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Developing and Validating a Potential Evaluation Inventory to Assess EFL Teachers' Engagement

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Abstract

Teacher engagement has been undertaken in various studies. However, most of the studies have disregarded the dearth of a practical framework to assess teachers' engagement in the English as a Foreign Language (EFL) context. Therefore, the researchers of the present study designed and validated a questionnaire to assess the engagement of EFL teachers. To examine the reliability and validity of the final draft of the TEQ, it was administered to 234 Iranian EFL teachers who had been selected using non-probability convenience sampling. The results of Cronbach's alpha indicated an appropriate reliability index and the factor analysis results revealed that items were loaded on 5 factors including 1) emotional, 2) social (colleagues), 3) social (students), 4) cognitive, and 5) agentic. Moreover, TEQ has the potential to be beneficial in assessing EFL teachers' engagement, according to the results of structural equation modeling (SEM), which revealed that the model enjoyed good psychometric features.

Keywords: agentic engagement, cognitive engagement, emotional engagement, social engagement, teacher engagement

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Introduction

The concept of work engagement has gained a surge of interest and became a very popular topic in various fields shortly after its introduction by Kahn (1990). According to Kahn (1990) work engagement refers to the behaviors that people bring in or leave out during work-related activities. Engaged workers express and employ themselves emotionally, cognitively, and physically while performing their job-related tasks. In recent decades, the notion of engagement has received significant attention from educationalists as a factor that affects teachers' professional development and learners' academic achievement (Zhang & Yang, 2021). Engaged teachers are usually extremely associated with their mission and are more competent and accountable. Teachers with a higher level of engagement, regulate their attention and make effort in accomplishing profession-related tasks to attain more satisfactory work conditions (Granziera & Perera, 2019). Teacher engagement has a central part in the course of teachers' own professional learning and their students' learning because engaged teachers assign more cognitive, physical, and emotional resources while teaching (Perera et al., 2018).

A plethora of research explored the interplay between teacher engagement and other factors such as teacher autonomy (Skaalvik & Skaalvic, 2014), teacher burnout (Faskhodi & Siyyari, 2018), social support (Minghui et al., 2018), teacher self-efficacy (Skaalvik & Skaalvic, 2019), teacher reflection (Han & Wang, 2021), teacher resilience (Xie, 2021), teacher psychological well-being (Kong, 2021), and teaching enjoyment (Xiao et al., 2022). All these studies have utilized Schaufeli et al.'s (2002) Utrecht Work Engagement Scale (UWES) to measure teachers' engagement and conceptualize work engagement as a three-dimensional construct namely, vigor, dedication, and absorption.

Although this tool has been utilized for assessing teachers' engagement in some studies, it fails to take into account the conditions of teachers' activities (Klassen et al., 2013). Since previous studies indicated a positive relationship between teacher engagement and learners' success (Mérida-López et al., 2017), it is worth investigating the amount of effort made by teachers in achieving positive educational outcomes. For so doing, a valid measurement instrument is required that considers teachers' professional context. To compensate for the nonexistence of an appropriate tool for measuring teachers' engagement, Klassen et al. (2013) introduced their conceptualization of teacher engagement and developed the Engaged Teacher Scale (ETS). ETS includes 16 items and focuses on particular features of teachers' work in the classroom such as emotional, cognitive, and social dimensions.

Despite the critical role of engagement in language education and scholars' increasing interest in investigating this construct in the EFL context, the researchers of the present study did not find any valid questionnaires to assess EFL teachers' engagement. To bridge this research gap, the researchers of the current attempt developed and validated a questionnaire to evaluate teachers' engagement in English as a foreign language context that not only encompasses the various dimensions of previous engagement conceptualizations namely, cognitive, emotional, social

(student), social (colleagues) but also introduced agentic engagement as a new dimension of teacher engagement which is missing in the existing theoretical definitions of teacher engagement.

In the context of teaching, the notion of agency is used to portray teachers' attempts to employ planned actions and to make principled decisions for creating a significant change (Yangın Ekşi et al., 2019). Teacher agency is defined as teachers' capacity to consider themselves active decision-makers who exert changes and reflect on the effectiveness of their professional activities (Ruan & Zheng, 2019). Therefore, rather than being passive individuals who apply whatever is dictated to them by policymakers and stakeholders, agentically-engaged teachers intend to promote their teaching practice by applying strategic changes. With agentic engagement, teachers try to give a voice to their inner motivation and act based on their localized and specific context.

Literature Review

Teacher Engagement

Numerous attempts have been made to define work engagement. Van Beek et al. (2012) defined work engagement as job-related fulfillment, desire for the job, high level of perseverance, dynamic participation, and being deeply immersed in what people do. From Wildermuth and Pauken's (2008) point of view, work engagement is unprompted and intentional active involvement in activities. As a motivational construct, teacher engagement reveals teachers' voluntary allotment of energy and resources in performing teaching-related activities, which is a crucial facilitator of teachers' participation in professional development (Li et al., 2019). Klassen et al. (2013) introduced a multifaceted conceptualization of teacher engagement consisting of cognitive, emotional, and social dimensions.

The notion of cognitive engagement is derived from individuals' appraisal of their work when it is useful, physically, psychologically, and emotionally safe, and whether they have adequate resources to carry out their work (Imandin et al., 2014) which is essential for their professional development (Atapattu et al., 2019). According to Sherab (2013) teachers are required to understand what keeps them cognitively engaged in their work so they may identify where to allocate their mental resources, consider whether certain activities are invigorating or exhausting, and adjust the plans and practices that they find mentally demanding.

Some earlier conceptualizations of engagement, such as Kahn's (1990) engagement conceptualization, described the cognitive-physical components proposed by Klassen et al. (2013). Engagement was defined by Kahn (1990) as the integration of the organization selves into their work responsibilities, allowing individuals to express themselves emotionally, physically, and cognitively while carrying out professional activities. Klassen et al.'s (2013) cognitive-physical dimension of engagement also originates from Schaufeli et al.'s (2002) viewpoint explaining it as a fulfilling, positive job-related mental state that is distinguished by vigor, absorption, and dedication, here, vigor and absorption correspond to the

cognitive-physical dimension of Klassen et al.'s (2013) engagement conceptualization.

