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Measuring Teacher Engagement: Development of the Engaged Teachers Scale (ETS)

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Abstract

The goal of this study was to create and validate a brief multidimensional scale of teacher engagement—the Engaged Teachers Scale (ETS)—that reflects the particular characteristics of teachers' work in classrooms and schools. We collected data from three separate samples of teachers (total N = 810), and followed five steps in developing and validating the ETS. The result of our scale development was a 16-item, 4-factor scale of teacher engagement that shows evidence of reliability, validity, and practical usability for further research. The four factors of the ETS consist of: cognitive engagement, emotional engagement, social engagement: students, and social engagement: colleagues. The ETS was found to correlate positively with a frequently used work engagement measure (the UWES) and to be positively related to, but empirically distinct from, a measure of teachers' self-efficacy (the TSES). Our key contribution to the measurement of teacher engagement is the novel inclusion of social engagement with students as a key component of overall engagement at work for teachers. We propose that social engagement should be considered in future iterations of work engagement measures in a range of settings.

Keywords: Teachers; Engagement; Scale validation; Motivation

1. Introduction

A recurring theme of recent educational debate in public and research circles is the critical importance of providing all students with access to teachers who are highly engaged in their work (Economist Intelligence Unit, 2012; Pianta, Hamre, & Allen, 2012; Rimm-Kaufman & Hamre, 2010; Staiger & Rockoff, 2010).

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Although work engagement research in business settings is thriving (Bakker, Albrecht, & Leiter, 2011; Sonnentag, 2003), the same attention has not been paid to the construct in education, at least partly due to the absence of context-relevant tools. Building an understanding of teachers' engagement at work is vital: research shows that teachers' attitudes and motivation levels are transmitted to students (Roth, Assor, Kanat-Maymon, & Kaplan, 2007). However, the most frequently used measure of work engagement (Bakker et al., 2011)—the Utrecht Work Engagement Scale (UWES)—is designed for research involving workers in the business sector, and sharply contrasting work environments may demand dimensions of work engagement not currently covered in existing measures. Shuck and colleagues noted "an essential first step (to advance development of work engagement research) is a context-specific, conceptual exploration of the construct of employee engagement in relation to other well-researched job attitude(s)" (Shuck, Ghosh, Zigarmi, & Nimon, 2013, p. 11). Thus, the purpose of this article is to report the design and validation of a teacher engagement scale that reflects the particular context and demands experienced by teachers working in classroom settings, and to explore the scale in relation to teachers' self-efficacy and to the frequently used work engagement scale, the UWES.

Work engagement is a motivation concept that refers to the voluntary allocation of personal resources directed at the range of tasks demanded by a particular vocational role (Christian, Garza, & Slaughter, 2011). Two core conceptual dimensions—energy and involvement—underpin work engagement (Bakker et al., 2011), with three domains of engagement often posited: physical, emotional, and cognitive (e.g., Saks, 2006). In some cases, these three domains are subsumed under a higher-order engagement construct, whereby the individual domains are experienced simultaneously or holistically (e.g., Rich, LePine, & Crawford, 2010; Sonnentag, 2003). The relationship of engagement to burnout has been debated. In the view of some, engagement is the opposite of burnout, representing the other end of the continuum that stretches from fully engaged (low burnout) to not engaged (high burnout). Recent research using the Oldenburg Burnout Inventory (OLBI; Demerouti, Mostert, & Bakker, 2010), which simultaneously measures the energy and identification dimensions of engagement/burnout using positively and negatively worded items, provides equivocal results about the relationship of burnout and engagement. The creators of the OLBI found that the identification dimension of burnout seemed to be opposite of the dedication dimension of engagement, whereas the energy dimensions of burnout (exhaustion) and engagement (vigour) operated as separate, but related, dimensions. Existing engagement measures—such as the OLBI and UWES—have the advantage of measuring engagement in a broad variety of settings, but have not been created to examine engagement in specific contexts, like teaching. Creating a tailor made teacher engagement measure offers the advantage of including content that reflects the unique characteristics of teachers and the teaching context.

Engagement is considered to be relatively stable, with some fluctuations over time, reflecting both trait-like and state-like components (Dalal, Brummel, Wee, & Thomas, 2008; Schaufeli, Salanova, Gonzalez-Roma, & Bakker, 2002). Macey and Schneider's (2008) review of the engagement literature and subsequent conceptualization of the construct suggests work engagement reflects the dispositions (feelings of energy) that lead to engaged behaviours (acting in an energetic fashion). Engagement reflects motivational forces (e.g., intrinsic reasons for behaviour), but is conceptually distinct from these forces and from the ensuing behaviours (Schaufeli & Salanova, 2011); for example, the related construct of work commitment refers to an attitude of attachment to a job or career (e.g., Meyer, Allen, & Smith, 1993; Saks, 2006), but is conceptually separate from the feelings of energy during work time that defines engagement. Work commitment refers to an attitude about work; work engagement refers to the degree of attention and absorption in work activities (Shuck et al., 2013). Work engagement has also shown discriminant validity from job attitudes (Christian et al., 2011), and job involvement and satisfaction (Rich et al., 2010). Engagement has been shown to be related to self-efficacy; that is, beliefs in the capabilities to accomplish tasks in particular domains. Xanthopoulou, Bakker, Demerouti, and Schaufeli (2007) found that self-efficacy (along with optimism and organizational-based self-esteem) served as workplace resources that predicted engagement. In education settings, teachers' self-efficacy has been shown to be a potent motivational force associated with commitment to teaching and (inversely) to quitting intention (Klassen & Chiu, 2011), and to be robustly related to teacher resilience (Gu & Day, 2007). Although there are close relationships between engagement and other work-related motivation constructs, there is support for empirical and conceptual

distinctiveness, and exploring the nomological web of relationships among key related variables results in a more nuanced picture of how people behave in the workplace.

Schaufeli and colleagues operationalised work engagement in their creation of the UWES (e.g., Schaufeli, Bakker, & Salanova, 2006), and defined work engagement as an affective-cognitive state, not targeted at any particular work event or task. However, questions remain about the robustness of its factor structure (e.g., Klassen et al., 2012; Shimazu et al., 2008; Sonnentag, 2003), and its item content may not be relevant for all contexts. For example, although the UWES has been used with teachers (e.g., Bakker & Bal, 2010; Hakanen, Bakker, & Schaufeli, 2006), the scale content ignores the particular conditions associated with teachers' work. In particular, the UWES and other work engagement scales do not reflect the dimension of social engagement with students, a dimension which perhaps uniquely defines the act of teaching (Jennings & Greenberg, 2009).

The work of teaching involves a level of demand for social engagement—energy devoted to establishing relationships—that is rarely found in other professions (e.g., Pianta et al., 2012; Roorda, Koomen, Spilt, & Oort, 2011) and that is not included in other conceptual definitions of engagement (i.e., the UWES). Although workers in many settings must engage socially with colleagues, teaching uniquely emphasises energy spent on the establishment of long-term, meaningful connections with the clients of the work environment (i.e., students) in a way that characterises the job of teaching. In fact, researchers propose that teacher-student relationships may play the primary role in fostering student engagement and positive student outcomes (Davis, 2003; Klassen, Perry, & Frenzel, 2012; Pianta et al., 2012; Wang, 2009). Teachers who devote energy to forming warm and nurturing relationships with their students tend to experience higher levels of well-being, and less emotional stress and burnout (Jennings & Greenberg, 2009). To be sure, workers in other professions such as health (e.g., physicians, nurses, psychologists) or business (e.g., sales representatives), may form deep and meaningful relationships with their patients or clients, but rarely do workers in these fields spend the number of hours that most teachers spend with their students. Like workers in other professions, teachers form social relationships with colleagues during work, but the emphasis on social relationships with students characterises the heart of the work of teaching; in fact, the opportunity to work closely with students is a strong motive for many teachers entering the profession (e.g., Watt & Richardson, 2007). Measuring teachers' work engagement without capturing social engagement with students ignores one of the most important aspects of teacher engagement.

