s) (Year)	Cultural context & population (number of respondents)	Description instrument	Underlying theoretical framework	Reliability scores (α) & validity (content, construct, discriminant)	Adopted and/or modified questionnaires	Instrument in other studies utilized
1. Abu-Altuz & Khasawneh (2013)	Jordan: Faculty members: assistant, associated and full professors ( <i>n</i> = 551).	Professional Identity Questionnaire (PQI); 4 factors: self-related identity, student-related identity, work-related identity and skill-related identity: 24 items: 5-point Likert scale (strongly agree to strongly disagree).	Based on the literature, but not stating which literature and how the theoretical framework was based on it.	α ranging from .89 to .94, the whole scale was .84. Face, content and construct validity were assessed with experts and EFA.		
2. Alaei (2015)	Iran: English language students ( <i>n</i> = 137).	Teacher Identity Questionnaire (TIQ); 48 items: 5-point Likert scale (strongly agree to strongly disagree)	Not stated.	α = .89; Validity not stated.	Modified TPI of Chi (2009). Reference was absent from the reference list.	
3. Beijaard, Verloop, & Vermunt (2000)	Netherlands: experienced secondary teachers ( <i>n</i> = 80).	Three categories: teacher as pedagogical, didactical subject matter expert; 17 items: 4-point Likert scale (ranging from not applicable to wholly applicable).	Influenced by the work of Bromme (1991).	α = .62, .58, .68. Validity not stated.		Hooge, Honingh and Langelaan (2011), Löfström, Proom-Valickis, Hammula, and Mathews (2010), Leijen, Linde, and Kivestu (2014).
4. Canrinus, Helms-Lorenz, Beijaard, Butink, & Hofman (2011)	Netherlands: secondary teachers ( <i>n</i> = 1214).	Three indicators: job satisfaction, classroom efficacy, and commitment; 71 items: 5-point Likert scale; 6-point Likert scale and 7-point Likert scale	According to Canrinus dissertation (2013) Kelchermans (2009) framework was followed.	α = .89, .92, .80, .81, .83. Construct validity with EFA.	Although various questionnaires had been adopted, it was not stated which ones were used.	Canrinus, Helms-Lorenz, Beijaard, Butink, and Hofman (2012), Li (2016).
5. Cheung (2008)	Hong Kong: in-service teachers ( <i>n</i> = 90, <i>n</i> = 80, <i>n</i> = 170).	Three domains: student-needs domain, school-issues domain and personal growth and	Influenced by the work of Enyedy, Goldberg, and Welsh (2005).	α = .89, .86, .83. Construct validity with EFA.		Zikovic (2013).

			development domain; 19 items; 5-point Likert scale (strongly agree to strongly disagree).			
6.	Chong & Low (2009)	Singapore: student teachers in a one-year program ( $n = 605$ , $n = 425$ , $n = 116$ ).	One dimension: 44 statements: "How do I feel about teaching..."; 5-point Likert scale (strongly agree to strongly disagree).	Identity-based motivation (Oyserman, 2007), possible-selves theory (Hamman et al., 2010).	Neither were stated.	
7.	Chong, Low, & Goh (2011)	Singapore: fourth-year primary and secondary student teachers of arts and science subject ( $n = 105$ ).	One dimension: sense of professional identity; 4 items: 5-point Likert scale.	Sociocultural perspective (Olsen, 2008).	$\alpha .65$ , Construct validity with EFA.	
8.	Fletcher, Mandigo, & Kosnik (2011)	USA: elementary student teachers of physical education ( $n = 308$ , $n = 285$ ).	One dimension: 4 items: 7-point Likert scale (ranging from strongly agree to strongly disagree).	Planned behavior (Faulker, Reeves, and Chedzoy (2004).	$\alpha$ ranging from pre-test 81, post-test .79 Validity not stated.	Faulker, Reeves, and Chedzoy (2004) questionnaire modified.
9.	Friesen & Besley (2013)	New Zealand: student teachers of early childhood, primary and secondary teachers ( $n = 109$ ).	Early Teacher Identity Measure (ETIM); 17 items: 5-point Likert scale (strongly agree to strongly disagree)	Erikson's (1964) theory of identity development and Turner, Oakes, Haslam, McCarty's (1994) self-categorization. Not stated.	$\alpha = .87$ Construct validity with EFA.	Arpaci and Bardakci (2015)
10.	Guangwen & Shuhua (2007)	China: primary and secondary teachers ( $n = 177$ ).	Six factors: individual cognition, emotion, will, skill, expectation and value; 25 items: 5-point Likert scale.	Not stated.	$\alpha = .85$ for the whole scale. However, internal consistency for subscales not stated. Content validity determined by experts.	
11.	Hasinoff & Mandzuk (2005)	Canada: student teachers ( $n = 239$ ).	Two constructs: role anticipation and role commitment; 14 items: 4-point Likert scale (strongly agree to strongly disagree).	Influenced by the work of Lorie (1975).	$\alpha = .69$ , .77. Construct validity with EFA.	Modified Jackson's (1981) questionnaire.