As Shuck and Reio (2013) stated, emotional engagement deals with the number of emotional resources individuals allocate while doing their careers. Emotionally-engaged workers devote personal resources such as confidence, pride, and knowledge. These positive feelings derive from the judgments they made about the conditions during the cognitive engagement stage when workers perceive that their work is worthwhile, the workplace atmosphere is safe, and they possess the required resources to accomplish their tasks. In their study, Klassen et al. (2013) used Schaufeli et al.'s (2002) conception of engagement to define emotional engagement as a rewarding, positive, work-related frame of mind that is marked by vigor, absorption, and devotion. According to this definition, emotional engagement and dedication are interconnected, and this definition represents teachers' positive emotional responses to their work. In light of this, teachers who are emotionally engaged work with positive feelings like inspiration, activation, enjoyment, passion, and energy (Perera et al., 2018), and regulation of these emotions makes teachers perform their teaching-related tasks more efficiently (Chen, 2016) and achieve job satisfaction and enhanced self-efficacy (Burić & Moe, 2020). Teachers' emotional engagement contributes to the active engagement of learners (Wang &Ye, 2021) which in turn results in learners' academic success (Wang et al., 2022).

The inclusion of social aspects of engagement in Klassen et al.'s (2013) engagement model distinguishes it from earlier work engagement models. Asserting that the current conceptualizations of work engagement fall short of adequately justifying teachers' dedication of energy to forming connections with colleagues and students. Therefore, Klassen et al. (2013) introduced social engagement with students and colleagues. By being socially engaged, teachers can have good relationships with their co-workers and students. According to Gan (2021), socially engaged teachers can experience better teacher-student communication and a good rapport between teachers and students can affect teacher engagement as well. In addition, a good teacher-student relationship can foster students' social and cognitive consequences even in the future (Thornberg et al., 2020). Moreover, teachers who provide and keep warm and supportive relationships with students can attain better student achievement. Establishing rapport with students leads to learners' increased sense of school belonging, well-being, and positive identities (Ibrahim & El Zaatari, 2020). Positive teacher-student connections can be established whenever students feel personally accepted and experience a sense of belonging (Bao et al., 2021). Additionally, the importance of teachers' social engagement with colleagues is emphasized since teachers' professional learning and development is not an individual matter that happens in a vacuum (Geeraerts et al., 2018; Klassen et al., 2013). Furthermore, rather than being a simply formal event, teachers' professional learning and growth occur through day-to-day collegial dialogues, interactions, and collaborations (Kvam, 2018). Asaoka (2021) also emphasized the role of social support in teacher engagement and professional development.

The notion of agentic engagement was first introduced by Reeve and Tseng (2011) as "students' constructive contribution to the flow of instruction they receive" (p. 258). Accordingly, students' agentic engagement refers to students' intentions and attempts to personalize learning circumstances and conditions which are integral to developing their outcomes. A considerable body of research (e.g., Matos et al., 2018; Reeve & Tseng, 2011; Reeve, 2013; Reeve & Shin, 2020) addressed the significance of student agentic engagement in achieving desired learning outcomes. To our knowledge, the concept of agentic engagement has never been introduced in current teacher engagement conceptualizations and they only focus on emotional, cognitive, and social facets of teacher engagement. However, teacher agency is identified as a critical element for promoting education quality which is described as teachers' endeavors to take planned actions and make principled decisions for prominent change (Yangın Ekşi et al., 2019). Agency plays a pivotal role in language teachers' work. Teachers with agentic engagement have the desire and skills to apply professional activities, promote their ability for lifelong learning, and accomplish difference and innovation (Ruan & Zhang, 2019). Agentically-engaged teachers take an active role in creating and constructing authentic knowledge, partaking collaboratively within the broader work community, replying proactively to emerging difficulties, dilemmas, and challenges, and exerting a significant amount of professional discretion and judgment. (Imants & Van der Wal, 2020) which are paramount elements for their professional growth (Li & Ruppar, 2021). Evaluating teachers' engagement without taking into account their agentic engagement disregards one of the crucial facets of teacher engagement.

According to Zhang and Yang (2021), who discussed the significance of English language teachers' engagement in their students' academic engagement, teachers who are enthusiastic and motivated in their careers help to nurture their students' engagement. They believe that motivated teachers may easily create a stimulating learning environment in the classroom. This in turn motivates learners to actively engage in tasks and activities in the classroom. They further suggested that highly engaged EFL teachers frequently exert more effort to effectively deliver the information. Moreover, they stated that students would be more inclined to participate in class activities if they see professors making an effort to instruct them efficiently.

Theoretical Framework

Self-Determination Theory

Teacher engagement is supported by theories that include cognitive, emotional, social, and motivational features of learning and teaching. Self-determination theory (SDT) developed by Deci and Ryan (1985) is one of the essential supporting theoretical frameworks for teacher engagement since this theory provides a sound conceptual basis for understanding factors that affect human social and individual development. SDT supposes that individuals are driven toward development, specifically the desire to interact and collaborate with society and to overcome problems and challenges in their social contexts (Ryan & Deci, 2017). According to SDT, people have internal energy and a desire for positive growth

when their cultural behaviors and values are comprehended, learned, and sustained (Sheldon & Ryan, 2011). To get individuals motivated enough to engage in social activities, three important psychological requirements namely, relatedness, autonomy, and competence should be satisfied. Relatedness addresses the individuals' ability to interact with others, establish trust, and keep respectful relationships, which promote their social engagement. Autonomy reflects individuals' sense of willingness to act, accept others' opinions, and keep a sense of freedom about others' actions and thoughts. This sense of willingness can affect their emotional engagement. Competence refers to one's potential ability to understand and acquire a task within their context which is a prerequisite for cognitive engagement (Ryan & Deci, 2017). Taken together, these requirements are known as self-determination needs. The accomplishment of such needs results in positive outcomes such as an increased level of engagement, well-being, self-confidence, and flexibility which act as the facilitator of individuals' continuing development and engagement in their context (Brenner, 2022). In effect, according to SDT, teachers' autonomy promotes their motivation and engagement and enhances their performance and creativity in teaching, since teachers are supposed to be creative, flexible, and motivated to overcome the challenging situations and dilemmas they may encounter while teaching. When teachers make principled decisions and autonomous actions to solve their day-to-day teaching problems, they become more engaged in their teaching practice (Mansouri et al., 2021). According to Ponton and Rhea (2006), autonomy can be defined as the agentic demonstration of inventiveness, creativity, and perseverance in self-directed learning. As a kind of human agency, it has been claimed in the literature that this perspective should be in line with Bandura's (2000) Socio-Cognitive Theory (SCT).