Shuck's recent review of work engagement (2011) concludes that the construct remains in a state of evolution, with disciplinary bridges needed between disparate communities of research. As educational psychologists, we question the fit of business-oriented work engagement models and measures to educational contexts, and see a clear need for a context-specific engagement measure tailored to the work performed by teachers. In this article, we address this need by creating and testing the *Engaged Teacher Scale* (ETS), in which workplace (i.e., classroom) engagement, comprising context-responsive physical, cognitive, and emotional dimensions (e.g., Rich et al., 2010), is combined with social engagement with students and colleagues to represent teachers' overall engagement.

1.1 Current study

The goal of the study was to create and validate a usable (i.e., brief) scale of teacher engagement. We followed five steps involving three samples of teachers (total $N = 810$) in developing and validating the ETS. In Step 1 we developed item content, and received critical feedback from a focus group of experts. In Steps 2 through 5 we collected data from three independent samples and conducted a series of statistical analyses designed to reduce the item pool, explore the factor structure, and examine the construct validity of the emerging scale. The result of our five steps is a 16-item, 4-factor scale of teacher engagement that shows evidence of reliability, validity, and usability for future research.

2. Step 1

Step 1 consisted of creation of an item pool, and generation of feedback about the content of the item pool. To begin, our team of researchers (i.e., the three authors who represent disparate backgrounds—psychology, education, and educational psychology—and three countries) reviewed the existing literature and created and adapted item content through a process of generation, discussion, and revision. A comprehensive literature search revealed a number of theory-driven work engagement measures (e.g., Rich, 2006; Saks, 2006; Schaufeli, et al., 2006; Shuck, 2010; Thomas, 2006; Wang & Qin, 2011). Theoretical guidance from research by Rich et al. (2010), Kahn (1990, 1992), and Schaufeli et al. (2006) provided the foundation for the dimensions of engagement (physical, cognitive, and emotional; or vigour, absorption, and dedication for the UWES). We also drew from teacher-student relatedness research (Davis, 2003; Klassen et al., 2012; Pianta et al., 2012; Wang, 2009) for generation of social engagement items. Item development included adaptation of items from existing measures (e.g., *At my work, I feel bursting with energy* was adapted to *When teaching, I feel bursting with energy*), and creation of new items guided by theory (e.g., *In class, I care about the problems of my students* was an item reflecting social engagement: students).

The proposed structure of the ETS is presented in Figure 1, with an over-arching *engagement* factor, and five second level dimensions: physical, cognitive, emotional, social: students, and social: colleagues. After reviewing the literature, an initial survey of 56 items was created and presented to 13 educational psychology graduate students, nine of whom were practicing teachers, during a graduate-level seminar. Following an introduction to the engagement literature (e.g., discussion of the UWES; Schaufeli et al., 2006), the students were given instructions to provide feedback on the content, wording, and plausibility of the initial item list. Small groups (2-4 students) were formed to provide feedback on one dimension after which the students participated in a large group discussion of the item content. The items and item content were revised based on the feedback and discussion, with the resulting survey consisting of 48 items representing five factors. Figure 1 presents the hypothesised dimensions of the ETS, with initial number of items for each dimension, and item examples for each of the five dimensions.

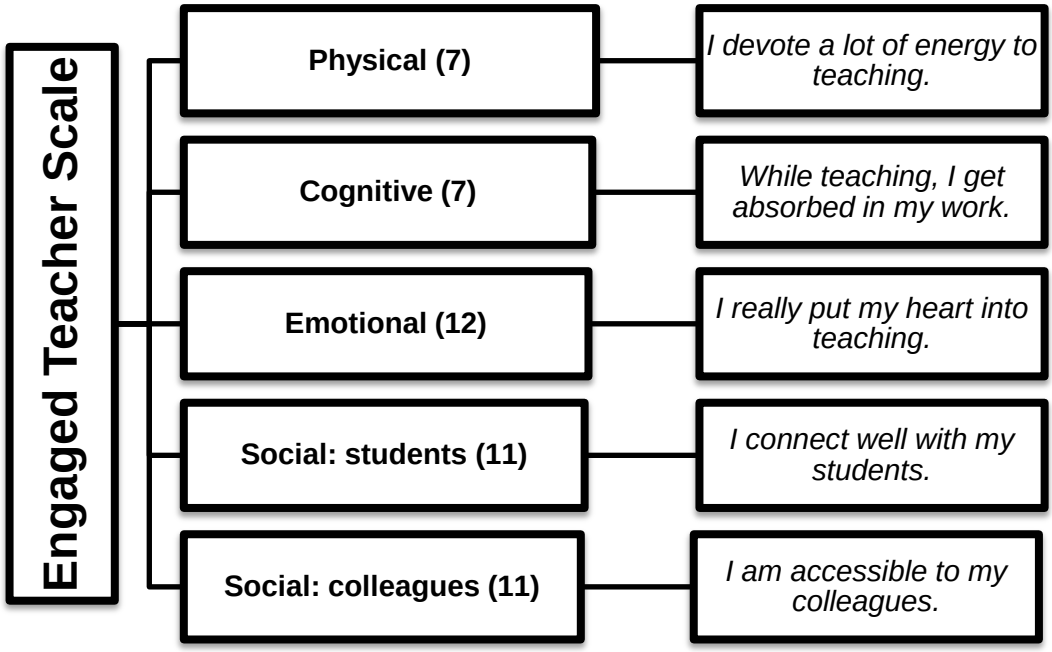

Figure 1. Hypothesised dimensions for the Engaged Teachers Scale (ETS). The number of initial items identified with each dimension is listed in parentheses, with example items listed in the following row.

3. Step 2

In Step 2, we administered the emergent 48-item measure to a sample of 224 practicing teachers, and analyzed the data using principle components analysis (PCA) for item reduction purposes. Although the use of PCA has been criticised as a means of extracting factors (e.g., Velicer & Jackson, 1990), it is a preferred method for item reduction (Conway & Huffcutt, 2003; Henson & Roberts, 2006; Matsunaga, 2010).

3.1 Participants and procedures

Data for Step 2 were collected at a compulsory teacher conference[1] in an urban/suburban setting with a population of about 1,000,000 in western Canada. Participants were volunteers who were recruited in the exhibition hall of the conference during breaks between professional development sessions. Consenting teachers completed the paper-and-pencil survey on-site while research assistants kept notes on any verbal feedback offered during data collection.