12. Hong (2010)	USA: student teachers and beginning teachers ( $n = 84$ ).	5 factors: Efficacy, value, commitment, emotions, knowledge and beliefs, and micropolitics.	Based on literature review in the field of teacher education and educational psychology.	$\alpha =$ ranging from .80 to .93. Not stated.	Perceived Task Value Scale (Eccles, O'Neil, Wigfield, Moore, & Lippman, 2005) and the Instrumentality Scale (Husman, McCann & Crowson, 2000); Self-efficacy: The teachers' sense of self-efficacy scale (Tschannen-Moran & Hoy, 2001); Commitment: the Vocational Exploration and Commitment scale (Blustein et al., 1989) and the Work commitment index (Blau, Paul, & John, 1993); Job-satisfaction: Emotional burnout (Maslach Burnout Inventory (Maslach & Jackson, 1986); Micropolitics: Empowerment Scale (Short & Rinehart, 1992).
13. Isbell (2008)	USA: student teachers of music ( $n = 578$ ).	Three factors: other perceptions as teacher, self-perceptions as teacher, combined perceptions as musician; 16 items: 6-point Likert scale (strongly agree to strongly disagree).	Symbolic interactionism.	Not stated. Construct validity with EFA.	Austin and Miksza (2012)
14. Kao & Lin (2015)	Taiwan: teachers at primary and secondary schools ( $n = 487$ ).	Six constructs: self-expectation, teachers' duties, external factors influencing pedagogy,	Based on the literature, but not stated how and what.	Not stated.	occupational identities (Borich & Tombari, 1997, Broyles, 1997, Cox, 1994, L'Roy, 1983 & Schonauer, 2002).

			external influential factors on instructional skills and knowledge, teachers' citizenship; 22 items: 5-point Likert scale (strongly agree to strongly disagree).			
15. Lamote & Engels (2010)	Belgium: student teachers for lower secondary school ( $n = 104$ , $n = 116$ ).	Four dimensions: professional orientation, task orientation, teachers' self-efficacy, and commitment to teaching; 60 items: 5-point Likert scale.	Influenced by the work of Puurula and Löfström (2003).	$\alpha$ ranging from .31 to .81. Construct validity with EFA.	Professional Orientation (Jongemans et al., 1997); Task Orientation (Denessen, 1999); Teachers' Self-efficacy (Tschannen-Moran & Woolfolk Hoy, 2001); commitment to teaching (Van Huizen, 2000). Wei's (2008) teachers professional identity questionnaire.	
16. Lei, Guo, & Liu (2012)	China: primary and secondary mental-health teachers ( $n = 54$ ).	Teachers' professional identity (TPQ): four dimensions: the sense of the role, the professional behavioral tendency, occupational values, and the sense of belonging; 18 items.	Based on the work of Wei (2008), however could not be retrieved by us.	$\alpha$ ranging from .72 to .86; full scale .86. Construct validity with EFA.		
17. Masoumpanah & Zarei (2014)	Iran: student teachers of English language ( $n = 25$ ).	Not stated.	Based on the work of Liou (2008), however could not be retrieved by us.	Not stated.	Liou's (2008) questionnaire was modified.	
18. Schepens, Aelterman, & Vlierick (2009)	Belgium: graduate student teachers ( $n = 762$ ).	Three dimensions: teacher self-efficacy, professional orientation, and teaching commitment; 35 items: 5-point, 6-point and 7-point Likert scales.	CIPP-model (Context, Input, Process, and product) (Guba, & Stufflebeam, 1970)	$\alpha = .78, .72, .77$ . Construct validity with EFA and CFA.	Teacher self-efficacy Tschannen-Moran and Hoy (2001); Personal orientation: Jongmans and Beijjaard, 1997); teaching commitment (van Huizen, 2000).	
19. Starr, Haley, Mazor, Ferguson, Philbin, & Quirk (2006)	USA: Medical students Physicians ( $n = 154$ ).	Nine elements: global teacher identity, feeling intrinsic satisfaction from teaching, having	Not stated.	$\alpha = .86, .81, .62, .88, .51, .78, .61, .58, .76$ . Discriminant, content and face validity		

<p>knowledge and skill about teaching, belonging to a group of teachers, believing that being a good doctor means being a teacher, feeling responsibility to teach, sharing clinical expertise, receiving rewards for teaching, desired outcomes; 37 items; 5-point Likert scale (strongly agree to strongly disagree).</p>	<p>by Delphi and cognitive interviews.</p>
<p>20. Zhang, Hawk, Zhang, &amp; Zhao (2016)</p> <p>China: student teachers (<i>n</i> = 606).</p>	<p>Expectancy value theory (Eccles et al., 1993).</p> <p><math>\alpha = .88, .78, .75</math>; whole scale <math>\alpha = .78</math>.</p> <p>Based on a previously validated scale of Zhang, Zhao, and Zhang (2011). However, the study was in Chinese.</p>

*Note.* *n* = number of respondents