Socio-Cognitive Theory

The socio-cognitive theory offers an underpinning theoretical framework for teachers' agentic engagement. According to the Socio-cognitive agency theory proposed by Bandura (2000), teachers are regarded as both the producers and products of the context. When they are produced by contextual conditions, they generate, change or transform similar conditions through agentic ability and as a result become "agents of experiences rather than simply undergoers of experiences" (Bandura, 2001, p. 4).

Agency is to purposefully lead to things that occur by one's actions (Bandura, 2001). One of the major aspects of agency is perceived efficacy which impacts individuals' behavior, goals, ambitions, expectations, and actions. Other main aspects of agency are intentionality, consideration, and self-reflection (Bandura, 2001). Bandura (2001) believed that all agentic activities are deliberate and individual selections are affected by the practicing of self-influence and positive commitment. By practicing forethought, people set goals, pay attention to the possible outcomes of their activities and choose those actions that they think would result in the most desired consequences. The expectation of upcoming actions directs their selections and actions. By being a forethinker, agentic people can relate thought to action, which includes self-monitoring, self-direction, and corrective self-

reactions (Bandura, 2001). Lastly, agentic people engage in self-reflection, investigating their choices, activities, and motivation.

As mentioned earlier various instruments including the Utrecht Work Engagement Scale (UWES) (Schaufeli et al., 2002), Gallup Work Audit (GWA) (developed by the Gallup Organization in the mid-1980s) and Employee Engaged Scale (EES) (Shuck et al., 2016) have been developed for measuring engagement in different sectors which mainly focus on emotional, physical, and cognitive dimensions of engagement. Klassen et al. (2013) developed the Engaged Teacher Scale (ETS) intending to reflect social engagement as a new dimension of teacher engagement. They rationalized the addition of this dimension by stating that current work engagement models fail to justify teachers' energy investment in creating associates with students and co-workers (Perera et al., 2018). To our best knowledge, all of the aforementioned instruments fall short of assessing the concept of teacher engagement in the EFL context and considering the extent to which teachers engage agenticly, exert changes, make principled decisions, and take actions while performing their profession-related activities. Therefore, due to the dearth of appropriate and sound instruments to measure the concept of engagement in the language teaching context, the researchers of the present study attempted to design and validate a questionnaire to evaluate teachers' engagement in the EFL context.

The novelty of the present inquiry not only relies on developing and validating a questionnaire to measure teacher engagement in the EFL context but also conceptualizes EFL teacher engagement as a construct including five components of cognitive, emotional, social (student), social (colleagues), and agentic engagement. The following research questions were posed in order to achieve this goal.

1) What are the fundamental components of the teacher engagement questionnaire (TEQ)?
2) What are the psychometric features of the teacher engagement questionnaire (TEQ)?
3) To what extent does the structural model of teacher engagement (TEQ) fit the hypothetical model generated by relevant literature?

Method

Participants

Twenty EFL teachers between the ages of 25 and 45 who were selected through non-probability convenience sampling (Best & Kahn, 2006) took part in a semi-structured interview comprised of 80% female participants and 20% male participants. They had been teachers for at least five years. According to their educational backgrounds, 7% of the participants had Ph.D., 45% were pursuing Ph.D., 35% had master's degrees, and 13% had bachelor's degrees with English majors like TEFL, Translation, and English Literature.

Since the newly developed TEQ consists of 44 items, 44 EFL teachers selected through non-probability convenience sampling participated in the pilot study. 64% of the participants were females and 36% of them were males who teach English as a foreign language in various institutions and universities in Iran. Their ages range from 25 to 45. Regarding their teaching experience, 14% of them had 1-5 years of teaching experience, 26% of them had 6-10 years of teaching experience, 48% of them had 11-15 years of teaching experience, and 12% of them had more than 15 years of teaching experience.

In the administration phase, 254 male and female EFL teachers of varied ages and levels of teaching experience participated in this study and completed the newly created questionnaire. They were chosen from a variety of Iranian institutions and universities using a non-probability convenience sampling. Out of this total number (254), 16 responses dropped out because either the items were mostly unanswered or the same choice was checked throughout the questionnaire. Four more participants dropped out because they were found as significant univariate outliers. Therefore, the quantitative phase was carried out with 234 participants whose demographic features are illustrated in Table 1 below. All the participants' consent was obtained on a form. Moreover, they were assured of the confidentiality of the data they provided us by answering either the semi-structured interview or the TEQ. Participants were also informed that the collected data would be utilized for research purposes. The TEQ did not require the participating teachers' names and numbers were used instead of their names (e.g., ID1).

The researchers of the present attempt used Pallant's (2016) strategy to sample size estimate, which claimed that 5 participants per item would be an acceptable sample size for choosing the best feasible number of people to answer the newly-made questionnaire. A minimum sample size of 220 participants was required for this study since the Teacher Engagement Questionnaire (TEQ) includes 44 items loaded on the five components of cognitive, emotional, social (colleagues), social (students), and agentic.

Table 1

Participants' Characteristics in the Quantitative (Piloting) Phase

Participants' characteristics		Frequency
Age range	20-30	92
	31-40	114
	> 40	28
Degree	B.A.	97
	M.A.	84
	Ph.D.	53
	TEFL	112
Major of study	Translation	81
	Literature	41
Teaching experience	1-5	31
	6-10	83
	11-15	86
	> 15	34
Gender	Male	68
	Female	166
Total		234

Instruments

In this study, three various instruments, including a comprehensive literature review, a series of semi-structured interviews, and a Likert-scale-based questionnaire were used in different phases to collect the required data. An in-depth literature review on teacher engagement was carried out by the researchers of the current study the outcomes of which led to determining the underpinning theoretical framework, conducting questions for a semi-structured interview, identifying the themes, and generating the items (Bandura, 2001; Chaaban & Sawalhi, 2020; Harper-Hill et al., 2020; Klassen et al., 2013; Leijen et al., 2020; Li et al., 2019; Perera et al., 2018; Ryan & Deci, 2017; Schaufeli et al., 2019).

Having performed a comprehensive literature review, a semi-structured interview containing 5 questions was conducted in English (Table 1, Appendix A). All of the questions in the semi-structured interview take the five components of teachers' engagement into consideration. Since this interview was a semi-structured one (Dörnyei, 2007) including 5 main questions, the interviewer asked the interviewees to elaborate more on their answers to provide the researchers with rich data. Besides, the researchers developed a valid and reliable seven-point Likert-scale-based questionnaire comprising 44 items that tackle the features of a teacher's engagement (Appendix B).