The sample for Step 2 consisted of 224 teachers (74.6% female) between the ages of 23 and 65 years (M = 40.73 years). Participants' highest level of education was reported as: undergraduate degree (73.4%), Master's degree (22.5%), doctorate degree (0.9%), and 3.2% unspecified. Most participants were employed full-time (84.8%) in urban[2] (77.5%), suburban (20.3%), and rural (2.3%) Canadian schools. Participants' school settings were elementary (43.3%), middle (17%), secondary (28%), and multiple (9%), with a mean class size of 26.6 students. Participants typically rated the socioeconomic status of most students in their class as low to average (67.9%), with 26.7% reported as average-high to high (5.4% varied or unknown). Teaching experience ranged from 0 to 38 years, with a mean of 13.42 (SD = 9.79) years of total teaching experience, and a mean of 5.05 years at their current school. Most participants (48.7%) were early career (≤10 years experience), with 23.7% at mid-career stage (11-20 years), and 25.6% with more than 20 years of experience.

Before conducting analyses, we examined item correlations, and subsequently excluded three items from further analysis due to non-significant correlations with the other variables, leaving 45 items. We used PCA with promax rotation (kappa set at 4) in order to derive a smaller number of items for subsequent steps.

3.2 Step 2 Results

Results of PCA revealed several items that did not load on theoretically consistent components, as well as items that clearly loaded on more than one component. For example, the item "I burst with energy while teaching" loaded on a component with items characterizing emotional engagement; however, the item was intended to characterise physical engagement. Furthermore, items that did not load on components with an adequate number of items (at least three) were excluded. Since the purpose of the PCA in this step was not to explore the factor structure but to reduce items, the main focus of the analysis was item reduction. Hence, rather than examining the number of components, we examined the emergence of principal components and the magnitude of component loadings, with a minimum component loading set at > .50. After inspecting conceptual fit of the items and the item loadings for each component, six items from three components and five items from one component were retained for further analyses. The loading of these items ranged between .61 and .98. In total, four components were extracted and retained, with a total of 23 items. Items on two components—tentatively labelled as cognitive and physical engagement—did not extract separately as initially hypothesised. Since we hypothesised physical engagement as an important facet of work engagement, we created an additional two items representing each of physical and cognitive engagement items for further analysis, resulting in 27 items available for analysis in Step 3.

[1] Attendance at one of the regional annual two-day teacher conventions is mandatory for all of the approximately 30,000 public school teachers in the province.

[2] The term "urban" in a Canadian context typically connotes geographical location (i.e., a large city or town), not sociological context (i.e., socioeconomic status level or ethnicity) as is sometimes the case in U.S.-based research.

4. Step 3

In Step 3 we administered the emergent 27-item version of the scale to a new sample of 265 teachers and conducted exploratory factor analysis (EFA) to test the scale's factor structure.

4.1 Participants and procedures

Participants were recruited in a similar fashion to Step 2, in a multi-district compulsory teacher conference at a different urban setting (population ~1,100,000) in the same western Canadian province. The Step 3 sample consisted of 265 teachers (68.7% female) between the ages of 21 and 68 years (M = 40.37 years). Demographics—SES, teaching level, and teaching experience—were similar to those in Step 2, with additional demographic information available from the authors.

4.2 Step 3 Results

The 27 items from Step 2 were analyzed using EFA with principle axis factoring and promax rotation (kappa set at 4). Results of the EFA were first examined in terms of the appropriateness of the existing data for factor analysis. The Kaiser-Meyer-Olkin measure of sampling adequacy was .92, suggesting that the data were appropriate for factor analysis. Additionally, Bartlett's test of sphericity, $\chi^2(351) = 4402.20$, $p < .05$, indicated that the population correlation matrix was not an identity matrix and suitable for factor analysis (Field, 2009).

We next followed three approaches to determine the number of factors to be retained. First, we examined Kaiser's eigenvalues > 1.0 and scrutiny of the screen test. Retaining factors with eigenvalues > 1.0 resulted in five factors and yielded 66.27% of the variance in respondents' scores. Examination of the scree plot suggested four or five factors. Although the eigenvalues > 1.0 rule and screen test are commonly used methods for determining number of factors, both are criticised for lack of reliability (e.g., Ledesma & Valero-Mora, 2007; Velicer & Jackson, 1990). Second, parallel analysis—based on statistical rather than mechanical rules—was used as an alternative and more accurate test to determine number of factors (Ledesma & Valero-Mora, 2007; O'Connor, 2000; Zwick & Velicer, 1986). Results from the parallel analysis suggested retention of four factors. Third, EFA was performed to compare 4- and 5-factor solutions. Only the 4-factor solution yielded interpretable factors. With the 5-factor solution, one item, "In class, I am accessible to my students" created a factor by itself. In the 4-factor solution, this item loaded inappropriately (i.e., theoretically unjustifiable) on the factor that was extracted by cognitive engagement items**.** Therefore, this item was excluded from the scale and the 4-factor solution was retained. As in Step 2, cognitive and physical engagement items did not produce separate factors; since cognitive items dominated the content, we labelled the factor *cognitive engagement*.

Examining the factor pattern coefficients with the cut-off point set at .70 resulted in eight more items eliminated from the scale. However, two borderline-case items with coefficients between .50 and .70 were retained since the item content made the factors more representative in terms of the construct being measured. Two items with redundant content were considered: "At school, I value the relationships I build with my colleagues," and "At school, I value spending time with my colleagues." We excluded the latter item due to lower factor loading (.82 versus .92 for the former item).

As a result of these procedures, the scale was reduced to 16 items with four items in each of four factors. Table 1 lists the pattern and structure coefficients of items for the related factors. The final version of the ETS with item content of each engagement dimension is presented in the Appendix. The EFA resulted in four factors accounting for 71.31% of the variance in the respondents' scores. The first factor was named *emotional engagement* (EE), accounting for 40.25% of the variance in the correlation matrix. The other three factors were *social engagement: colleagues* (SEC), *cognitive engagement* (CE), and *social engagement: students* (SES) accounting for 13.84%, 9.56%, and 7.66% of the variance, respectively. Correlations between factors ranged from .33 to .62. Cronbach's alpha coefficients for the EE, SEC, CE and SES factors were .89, .85, .85, and .84, respectively.

Table 1

Factor Pattern and Structure Coefficients in Descending Order (EFA, Promax Rotation) for the Four-Factor Model of ETS

Item	Content	Factor			
		EE	SEC	CE	SE
10	I love teaching	.95 (.89)			
2	I am excited about teaching	.80 (.81)			
5	I feel happy while teaching	.72 (.83)			
13	I find teaching fun	.70 (.76)			
9	At school, I value the relationships I build with my colleagues		.88 (.83)		
7	At school, I am committed to helping my colleagues		.83 (.83)		
12	At school, I care about the problems of my colleagues		.79 (.82)		
1	At school, I connect well with my colleagues		.57(.58)		
11	While teaching I pay a lot of attention to my work			.82 (.82)	
8	While teaching, I really "throw" myself into my work			.77 (.80)	
15	While teaching, I work with intensity			.76 (.76)	
4	I try my hardest to perform well while teaching			.65 (.71)	
14	In class, I care about the problems of my students				.87 (.82)
16	In class, I am empathetic towards my students				.79 (.83)
6	In class, I am aware of my students' feelings				.75 (.73)
3	In class, I show warmth to my students				.53 (.65)

Note. Factor structure coefficients were included in the parenthesis. EE = emotional engagement, SEC = social engagement: colleagues, CE = cognitive engagement, SES = social engagement: students.

5. Step 4

In Steps 4 and 5 we administered the final version of the scale to 321 teachers and analyzed the data using first- and second-order confirmatory factor analyses (CFA) for the purpose of testing construct validity. In particular, Step 4 was performed to validate the factor structure of the ETS.

5.1 Participants and procedures

Data were collected at compulsory teachers' convention in an adjacent province. Demographic information was similar to the samples in Steps 2-3 and is available from the authors.

5.2 Step 4 Results

A series of CFAs was performed in Step 4 to test the factor structure of the ETS. First, we performed CFA on the 16 items and 4 factors (model 1). Second, we tested models with and without social engagement by testing models that excluded factors representing social engagement with students (SES, model 2) and social engagement with colleagues (SEC, model 3). Finally, a second-order CFA was performed to examine whether the four first-order factors could be explained by a second-order *Teacher Engagement* (TE) factor (model 4).

We used LISREL 8.80 (Jöreskog & Sörbom, 2006) with SIMPLIS command language to conduct CFA. We used a series of fit indices to evaluate the model fit in addition to the conventional use of chi-square (see Kline, 2005): comparative fit index (CFI), normed fit index (NFI), goodness-of-fit index (GFI), and root mean square error of approximation (RMSEA). Since the level of missing data was low (1.8%), we replaced missing values with means (Tabachnick & Fidel, 2007). Data were checked for multivariate normality through inspection of univariate and multivariate outliers (Kline, 2005), with eight cases excluded as a result. Skewness and kurtosis values were checked and absolute values were found within the ranges .40 - 1.0 and .03 - .45, respectively. The maximum likelihood approach was selected to estimate the parameters of the model (Chou & Bentler, 1995).

5.2.1 Model 1: Four first-order factors

The 16-item scale was subjected to first-order CFA to test the four-factor structure of ETS. Results demonstrated a good fit to the data ($\chi^2_{(98)} = 292.67$, $p < .05$; CFI = .97; GFI = .90; NFI = .96; RMSEA = .08; 90% CI = .07, .09). Standardised parameter estimates for each item of the four-factor ETS model are listed in Table 2. As presented in the table, all of the standardised estimates (ranging from .66 to .85) were significant and above a cut-off value of .50 (Hair, Black, Babin, Anderson, & Tatham, 2010). Table 3 presents the correlations (*phi* estimates) among the four factors. As seen in the table, correlations ranged between .49 and .73, and were significant at the $p < .01$ level. Internal consistencies of each subscale of ETS were examined, with Cronbach's alpha coefficients at .84, .87, .83, and .79 for CE, EE, SES, and SEC, respectively. Table 4 presents the means, standard deviations, and reliability coefficients for the four factors. These findings supported our initial prediction of a first-order factor structure for teacher engagement. Since we proposed the novel hypothesis that social engagement was a dimension of teacher engagement, we tested Models 2 and 3 that examined the validity of including social engagement dimensions with students and colleagues in our model of teacher engagement.

Table 2

Standardised Parameter Estimates for the First-Order Factor Solution for the ETS (Model 1)

Item	Content	Factor	λ
4	I try my hardest to perform well while teaching	CE	.72
8	While teaching, I really "throw" myself into my work	CE	.80
11	While teaching I pay a lot of attention to my work	CE	.75
15	While teaching, I work with intensity	CE	.74
2	I am excited about teaching	EE	.78
5	I feel happy while teaching	EE	.75
10	I love teaching	EE	.85
13	I find teaching fun	EE	.80
3	In class, I show warmth to my students	SES	.71
6	In class, I am aware of my students' feelings	SES	.69
14	In class, I care about the problems of my students	SES	.74
16	In class, I am empathetic towards my students	SES	.81
1	At school, I connect well with my colleagues	SEC	.66
7	At school, I am committed to helping my colleagues	SEC	.68
9	At school, I value the relationships I build with my colleagues	SEC	.85
12	At school, I care about the problems of my colleagues	SEC	.66

Note. CE = cognitive engagement, EE = emotional engagement, SES= social engagement: students, SEC = social engagement: students.

All coefficients were significant, $p < .05$.

Table 3

Factor Correlations (Phi Estimates) of Model 1

		2	3	4
1.	CE	.73**	.73**	.49**
2.	EE		.64**	.53**
3.	SES			.52**
4.	SEC			

Note. CE = cognitive engagement, EE = emotional engagement, SES= social engagement: students, SEC = social engagement: students.

**$p < .001$.

Table 4

Means, Standard Deviations, and Reliability Coefficients for Factors of ETS

Factors	Mean	SD	α
TE (composite)	5.07	.56	.91
CE	5.16	.65	.84
EE	5.05	.73	.87
SES	5.26	.60	.83
SEC	4.80	.80	.79

Note. TE = teacher engagement, CE = cognitive engagement, EE = emotional engagement, SES= social engagement: students, SEC = social engagement: colleagues.

5.2.2 Model 2: Three first-order factors, SES excluded

Model 2 was constructed to test if a 3-factor structure without SES provided a better fit to the data than the full 4-factor structure. The purpose of this procedure was to examine the contribution of teacher' social engagement with students to explain their general work engagement. This model showed good fit to the data ($\chi^2_{(51)} = 155.65$, $p < .05$; CFI = .97; GFI = .93; NFI = .96; RMSEA = .08; 90% CI = .07, .09). Model 2 was compared to model 1 using the chi-square difference test. The $\Delta\chi^2$ value of 137.02 ($\Delta df = 47$) was significant, indicating that model 2 was a significantly poorer fit for the data than model 1.

5.2.3 Model 3: Three first-order factors, SEC excluded

In Model 3, we excluded the social engagement: colleagues (SEC) factor from the 4-factor ETS. The model was compared with model 1 to test the role of teachers' relationship with colleagues in teacher engagement. Although model 3 showed an adequate fit to the data ($\chi^2_{(51)} = 179.33$, $p < .05$; CFI = .97; GFI = .91; NFI = .96; RMSEA = .09; 90% CI = .08, .11), the chi-square difference test between model 1 and model 3 revealed a significantly poorer fit for the model 3 data ($\Delta\chi^2 = 113.34$, $\Delta df = 47$). Thus we concluded that social engagement with students and peers were viable dimensions with which to measure teacher engagement.

5.2.4 Model 4: Second-order factor

The high reliabilities and intercorrelations found in the first-order factor structure of ETS suggested the possibility of a second-order factor. Therefore, a second-order CFA was conducted to examine whether the four-factor ETS could be represented by a superordinate factor labelled *teacher engagement*. Figure 2 presents the first order and second order models in graphic format. The fit indices for the second-order factor ($\chi^2_{(100)} = 296.94$, $p < .05$; CFI = .97; GFI = .89; NFI = .95; RMSEA = .08; 90% CI = .07, .09) suggested that the hypothesised model fit the data well. As shown in Table 5, all first-order factors significantly loaded on the second-order factor and their standardised coefficients were above the .50 cut-off suggested by Hair et al. (2010). A chi-square difference test conducted between models 1 and 4 revealed no significant difference, suggesting the viability of an underlying single factor in addition to valid use of the four subscale scores. A summary of the goodness of fit indices for the four models is presented in Table 6. Thus, results suggested that using the four-factor or single factor models was viable for measuring teacher engagement.

Table 5

Standardised Parameter Estimates for the Second-Order Factor Solution for the ETS (Model 4)

Second-order factor	First-order factors	γ
TE	CE	.88
TE	EE	.82
TE	SES	.82
TE	SEC	.61

Note. TE = teacher engagement, CE = cognitive engagement, EE = emotional engagement, SES= social engagement: students, SEC = social engagement: colleagues.

All coefficients were significant, $p < .05$.