Procedure

Since this study is an exploratory sequential mixed-methods research (Creswell & Creswell, 2018), the required data were collected in two general phases, including qualitative and quantitative phases. In the qualitative phase, an inclusive literature review on teacher engagement was conducted to identify the conceptual framework based on which the questions of semi-structured interviews were proposed. To confirm the credibility of the interview questions, a group of 5 experts in the field of language teacher education scrutinized the interview questions considering their contents and wording appropriacy. Then, a semi-structured interview was conducted with 20 EFL teachers. It should be noted that before asking the interview questions, the researchers defined the concept of teacher engagement for the participants to avoid any ambiguities or misunderstandings. It took 20 minutes to conduct each interview which was then audio-recorded, transcribed, and coded using the NVivo program. The qualitative data were encoded by the researchers in collaboration, and the extracted themes were cross-checked. The items for the questionnaire were then created using these codes and themes. The TEQ components and their coded themes are displayed with a few related items in Table 2.

Table 2

Initial Components and Retrieved Themes in the TEQ

Component	Theme	Example
Emotional	enjoying teaching being full of energy being enthusiastic feeling vigorous	11. I feel vigorous while teaching.
Cognitive	working meticulously concentrating on teaching reflecting critically on teaching	31. Teaching is meaningful and significant for me.
Social (colleagues)	appreciating relationship providing assistance paying attention to colleagues' problems interacting and collaborating with colleagues	12. I appreciate my relationships with my colleagues at the institute.
Social (students)	taking into account their problems paying attention to students' feelings establishing rapport being aware of students' needs facilitating discourse with students and their parents having positive attitudes	20. In class, I establish rapport with my students.
Agentic	enacting required changes making creative choices taking advantage of resources setting goals relying on personal and professional experiences	34. I make creative choices to make influential differences in my teaching practice.

A 44-item questionnaire with a Likert scale ranging from 1 to 7 (1 = never, 2 = almost never, 3 = only occasionally, 4 = sometimes, 5 = usually, 6 = almost always, 7 = always) was created using the findings from the thorough examination of the literature on teachers' engagement and the outcomes from the semi-structured interviews with 20 EFL teachers. It is important to note that while some items were created using information from the literature, and the answers provided by respondents to the semi-structured interview questions, others were created based on Klassen et al.'s (2013) ETS which were modified by the researchers of the current study. The items were then assessed by a panel of 5 experts, comprising 3 academics and 2 EFL instructors, to determine the questionnaire's content validity. The panel of experts approved the questionnaire's initial draft's content validity.

Then, the newly developed questionnaire was piloted with 44 EFL teachers. Using non-probability convenience sampling. They were given the newly developed 44-item questionnaire (11 items for emotional, 8 items for social (students), 5 items for social (colleagues), 8 items for cognitive, and 12 items for the agentic component). All questionnaire items were answered by all the participants. The researchers of the current attempt created an online survey using the Google Forms platform due to the Covid-19 outbreak and distributed it through email or other social networking sites. After that, a Cronbach's alpha was run to detect and eliminate problematic items (Dörnyei, 2003) and exploratory factor analysis (Riazi, 2016) was run to explore the underlying components of the TEQ. Then, following the same procedure the final draft of the TEQ was administered to 234 EFL teachers from various universities and institutes in Iran selected through non-probability convenience sampling.

To check the concurrent validity of the teacher engagement questionnaire (TEQ), its correlation with the total scores of the same participants on the engaged teacher scale (ETS), developed and validated by Klassen et al. (2013), was calculated. However, before running the calculations, the normality of the data sets was made clear (Table 1, Appendix C). The result indicated that both data sets were normal and therefore, a parametric kind of formula, Pearson Correlation, in this case, was appropriate the results of which showed that the teacher engagement questionnaire total scores were highly and significantly correlated with engaged teacher scale's total scores (0.78), which was a good sign of the criterion-related validity of the two inventories (Table 2, Appendix C).

Finally, to analyze the data collected from the main participants the following statistical analyses were done. Through the use of SPSS software (version 29), the newly-developed questionnaire was subjected to Cronbach's alpha and exploratory factor analysis (EFA) to determine its reliability and probe the underlying constructs of the 44 items of the TEQ. As Riazi (2016) stated, EFA is utilized as a statistical test to reveal the underpinning conceptual foundations of a topic by condensing the data to a more manageable number of variables. Confirmatory factor analysis (CFA), on the other hand, is a statistical test that is used to confirm the factor structure of a group of observable variables. Therefore, in the present study, confirmatory factor analysis was run using LIZREL 8.2 to explore and ensure the fit of the TEQ model including five measurement models. In addition to factor analysis, a path analysis was conducted to ascertain the factor loadings and path orientation of the underlying elements of teacher engagement, and structural equation modeling (SEM) was run which is diagram-based and presents a graphical interface (Kline, 2016).

Results

Before administering the TEQ to the main sample in a real context it was piloted with 44 EFL teachers to calculate the reliability and construct validity of the newly-developed questionnaire. The Cronbach alpha reliability index of the TEQ in this piloting phase was α = .89, which was a sign of a strong reliability index as values higher than .80 are considered strong reliability indices (George & Mallery, 2020). Item-total statistics were also checked and it was identified that putting any

single item aside, the reliability indices of the other items would still be above .80, meaning that there were no deviant items in the questionnaire. Finally, the results of the factor analysis revealed that the TEQ includes no irrelevant items, and all items were loaded on 5 components namely, 1) emotional, 2) social (colleagues), 3) social (students), 4) cognitive, and 5) agentic.

The data collected from the main administration phase including 234 EFL participating teachers were checked for any significant univariate and multivariate outliers by computing the standardized scores (z-scores) and Mahalanobis Distances. The results showed that the participants with ID numbers: 6, 31, 132, and 208, whose z-scores were higher than the maximum acceptable value of + / - 3.29 (Tabachnick & Fidell, 2014), were dropped out (Table 3, Appendix C). After removing ID number 99, the data were scrutinized for any significant multivariate outliers by computing the Mahalanobis Distances (MD). The MD values were compared against the critical value of chi-square at .001 levels for 44 items, i.e., 78.74 (Tabachnick & Fidell, 2014). The maximum MD value of 69.79 was smaller than 78.74, it was considered that the current data did not include any significant multivariate outliers (Table 4, Appendix C). The univariate normality of the data was probed through skewness and kurtosis indices. Since skewness and kurtosis values were shown to be within the ranges of + / - 2 (George & Mallery, 2020), the assumption of univariate normality was found to be maintained (Table 5, Appendix C). Mardia's index was used to test the multivariate normality assumption. The Mardia's index was 19.16, below the threshold of 2024 (Khine, 2013). As a result, it was determined that the multivariate normality assumption was maintained.