Table 6

Goodness of Fit Indices for the Four Models

Model	χ^2	*df*	χ^2/df	RMSEA	CFI	GFI	NFI	Model comparison	$\Delta\chi^2$	Δdf
Four first-order factor model (Model 1)	292.67	98	2.99	.08	.97	.90	.96			
Three first-order factor model, SES excluded (Model 2)	155.65	51	3.85	.08	.97	.93	.96	2 vs. 1	137.02**	47
Three first-order factor model, SEC excluded (Model 3)	179.33	51	3.52	.09	.97	.91	.96	3 vs. 1	113.34**	47
One second-order factor model (Model 4)	296.94	100	2.97	.08	.97	.89	.95	4 vs. 1	4.27	2

Note. *df* = degrees of freedom; RMSEA = root mean square error approximation; CFI = comparative fit index, GFI = goodness-of-fit index, NFI = normed fit index.

**$p < .001$.

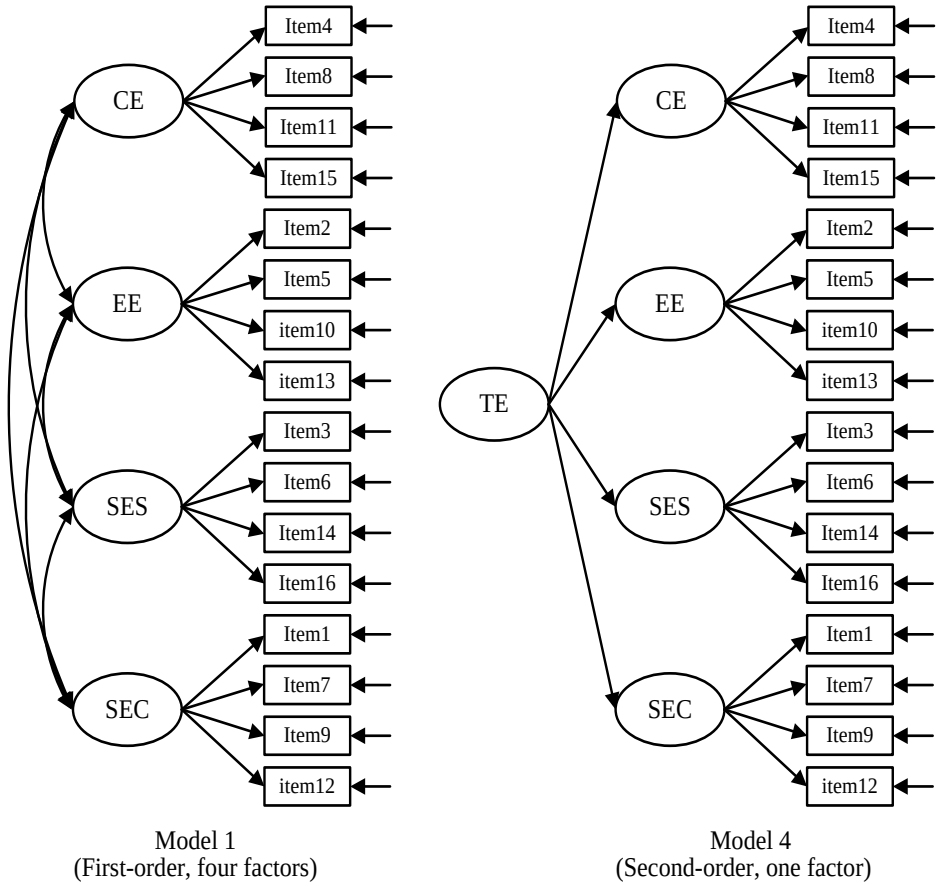

Figure 2. First-order and second-order factor structures for ETS (EE = emotional engagement, SEC = social engagement: colleagues, CE = cognitive engagement, SES= social engagement: students, TE = teacher engagement).

6. Step 5

In Step 5 we conducted canonical and zero-order correlation analyses to further test the construct validity of the scale. Canonical correlation analysis examines commonalities in sets of factors from different variables by providing linear combinations of each set of the factors (Hair, et. al., 2010). We examined correlations between the ETS and two related measures: the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006) and the Teacher Sense of Efficacy Scale (TSES; Tschannen-Moran & Woolfolk Hoy, 2001), a teacher motivation variable that taps teachers' expectancies of success in the classroom. The TSES consists of three factors: self-efficacy for student engagement (SE), instructional strategies (IS), and classroom management (CM). The scale has been shown to be valid in a range of settings and to be related to positive teacher outcomes such as teacher commitment and inversely with quitting intention (Klassen & Chiu, 2011). Schaufeli et al. (2006) found professional efficacy to be strongly related to work engagement across international contexts.

6.1 Procedure

The sample consisted of the same 321 participants described in Step 4. To start, we used CFA to ensure the factor structure of the UWES and TSES with our sample. Results for the 3-factor UWES showed adequate fit to the data ($\chi^2_{(24)}$= 78.51, p < .05; CFI = .98; GFI = .95; NFI = .97; RMSEA = .08; 90% CI =

.06, .10). All factor loadings were significant and internal consistencies of each subscale raged from .74 to .78. Results for the 3-factor TSES also indicated good model fit ($\chi^2_{(41)}$= 112.90, $p < .05$; CFI = .98; GFI = .94; NFI = .97; RMSEA = .07; 90% CI = .06, .09). All factor loadings were significant, with reliability coefficients above .80.

6.2 Step 5 Results

The relationship of the ETS with the TSES and UWES scales was assessed through canonical correlation analyses (see Table 7). The first canonical analysis (ETS and TSES) yielded three canonical variate pairs. A canonical correlation of .58 (33% overlapping variance), $\chi^2_{(12)} = 149.02$, $p < .001$, was found for the first canonical variate, and .25 (6% overlapping variance), $\chi^2_{(6)} = 22.03$, $p < .05$, for the second canonical variate. While the first two pairs of canonical variates accounted for the significant relationship, the χ^2 test was not statistically significant for the third pair. Since the overlapping variance for the second variate was very low (i.e., < 10%, see Tabachnick & Fidell, 2007), only the result of the first pair is reported. As shown in Table 7, with a cut off value set at .30 (Tabachnick & Fidell, 2007), all variables had significant relationship with the first canonical variate. Thus, the first canonical analysis suggests positive relationships between all teacher engagement variables and teacher self-efficacy variables.

Table 7

Correlations, Standardised Canonical Coefficients, Canonical Correlations, Percentages of Variance, and Redundancies between Self-Efficacy and Engagement Variables

	First Canonical Variate	
Variables	Correlation	Coefficient
Set 1 (TSES)		
Student engagement	-.84	-.57
Instructional strategies	-.89	-.66
Classroom management	-.50	-.13
Percent of Variance	.59	
Redundancy	.19	
Set 2 (ETS)		
CE	-.87	-.45
EE	-.75	-.23
SES	-.89	-.56
SEC	-.39	-.17
Percent of Variance	.57	
Redundancy	.19	
Canonical Correlations	.58	

Note. CE = cognitive engagement, EE = emotional engagement, SES= social engagement: students, SEC = social engagement: colleagues.