Table 3 shows Cronbach's alpha reliability indices for the TEQ and its components. The reliability index for the overall TEQ was .844. The reliability indices for the components were as follows: emotional engagement = .876, social engagement (colleagues) = .789, social engagement (students) = .891, cognitive engagement = .855, and agentic engagement = .901. All these reliability indices can be considered appropriate (George & Mallery, 2020). The results of corrected item-total correlations for the items of the TEQ (Table 6, Appendix C) showed that none of the items had negative item-total correlations; nor was any of them lower than .30 (Field, 2018; Pallant, 2016).

Table 3

Cronbach's Alpha Reliability Indices

	Cronbach's Alpha	N of Items
Emotional Engagement	.876	11
Social Engagement (Colleagues)	.789	5
Social Engagement (Students)	.891	8
Cognitive Engagement	.855	8
Agentic Engagement	.901	12
Total TEQ	.884	44

Applying principal axis factoring and direct Oblimin rotation, an exploratory factor analysis (EFA) was carried out in order to probe the fundamental constructs of the 44 items of the TEQ. Two decisions had to be made before running the EFA, choosing a rotation method, and deciding on an optimum number of factors to be extracted. The present EFA model was explored through the varimax rotation method. Before stating the reason, it should be mentioned that EFA can be carried out through orthogonal or non-orthogonal rotations. Orthogonal rotation assumes that the factors being extracted are not correlated; whereas non-orthogonal rotation can be used when underlying factors are assumed to be correlated. The decision can be made based on the results of the "Component Correlation Matrix" (Table 7, Appendix C). If the correlation among the factors, ignoring the 1's on the diagonal, is higher than + / - .32 (Dagdag et al., 2020), it can be concluded that the factors are correlated; thus, the non-orthogonal rotation should be used; otherwise, the orthogonal rotation should be employed, as is the case in Table 7 (Appendix C). Three different methods were employed to decide on the optimum number of factors to be extracted; i.e., scree plot, Watkins (2005), and Revelle (2020) parallel analysis methods. First, Scree Plot 1 (Fig. 1, Appendix C) suggested five factors to be extracted for the 44 items of the TEQ. Second, the results of the parallel analysis using Watkins's (2005) method suggested five factors to be extracted (Table 8, Appendix C). The Watkins method compares the observed eigenvalues with the simulated ones. The factors whose observed eigenvalues are higher than the simulated ones are retained. And finally, Revelle (2020) developed the R package "psych" which can be used to run parallel analysis. This method is also graphically similar to the scree plot, except for the fact that the data are both simulated and resampled in order to decide on the number of factors to be extracted. This method also suggested a five-factor model.

The KMO index of .886 indicated that the sample size of 234 was "meritorious," following Field's (2018) classification of KMO indices for running the EFA (Table 9, Appendix C). The significant findings of Bartlett's test (χ^2 (946) = 4910.91, $p < .05$) indicated that the correlation matrix was appropriate for running the factor analysis. The EFA extracted five factors as the underlying constructs of the 44 items of the TEQ (Table 10, Appendix C) which accounted for 49.78 percent of the total variance (Table 11, Appendix C). All items loaded under their respective factor loadings are as follows:

- Agentic Engagement (AE) items 33 to 44.
- Emotional Engagement (EE) items 1 to 11,
- Social Engagement Students (SES) items 17 to 24,
- Cognitive Engagement (CE) items 25 to 32, and
- Social Engagement Colleagues (SEC) items 12 to 16,

A confirmatory factor analysis (CFA) using IBM AMOS 21 was run to explore the fit of the TEQ model. The model included five measurement models whose fit (Appendix C) was discussed first before reporting the main model. Figure 1 displays the final model of TEQ. The model enjoyed a good fit (Table 12,

Appendix C). The chi-square test of the badness of fit was not significant (χ^2 (896) = 769.58, p > .05). The NFI and CFI indices of 1.00 were higher than .95; and finally, the RMSEA index of .000 was between .05 and .08. All these indices supported the fit of the SES measurement model.

Figure 1

Measurement Model of TEQ

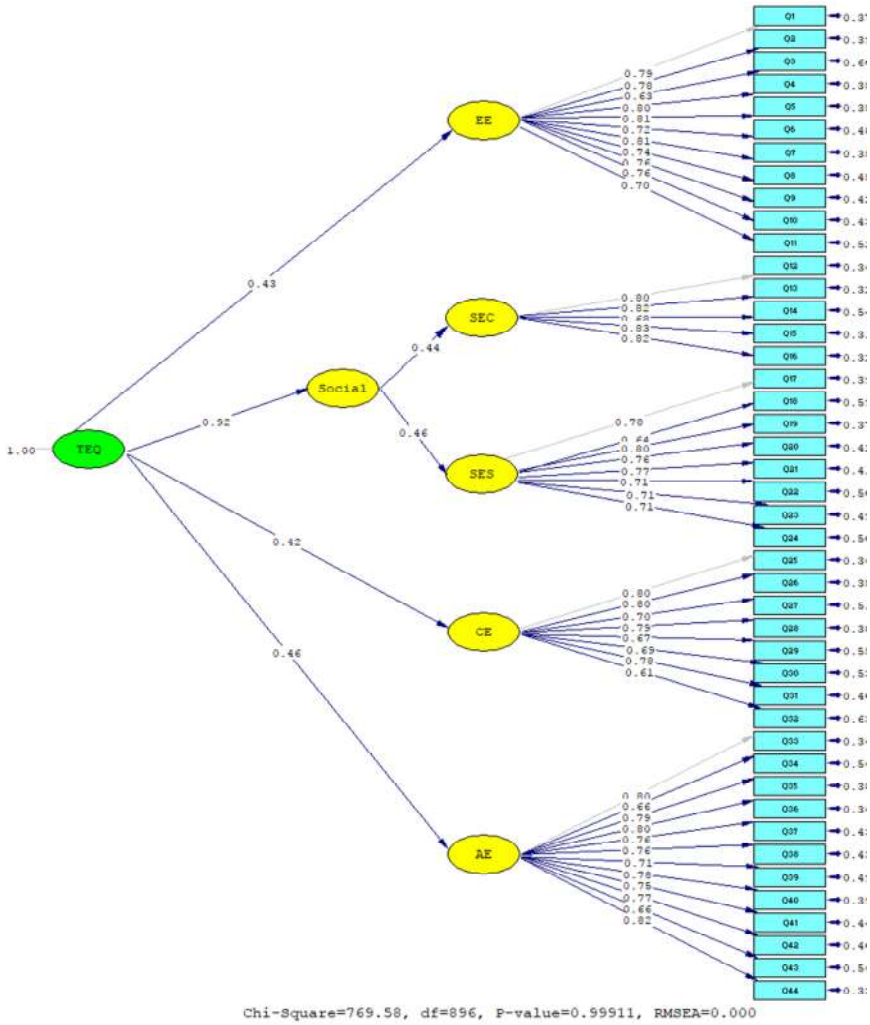

Table 4 displays all fit indices for the TEQ and its five components.

Table 4

All-Fit Indices of TEQ and Its Components

Indices	EE	SEC	SES	AE	CE	Main	Criterion
Chi-square	49.48	2.17	7.85	75.93	37.45	692.50	--
Df	44	5	20	54	20	813	--
P	.263	.824	.992	.026	.010	.999	> .05
Ratio	1.12	.434	.392	1.40	1.87	.851	< = 3
RMSEA	.023	.000	.000	.042	.061	.000	.05 to .08
CI RMSEA	.000, .051	.000, .054	.000, .000	.015, .062	.029, .091	.000, .000	.05 to .08
PCLOSE	.94	.94	1.00	.72	.25	1.00	> .05
NFI	.99	1.00	1.00	.98	.98	1.00	> = .95
CFI	1.00	1.00	1.00	1.00	.99	1.00	> =.95
IFI	1.00	1.00	1.00	1.00	.99	1.00	> = .95
RFI	.99	.99	.99	.98	.97	.95	> = .95
SRMR	.034	.013	.016	.037	.039	.044	< .05
GFI	1.00	1.00	1.00	1.00	.99	.99	> = .95
CN	324.53	1619.31	1116.60	249.77	234.70	302.98	> 200

Discussion

Our objective in the current study was to create and validate an instrument to measure the engagement of EFL teachers. The main outcome was an acceptable index of reliability for the teacher engagement questionnaire (TEQ). Cronbach alpha reliability indices for emotional, cognitive, social (colleagues), social (students), agentic, and overall engagement were respectively .876, .855, .789, .891, .901, .884. The results of factor analysis demonstrated that all items contributed to their respective components and were loaded on five factors: 1) emotional, 2) social (colleagues), 3) social (students), 4) cognitive, and 5) agentic. Additionally, the results of the SEM revealed that the model enjoyed good psychometric features.

The first factor of the TEQ, emotional engagement, includes 11 items targeting teachers' level of emotional engagement while performing their teaching practice. Researchers (Burić & Moe, 2020; Chen, 2016; Wang & Ye, 2021; Wang et al., 2022) support the significant impact of teachers' emotions on the effectiveness of their teaching practice. In this respect, Chen (2016) stated that classrooms are intricate emotional contexts where teachers continually experience emotional demands from various stakeholders such as students, colleagues, administrators, and parents. To deal with such emotional demands, teachers should be able to regulate their emotions proficiently to perform their teaching practice efficiently and interact with others successfully. Similarly, Burić and Moe (2020) proved that teachers' positive emotions at work lead to increased enthusiasm and promoted teachers' self-efficacy and job satisfaction. By the same token, Wang and Ye's (2021) study

indicated that teacher emotion regulation as a pivotal personal feature can considerably affect learners' tendency to engage actively in the learning experience. Moreover, Wang et al. (2022) concluded that teacher engagement can consequentially impact EFL learners' success through positive feelings and teachers' emotional engagement has a paramount effect on students' accomplishments. Since learning a foreign language is a multifaceted and demanding task, language teachers should improve their emotional engagement in their classroom in various ways such as taking students' academic problems into account, and supporting them with encouragement and insightful feedback. In this way, they encourage learners to invest more effort in learning a language and ultimately enhance their EFL achievement.

The second factor of the TEQ is social engagement (colleagues) with 5 items reflecting teachers' relationships with their colleagues. Research (Asaoka, 2021; Geeraerts et al., 2018; Kvam, 2018) also indicates teachers' professional development cannot happen merely through formal professional development events; instead, most of the teachers' learning occurs through day-to-day interactions and discussions among colleagues. Kvam (2018) considered teachers' collaboration and interactions with colleagues as probable instruments for teachers' learning. She found that in learning settings, mental structures are noteworthy when ideas are challenged and a state of uncertainty is achieved. Likewise, Asaoka (2021) reported that taking part in a collaborative community of practice provided Japanese EFL teachers with the opportunity to reflect on and regulate their teaching practice which in turn leads to their professional growth.

The third factor of the TEQ, is social engagement (students), with 8 items dealing with teachers' relationships with their students. Several studies (Gan, 2021; Ibrahim & El Zaatari, 2020; Thornberg et al., 2020) proved that teachers' supportive relationships with students lead to better student achievement. Thornberg et al. (2020), for instance, stated that teachers who create and sustain kind, warm, and caring relationships with their students and are respectful and patient toward students attain more successful classroom management and effective teaching. Likewise, Ibrahim and El Zaatari (2020) asserted that the teachers' relationship with students is significant in educational settings since warm and supportive relationships promote learners' sense of school belonging, well-being, and positive identities. Similarly, Gan (2021) reported that the interactions between teachers and students in the context of learning a foreign language might play a central part in the progress of EFL learners' language ability. Moreover, some contributing factors were revealed that improve teacher-student relationships and interactions such as EFL learners' and teachers' expectations, knowledge, personality, beliefs, and the context of language teaching.

The fourth factor of TEQ, cognitive engagement, with 8 items, deals with teachers' amount of, notice of, and investment in their teaching tasks. Empirical studies (Atapattu et al., 2019; Ravindran et al., 2005; Sherab, 2013) revealed that recognizing what makes teachers cognitively engaged in their profession can contribute to them estimating where they invest their resources more, reflecting on if those activities are draining or energizing, and modifying their plans and practices

that they discover mentally draining. Atapattu et al. (2019) suggested an approach to detect cognitive engagement in negotiations within the community and the importance of examining types of cognitive engagement for identifying how teachers involve in professional growth.

Finally, agentic engagement with 11 items as the last factor addresses teachers' agentic engagement while doing teaching-related activities. Teacher agency is considered to be an essential component of effective and meaningful education for some reasons. First, cognizance of the teachers' agentic role as change agents in professional growth, school reform, and educational improvement is growing. Second, the particular problem of continual change in professional development requires the perception of teachers' agentic role in professional growth and education reform, since agentic action is associated with significant issues such as professional identity and schools' change capacity. Lastly, attention is increasing to the role of teachers' work atmosphere in professional development and education improvement (Imants & Van der Wal, 2020). Li and Ruppar (2021) stated that teachers with a high level of agentic engagement not only practice a higher level of professional decision-making but also consider it a vital element of teacher professionalism.