The second canonical correlation analysis was performed between the set of ETS variables and the set of UWES variables (vigour, dedication, and absorption). This second analysis yielded only two of the three variates as significant (see Table 8). The first canonical correlation was .73 (i.e., 53% overlapping variance), $\chi^2_{(12)} = 286.92$, $p < .001$. The second canonical correlation was .37 (14% overlapping variance), $\chi^2_{(6)} = 46.37$, $p < .05$. In light of the high overlapping variance and the modest overlapping variance of the second correlation, only the first variate was taken into account. All factors had significant relationships (i.e., above .30 as suggested by Tabachnick & Fidell, 2007) with the first canonical variate suggesting a positive relationship between the ETS and UWES variables. Therefore, based on the results of two canonical correlation analyses, it can be concluded that teachers with high engagement scores on ETS tend to gain high score on the TSES and UWES. The zero-order correlation matrix (Table 9) confirms this finding with all pairs of factors showing significant relationships. Cognitive engagement showed the strongest correlations with absorption ($r = .63$, UWES) and student engagement ($r = .48$, TSES); emotional engagement was most strongly related to dedication ($r = .67$, UWES) and student engagement ($r = .39$, TSES); social engagement: students showed the strongest relationship with absorption ($r = .42$, UWES) and instructional strategies ($r = .45$, TSES); and social engagement: colleagues showed the strongest relationship with dedication ($r = .37$, UWES) and student engagement ($r = .26$, TSES).

Table 8

Correlations, Standardised Canonical Coefficients, Canonical Correlations, Percentages of Variance, and Redundancies between the UWES and ETS Subscales

	First Canonical Variate	
Variables	Correlation	Coefficient
Set 1 (UWES)		
Vigour	-.80	-.09
Dedication	-.94	-.58
Absorption	-.89	-.43
Percent of Variance	.77	
Redundancy	.41	
Set 2 (ETS)		
CE	-.86	-.46
EE	-.93	-.65
SES	-.61	-.06
SEC	-.53	-.07
Percent of Variance	.57	
Redundancy	.30	
Canonical Correlations	.73	

Note. CE = cognitive engagement, EE = emotional engagement, SES= social engagement: students, SEC = social engagement: colleagues.

Table 9

Zero-Order Correlation Coefficients between ETS variables and UWES and TSES Variables

	UWES			TSES		
	Vigour	Dedication	Absorption	Instructional strategies	Student engagement	Classroom management
CE	.43**	.54**	.63**	.38**	.48**	.28**
EE	.59**	.67**	.55**	.38**	.39**	.22**
SES	.32**	.41**	.42**	.45**	.44**	.27**
SEC	.31**	.37**	.33**	.15**	.26**	.24**

Note. CE = cognitive engagement, EE = emotional engagement, SES= social engagement: students, SEC = social engagement: colleagues.

**$p < .001$

7. Discussion

Recent discussions about ways to improve social and educational outcomes have focused on the critical role played by teachers. Rarely before has so much emphasis been placed on understanding the psychological make-up of effective teachers (Rimm-Kaufman & Hamre, 2010; Staiger & Rockoff, 2010). From a psychological viewpoint, effective teaching is dependent on teachers who are motivated: fully engaged in their work, and engaged not just cognitively and emotionally, but also socially. Our study's aim was to respond to the call for better understanding of teacher engagement by creating a reliable, valid, and usable multi-dimensional measure of work engagement that was specifically targeted at the work carried out by teachers in classrooms and schools.

From a measurement perspective, the findings from this research provide support for the reliability and validity of the ETS. In particular, the item statistics and reliabilities of the ETS are very good, and the four factors represent appropriate measures of the internal structure of teacher engagement. Furthermore, the analyses show that the ETS factors are discrete, reliable, and valid. In general, the results suggest that measures of teacher engagement should incorporate the component factors of engagement, and that the factors are related to an overarching engagement factor. From a theoretical perspective, the findings show that social engagement with students and with colleagues should be considered as important dimensions of teacher engagement, alongside cognitive and emotional dimensions of engagement. Our primary contribution to future research is in the creation of a four-factor teacher engagement measure that is practical (i.e., brief), valid, reliable, and that reflects the context of educational settings. Our multiple steps of analyses resulted in a robust measure that correlates positively with a frequently used work engagement measure (the UWES), and is positively related to, but empirically distinct from, teachers' self-efficacy.

The inclusion of social engagement is novel for conceptualizing and measuring work engagement, but the conceptual framework for work engagement is still developing (Bakker et al., 2011; Shuck et al., 2013), and conceptualizations that challenge how engagement is defined across contexts may contribute to a more general understanding of how the construct operates in diverse vocational settings. We know that social engagement with students is a fundamental aspect of teachers' work (e.g., Pianta et al., 2012), and perhaps reflects the key mechanism through which student development is influenced. Although conceptualizations of engagement that consist of dimensions of physical, cognitive, and emotional energy and involvement at work have been conventionally proposed, the results from our study suggest that social engagement—with students and with colleagues—forms an important dimension of overall engagement for teachers. We

suggest that a dimension representing social engagement is worth considering for future iterations of work engagement measures applied to a wide range of vocational settings.

We failed to find separate domains of physical and cognitive engagement in our samples of teachers, and the question remains whether physical engagement is separable from cognitive, emotional, and social dimensions of teacher engagement. Hakanen et al. (2006) proposed vigour (physical engagement) and dedication (emotional engagement) as the core dimensions of engagement in their study of the UWES with a group of teachers, but they did not test the hypotheses by including a cognitive dimension in their analyses. We did not find clear support for the separation of physical and cognitive engagement dimensions, and propose that for teachers, the line between the two is blurred. For example, we labelled "I try my hardest to perform well while teaching" and "While teaching, I really 'throw' myself into my work" as examples of cognitive engagement, but the demands of individual teachers' classroom work may determine the relevance of particular dimensions for teachers. A teacher of young children may need to physically interact with students (crouching down, tying shoes, performing actions during music sessions) more often than a high school history teacher, thus increasing the salience of the physical engagement dimension for some teachers. Hakanen et al. describe the physical job demands and resources that can be associated with engagement, but the level of physical demands for teachers varies as a function of the setting. Further work should focus on teasing apart teachers' physical and cognitive engagement by exploring the two dimensions in a wider range of contexts.

More work is needed to understand how engagement is fostered in teachers, and especially how the specific dimensions—emotional, cognitive, social, and perhaps physical engagement—develop through teacher training and into professional practice. Research from related constructs such as teacher resilience (Gu & Day, 2007), self-efficacy (Klassen & Chiu, 2010, 2011), and commitment (Collie, Shapka, & Perry, 2011) have shown that teacher motivation constructs change in predictable ways over the course of a career. The ETS provides a way of measuring individual facets of engagement and how the facets change over time: for example, a teacher may exhibit high levels of social engagement at the beginning of a career but lower levels of cognitive engagement.

We know that teacher engagement changes over even brief periods of time: recent research has shown that global teacher engagement shows weekly within-person variability in starting teachers (Bakker & Bal, 2010; Durksen & Klassen, 2012), with commitment to the profession mirroring the pattern of change in engagement. The job-demands resources model (JDR; e.g., Bakker, Hakanen, Demerouti, & Xanthopoulou, 2007; Hakanen et al., 2006) provides a general way of conceptualizing the drivers of engagement, but details about how job resources in classrooms and schools—supportive climate, transformational leadership, access to information, job control—can be targeted at fostering specific engagement dimensions have not yet been studied. Multilevel analyses of teacher engagement may provide insight into how engagement might be shared in a school, and how teachers working together transmit their engagement amongst themselves, and to their students. Psychosocial research in a range of vocational contexts has shown that workers regularly share beliefs, emotions, and motivational patterns, and that social interaction influences individual psychology (e.g., Bandura, 1997).

7.1 Limitations

Although we found strong psychometric properties of the ETS, and collected data from three independent samples of teachers, there are some clear limitations. The participants were all working in two western provinces in Canada, and were largely female, and thus the samples offer only limited representativeness to other populations. The data collected were cross-sectional, and although engagement is said to possess state and trait characteristics (e.g., Schaufeli & Salanova, 2011), engagement fluctuates over time (e.g., Bakker & Bal, 2010). External validity of the measure is limited by the correlational nature of the study design, and no objective measure of teaching effectiveness or of student achievement was used as an outcome measure, a clear direction for future research. Teacher engagement may lead to positive teacher-student interactions, increased student engagement, and eventually to increased student achievement, but the evidence base needs developing. It must also be considered that the relationships among teacher engagement,

teacher-student interactions, student engagement, and student achievement are reciprocal: it is likely that teacher engagement both influences, and is influenced by, positive experiences of teacher-student interaction. Although the ETS focuses on in-classroom and in-school engagement, for some (but not all) teachers, out-of-school activities involving parents and the community form an important component of their social engagement. Other measures, such as the OLBI and UWES measure engagement more broadly, and their use may be preferable for cross-professional comparisons and to capture teachers' non-classroom related engagement.

7.2 Conclusions and Future Research

Understanding teacher engagement is critical to understanding the psychological processes underlying effective teaching. Our aim was to create a measure of teacher engagement that reflects the particular features of working in classrooms and in schools, and especially the social interactions shared by teachers and students. An important step in understanding effective teaching is to conceptualise and measure teacher engagement, and we hope that the ETS can be useful in this regard, but our knowledge of how teachers' self-reports of engagement are reflected by behaviours in real classrooms is limited. Although data from observation systems (e.g., the CLASS from Pianta et al., 2012) provide some insight into how engaged and effective teachers behave, such methods still leave interpretation of teachers' behaviours to the presence of external observers sitting in classes for relatively brief periods of time. Further study is needed to identify the behavioural indicators of teacher engagement, and how these behaviours develop individually and collectively, and change over time. Bakker and Bal's 2010 study on weekly fluctuations of teacher engagement provides a useful starting point, but examining work engagement using finer-grained time spans may provide a valuable way forward in understanding teachers and teaching. Creation of the ETS may be a useful point of departure for better understanding teacher engagement, and by extension, student engagement and learning.

Keypoints

- We created and validated a 4-factor 16-item measure of teacher engagement: the Engaged Teachers Scale (ETS).
- The five steps of development resulted in a multidimensional measure that is practical (i.e., brief), valid, and reliable for use in education settings.
- The four factors were cognitive engagement, emotional engagement, social engagement: students, and social engagement: colleagues.

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References

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York: W.H. Freeman.

Bakker, A. B., Albrecht, S. L., & Leiter, M. P. (2011). Key questions regarding work engagement. *European Journal of Work and Organizational Psychology, 20,* 4-28. doi:10.1080/1359432X.2010.485352

Bakker, A., & Bal, M. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal Of Occupational And Organizational Psychology, 83,* 189-206. doi:10.1348/096317909X402596

Bakker, A. B., Hakanen, J. J., Demerouti, E., & Xanthopoulou, D. (2007). Job resources boost work engagement, particularly when job demands are high. *Journal of Educational Psychology, 99,* 274–284. doi: 10.1037/0022-0663.99.2.274

Christian, M. S., Garza, A. S., & Slaughter, J. E. (2011). Work engagement: A quantitative review and test of its relations with task and contextual performance. *Personnel Psychology, 64,* 89-136. doi:10.1111/j.1744-6570.2010.01203.x

Chou, C. P., & Bentler, P. M. (1995). Estimates and tests in structural equation modeling. In R. H. Hoyle (Ed.), *Structural Equation Modeling: Concepts, Issues, and Applications* (pp. 37-55), Thousand Oaks, CA: Sage.

Collie, R. J., Shapka, J. D., & Perry, N. E. (2011). Predicting teacher commitment: The impact of school climate and social-emotional learning. *Psychology in the Schools, 48,* 1034-1048. doi:10.1002/pits.20611

Conway, J. M., & Huffcutt, A. I. (2003). A review and evaluation of exploratory factor analysis practices in organizational research. *Organizational Research Methods, 6,* 147-168. doi:10.1177/1094428103251541Dalal, R. S., Brummel, B. J., Wee, S., & Thomas, L. L. (2008). Defining employee engagement for productive research and practice. *Industrial and Organizational Psychology, 1,* 52-55. doi:10.1111/j.1754-9434.2007.00008.x

Davis, H. A. (2003). Conceptualizing the role and influence of student– teacher relationships on children's social and cognitive development. *Educational Psychologist, 38,* 207–234. doi:10.1207/S15326985EP3804_2

Demerouti, E., Mostert, K., & Bakker, A. B. (2010). Burnout and work engagement: A thorough investigation of the independency of both constructs. *Journal of Occupational Health Psychology, 15,* 207-234. doi:10.1037/a0019408

Durksen, T. L., & Klassen, R. M. (2012). Pre-service teachers' weekly commitment and engagement during a final training placement: A longitudinal mixed methods study. *Educational and Child Psychology, 29,* 32-46.

Economist Intelligence Unit (2012). *The learning curve: lessons in country performance in education.* Retrieved from: http://thelearningcurve.pearson.com/

Field, A. (2009) *Discovering statistics using SPSS* (3rd ed.). London: Sage.

Gu, Q., & Day, C. (2007). Teachers' resilience: A necessary condition for effectiveness. *Teaching and Teacher Education, 23,* 1302-1316. doi:10.1016/j.tate.2006.06.006

Hair, J. F., Black, B., Babin, B., Anderson, R. E., & Tatham, R. L. (2010). *Multivariate Data Analysis*. (7th ed.). Upper Saddle River, NJ: Prentice-Hall.

Hakanen, J. J., Bakker, A. B., & Schaufeli, W. B. (2006). Burnout and work engagement among teachers. *Journal of School Psychology, 43,* 495-513. doi:10.1016/j.jsp.2005.11.001

Henson, R. K., & Roberts, J. K. (2006). Use of exploratory factor analysis in published research: Common errors and some comment on improved practice. *Educational and Psychological Measurement, 66,* 393-416. doi: 10.1177/0013164405282485

Jennings, P. A., & Greenberg, M. T. (2009). The Prosocial Classroom: Teacher Social and Emotional Competence in Relation to Student and Classroom Outcomes. *Review Of Educational Research, 79,* 491-525. doi:10.2307/40071173

Jöreskog, K. G. & Sörbom, D. (2006). *LISREL 8.80 for Windows [Computer Software]*. Lincolnwood, IL: Scientific Software International, Inc.