Because of the dearth of research in the teacher engagement questionnaires area, the only study whose findings can be compared with the outcomes of the present study is Klassen et al's engaged teacher scale (ETS) focusing on teachers' engagement in four domains: cognitive engagement, emotional engagement, social engagement (with students), and social engagement (with teachers). In terms of the structure of its components, the ETS and TEQ questionnaires are somewhat similar. That is, the components of emotional, social (students), social (colleagues), and cognitive engagement are common in both instruments. However, TEQ includes one more dimension of teacher engagement, agentic engagement, which is novel for theorizing and conceptualizing teacher engagement. The notion of agentic engagement is employed to describe teachers' attempts to take planned actions and to make choices for creating a significant change (Yangin Ekşi et al., 2019). Although the conceptualizations of teacher work engagement include aspects of cognitive, emotional, and social involvement that have been generally suggested, the upshots of the current study indicated that agentic engagement is a significant aspect of teacher engagement.

Conclusion

Teacher engagement has been considered a critical factor in attaining positive educational outcomes (Zhang & Yang, 2021), and keeping students motivated and engaged to accomplish their academic achievement in learning a foreign language demands teachers' improved levels of engagement (Bao et al., 2021). Therefore, evaluating teachers' level of engagement at work is essential since highly engaged teachers promote learners' engagement and achievement. The absence of a valid instrument to measure EFL teachers' engagement prompted us to conduct this mixed-methods research. Accordingly, the current study was set up to design and validate a potential evaluation inventory to assess EFL teachers' engagement that

resulted in the creation of a questionnaire with a final version containing 44 items loaded on five factors: emotional (11 items), social colleagues (5 items), social students (8 items), cognitive (8 items), and agentic (12 items) that showed the degree to which the statement was considered to be true by the participating teachers on a 7-point Lickert scale ranging from 1 to 7. Utilizing exploratory factor analysis, confirmatory factor analysis, and structural equation modeling, as analytical techniques, the newly-created questionnaire demonstrated strong psychometric features and can be implemented as an effective instrument for evaluating EFL teachers' engagement.

The results of our study provide some implications for stakeholders in the domain of teacher education. Conceptually speaking, the emerged model has the potential to portray a more accurate picture of a teacher engagement construct, providing a clear picture of the combination of conceptualizations of the issue. The outcomes of the current study can also introduce an agenda for further inquiries on teacher engagement and related topics in teaching contexts. In the first place, relations between teacher engagement and other various teacher-related variables can be explored by employing the newly-developed TEQ. In addition, TEQ as a valid and robust measurement instrument can be also used by the researchers together with qualitative instruments such as observation, and interviews, in related studies with a mixed-method design. Furthermore, making use of a valid scale for self-assessment purposes can contribute teachers to evaluating their engagement and promoting it to achieve desired learning outcomes. Moreover, supervisors and managers can utilize TEQ as a diagnostic or consciousness-raising tool, and teaching practitioners provide preservice and in-service teachers with learning programs and assignments pertaining to many facets of engagement and help them to recognize their engagement formation and perseveration.

This study has some limitations that must be taken into consideration. First of all, because this study was conducted in Iran and included only Iranian EFL teachers, the sample is not entirely representative of other populations. This is because Iranian EFL teachers may behave differently than other EFL teachers since cultural contexts can influence teachers' professional beliefs, motivation, and self-efficacy. The second drawback may be seen as the current study's limited sample size. It is crucial to use the newly created TEQ questionnaire with a bigger sample size in order to ensure generalizability. Additionally, because of the Covid-19 outbreak, it was impossible to access a large sample size, and participant individual differences like age, gender, experience, and cognitive, emotional, and social background were not fully controlled. Furthermore, semi-structured interviews were conducted as part of the qualitative phase of this study, as well as an inclusive review of the pertinent literature. Future studies can build on this research by using different data collection techniques, like classroom observation, documenting, and focused group discussions, to get a better understanding of the notion of teacher engagement.

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Appendix A

Semi-Structured Interview Questions

Table 1

Semi-structured Interview Questions, their Functions, and Sources

Question	Function	Source
1) In what specific ways can teachers engage emotionally in their teaching practice?	Emotional	Perera et al. (2018); Schaufeli et al. (2019)
2. In what specific ways can teachers engage cognitively in their teaching practice?	Cognitive	Harper-Hill et al. (2020); Perera et al. (2018); Teng (2019)
3. In what specific ways can teachers engage socially with their colleagues?	Social (colleagues)	Klassen et al. (2013)
4. In what specific ways can teachers engage socially with their students?	Social (students)	Klassen et al. (2013)
5. In what specific ways can teachers engage agenticly in their teaching practice?	Agentic	Leijen et al. (2020)

Appendix B

Teacher Engagement Questionnaire

	Statements	1	2	3	4	5	6	7
Emotional Engagement (EE)								
1	I enjoy teaching greatly.	1	2	3	4	5	6	7
2	I feel enthusiastic about teaching.	1	2	3	4	5	6	7
3	I am delighted while teaching.	1	2	3	4	5	6	7
4	Teaching is interesting for me.	1	2	3	4	5	6	7
5	While teaching, I am full of energy.	1	2	3	4	5	6	7
6	When I am teaching, time passes very quickly.	1	2	3	4	5	6	7
7	I cannot disconnect myself from teaching.	1	2	3	4	5	6	7
8	I am captivated by teaching.	1	2	3	4	5	6	7
9	I always keep going even when things do not go well with teaching in my class.	1	2	3	4	5	6	7
10	I am satisfied with being a teacher.	1	2	3	4	5	6	7
11	I feel vigorous while teaching.	1	2	3	4	5	6	7
Social Engagement: Colleagues (SEC)								
12	I appreciate my relationships with my colleagues at institute.	1	2	3	4	5	6	7
13	I provide assistance to my colleagues at institute.	1	2	3	4	5	6	7
14	I pay attention to my colleagues 'problems at institute.	1	2	3	4	5	6	7
15	I try to interact with my colleagues at institute.	1	2	3	4	5	6	7
16	At institute, I collaborate with my colleagues.	1	2	3	4	5	6	7
Social Engagement: Students (SES)								
17	I take into account my students' problems in class.	1	2	3	4	5	6	7
18	I display an appreciation of my students' feelings in class.	1	2	3	4	5	6	7
19	I pay attention to my students' feelings in class.	1	2	3	4	5	6	7
20	In class, I establish rapport with my students.	1	2	3	4	5	6	7
21	In class, I am aware of my students' needs.	1	2	3	4	5	6	7
22	In class, I respect my students.	1	2	3	4	5	6	7
23	I facilitate discourse with my students and their parents.	1	2	3	4	5	6	7
24	I have a positive attitude toward my students.	1	2	3	4	5	6	7
Cognitive Engagement (CE)								
25	I work meticulously while teaching.	1	2	3	4	5	6	7
26	I devote myself while teaching.	1	2	3	4	5	6	7
27	I work vehemently while teaching.	1	2	3	4	5	6	7
28	I exert myself to do well while teaching.	1	2	3	4	5	6	7
29	While teaching, I put aside everything else.	1	2	3	4	5	6	7
30	I am resilient while teaching.	1	2	3	4	5	6	7
31	Teaching is meaningful and significant for me.	1	2	3	4	5	6	7
32	I reflect actively on my teaching practices and behaviors in class.	1	2	3	4	5	6	7
Agentic Engagement (EA)								
33	I enact the required changes in my teaching context.	1	2	3	4	5	6	7
34	I make creative choices to make influential differences in my teaching practice.	1	2	3	4	5	6	7
35	I take principled actions to deal with problems in my class.	1	2	3	4	5	6	7
36	I take advantage of available resources to promote my teaching quality.	1	2	3	4	5	6	7
37	I make responsible robust judgments about the value of my intention while taking action in my class.	1	2	3	4	5	6	7