Kahn, W. A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy Of Management Journal, 33,* 692-724. doi: 10.2307/256287Kahn, W. A. (1992). To be fully there: Psychological presence at work. *Human Relations, 45,* 321-349. doi: 10.1177/00187267920450040

Klassen, R. M., Al-Dhafri, S., Mansfield, C. F., Purwanto, E., Siu, A., Wong, M. W., & Woods-McConney, A. (2012). Teachers' engagement at work: An international validation study. *Journal of Experimental Education, 80,* 1-20. doi: 10.1080/00220973.2012.678409

Klassen, R. M., Bong, M., Usher, E. L., Chong, W. H., Huan, V. S., Wong, I. Y., & Georgiou, T. (2009). Exploring the validity of the Teachers' Self-Efficacy Scale in five countries. *Contemporary Educational Psychology, 34,* 67-76. doi:10.1016/j.cedpsych.2008.08.001

Klassen, R. M., & Chiu, M. M. (2010). Effects on teachers' self-efficacy and job satisfaction: Teacher gender, years of experience, and job stress. *Journal of Educational Psychology. 102,* 741-756. doi:10.1037/a0019237

Klassen, R. M., & Chiu, M. M. (2011). The occupational commitment and intention to quit of practicing and pre-service teachers: Influence of self-efficacy, job stress, and teaching context. *Contemporary Educational Psychology, 36,* 114-129. doi:10.1016/j.cedpsych.2011.01.002

Klassen, R. M., Perry, N. E., & Frenzel, A. C. (2012). Teachers' relatedness with students: An underemphasized component of teachers' basic psychological needs. *Journal of Educational Psychology, 104,* 150-165. doi: 10.1037/a0026253

Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: Guilford.

Ledesma, R. D., & Valero-Mora, P. (2007). Determining the number of factors to retain in EFA: An easy-to-use computer program for carrying out Parallel Analysis. *Practical Assessment, Research & Evaluation, 12(2),* 2-11. Retrieved from http://pareonline.net/pdf/v12n2.pdf

Macey, W. H., & Schneider, B. (2008). The meaning of employee engagement. *Industrial and Organizational Psychology, 1,* 3-30. doi: 10.1111/j.1754-9434.2007.0002.x

Matsunaga, M. (2010). How to factor-analyze your data right: Do's, don'ts, and how-to's. *International Journal of Psychological Research, 3,* 97-110. Retrieved from http://www.redalyc.org/articulo.oa?id=299023509007

Meyer, J. P., Allen, N. J., & Smith, C. A. (1993). Commitment to organizations and occupations: Extension and test of a three-component conceptualization. *Journal of Applied Psychology, 78,* 538–551. doi: 10.1037/0021-9010.78.4.538

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, & Computers, 32,* 396-402. doi: 10.3758/BF03200807

Pianta, R. C., Hamre, B. K., & Allen, J. P. (2012). Teacher-student relationships and engagement: Conceptualizing, measuring, and improving the capacity of classroom interactions (pp. 365-386). In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement.* Dordrecht, Netherlands: Springer. doi:10.1007/978-1-4614-2018-7

Rich, B. L. (2006). *Job engagement: Construct validation and relationships with job satisfaction, job involvement, and intrinsic motivation* (Doctoral Dissertation, University of Florida). Retrieved from ECONIS, ProQuest UMI 3228825 Dissertation Publishing.

Rich, B. L., Lepine, J. A., & Crawford, E. R. (2010). Job engagement: Antecedents and effects on job performance. *The Academy of Management Journal, 53,* 617-635. doi:10.5465/AMJ.2010.51468988

Rimm-Kaufman, S. E., & Hamre, B. K. (2010). The role of psychological and developmental science in efforts to improve teacher quality. *Teachers College Record, 112,* 2988-3023. Retrieved from http://www.tcrecord.org/library

Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement: A meta-analytic approach. *Review of Educational Research, 81,* 493-529. doi:10.3102/0034654311421793

Roth, G., Assor, A., Kanat-Maymon, Y., & Kaplan, H. (2007). Autonomous motivation for teaching: How self-determined teaching may lead to self-determined learning. *Journal of Educational Psychology, 99,* 761-774. doi: 10.1037/0022-0663.99.4.761

Saks, A. M. (2008). The meaning and bleeding of employee engagement: How muddy is the water? *Industrial and Organizational Psychology, 1,* 40-43. doi: 10.1111/j.1754-9434.2007.00005.x

Schaufeli, W. B., Bakker, A. B., & Salanova, M. (2006). The measurement of work engagement with a short questionnaire: A cross-national study. *Educational and Psychological Measurement, 66,* 701-716. doi: 10.1177/0013164405282471

Schaufeli, W., & Salanova, M. (2011). Work engagement: On how to better catch a slippery concept. *European Journal of Work and Organizational Psychology, 20,* 39-46. doi: 10.1080/1359432X.2010.515981

Schaufeli, W.B., Salanova, M., Gonzalez-Roma, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two-sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3,* 71–92. doi: 10.1023/A:1015630930326

Shimazu, A., Schaufeli, W.B., Kosugi, S., Suzuki, A., Nashiwa, H., Kato, A., et al. (2008). Work engagement in Japan: Development and validation of the Japanese version of the Utrecht Work Engagement Scale. *Applied Psychology: An International Review, 57,* 510-523. doi: 10.1111/j.1464-0597.2008.00333.x

Shuck, M. B. (2010). *Employee engagement: An examination of antecedent and outcome variables* (Doctoral Dissertation, Florida International University). Retrieved from http://digitalcommons.fiu.edu/etd/235

Shuck, B. (2011). Four emerging perspectives of employee engagement: An integrative literature review. *Human Resource Development Review, 10,* 304-328. doi:10.1177/1534484311410840

Shuck, B., Ghosh, R., Zigarmi, D., & Nimon, K. (2013). The jingle jangle of employee engagement: Further exploration of the emerging construct and implications for workplace learning and performance. *Human Resource Development Review, 12,* 11-35. doi:10.1177/1534484312463921

Sonnentag, S. (2003). Recovery, work engagement, and proactive behavior: A new look at the interface between non-work and work. *Journal of Applied Psychology, 88,* 518-528. doi: 10.1037/0021-9010.88.3.518

Staiger, D. O., & Rockoff, J. E. (2010). Searching for effective teachers with imperfect information. *Journal of Economic Perspectives, 24,* 97-118. doi:10.1257/jep.24.3.97

Tabachnick, B. & Fidell, L. S. (2007). *Using Multivariate Statistics* (5th ed.). Boston: Pearson.

Thomas, C. H. (2006). *Clarifying the concept of work engagement: Construct validation and an empirical test.* (Doctoral Dissertation, The University of Georgia). Retrieved from http://hdl.handle.net/10724/9113

Tschannen-Moran, M. & Woolfolk Hoy, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education, 17,* 783-805. Retrieved from http://www.sciencedirect.com/science/article/pii/S0742051X01000361#

Velicer, W. F., & Jackson, D. N. (1990). Component analysis versus common factor analysis: Some further observations. *Multivariate Behavioral Research, 25*(1), 97-114. doi: 10.1207/s15327906mbr2501_12

Wang, M.-T. (2009). School climate support for behavioral and psycho- logical adjustment: Testing the mediating effect of social competence. *School Psychology Quarterly, 24,* 240–251. doi:10.1037/a0017999

Wang, Y., & Qin, J. (2011). The structure of preschool teachers' work engagement survey in China. *International Conference on Social Science and Humanity, 5,* 464-468. Retrieved from http://www.ipedr.com/vol5/no2/103-H10248.pdf

Watt, H. M. G., & Richardson, R. W. (2007). Motivational factors influencing teaching as a career choice: Development and validation of the FIT-Choice Scale. *The Journal of Experimental Education, 75,* 167-202. doi:10.3200/JEXE.75.3.167-202

Xanthopoulou, D., Bakker, A.B., Demerouti, E., & Schaufeli, W.B. (2007). The role of personal resources in the job demands-resources model. *International Journal of Stress Management, 14,* 121-141. doi: 10.1037/1072-5245.14.2.121

Zwick, W. R., & Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*, 99, 432-442. doi: 10.1037/0033-2909.99.3.432