	Statements	1	2	3	4	5	6	7
Emotional Engagement (EE)								
38	I evaluate whether I have met the goals that I have set.	1	2	3	4	5	6	7
39	I initiate purposeful teaching-related actions in my class.	1	2	3	4	5	6	7
40	I respond anticipatorily to the emerging ambiguities and dilemmas in my class.	1	2	3	4	5	6	7
41	I try to critically form my responses to challenging situations in my class.	1	2	3	4	5	6	7
42	I search for innovative ideas to employ in my class.	1	2	3	4	5	6	7
43	I monitor my student's progress in class and provide them with my feedback.	1	2	3	4	5	6	7
44	I rely on my personal and professional experiences to deal with challenging situations in my class.	1	2	3	4	5	6	7

1 = "never" **2** = "almost never" **3** = "only occasionally" **4** = " sometimes" **5** = "usually"
6 = "almost always" **7** = "always"

Appendix C

Tables and Figures

Table 1

One-Sample Kolmogorov-Smirnov Test of the Teacher Engagement Questionnaire and Engaged Teacher Scale

		Teacher Engagement Questionnaire	Engaged Teacher Scale
N		238	238
Normal Parameters	Mean	47.13	126.63
	SD	9.29	25.56
Asymp. Sig. (2-tailed)		.78	.99

According to Table 1, the significance value of the total score of the teacher engagement questionnaire is .78 and that of the engaged teacher scale is .99, both of which are higher than the critical .05 level of significance ($\alpha = .05$; $p > \alpha$) meaning that both data sets are normal and therefore, parametric kind of formulae, Pearson Correlation, in this case, was appropriate.

Table 2

Correlations Between the Teacher Engagement Questionnaire and Engaged Teacher Scale

		Teacher Engagement Questionnaire Total Score
Engaged Teacher Scale Total Score	Pearson Correlation	.78
	Sig. (2-tailed)	.00**

As reported in Table 2, the teacher engagement questionnaire total scores were highly and significantly correlated with the engaged teacher scale's total scores, and hence a good sign of the criterion-related validity of the two inventories.

Table 3

Minimum and Maximum Standardized Scores; Teacher Engagement Questionnaire

Items	Min	Max	Items	Min	Max	Items	Min	Max
Q1	-1.73	2.59	**Q16**	-2.44	**3.47**	Q31	-1.76	2.59
Q2	-1.58	3.00	Q17	-1.74	2.54	Q32	-2.53	1.48
Q3	-2.55	1.44	Q18	-2.52	1.47	Q33	-1.64	3.00
Q4	-2.33	3.24	Q19	-1.74	2.60	Q34	-2.77	1.50
Q5	-1.67	1.51	Q20	-2.40	1.28	Q35	-2.28	3.21
Q6	-2.44	1.34	Q21	-2.23	1.18	Q36	-2.33	1.19
Q7	-1.59	1.46	Q22	-2.56	1.40	Q37	-2.46	1.97
Q8	-1.56	1.47	Q23	-2.48	1.31	Q38	-1.68	1.54
Q9	-1.56	1.49	Q24	-2.34	1.24	Q39	-2.54	1.31
Q10	-2.28	3.21	Q25	-1.66	1.50	Q40	-1.79	2.64
Q11	-2.54	1.48	Q26	-1.72	2.51	Q41	-1.79	2.65
Q12	-2.37	1.25	**Q27**	-2.41	**3.33**	Q42	-2.35	3.25
Q13	-1.58	1.42	Q28	-1.79	2.62	Q43	-2.63	1.55
Q14	-2.62	1.47	Q29	-2.48	1.36	Q44	-1.63	1.39
Q15	-1.51	1.41	Q30	-2.60	1.45			

Table 4

Descriptive Statistics: Mahalanobis Distances

	N	Min	Max	Mean	Std. Deviation
Mahalanobis Distance	234	27.36	69.79	43.8120	7.16838
Critical Value of Chi-square (.001, 44)	78.74				

Table 5

Tests of Univariate and Multivariate Outliers

Item	skew	kurtosis	Item	skew	kurtosis	Item	skew	kurtosis
Q32	-.829	.072	Q37	-.122	-1.050	Q14	-.740	-.051
Q31	.616	-.503	Q36	-.542	-.653	Q15	-.039	-.889
Q30	-.876	.363	Q35	.306	1.780	Q16	-.016	.929
Q29	-.857	-.026	Q34	-.817	.051	Q11	-.485	-.611
Q28	.594	-.516	Q33	.048	-.339	Q10	.384	1.493
Q27	.276	.778	Q17	.476	-.435	Q9	-.021	-.635
Q26	.453	-.814	Q18	-.710	-.288	Q8	-.022	-.682
Q25	-.025	-.454	Q19	.517	-.403	Q7	-.034	-.656
Q44	-.081	-.687	Q20	-.427	-.718	Q6	-.284	-.821
Q43	-.664	-.109	Q21	-.645	-.519	Q5	-.031	-.452
Q42	.342	1.669	Q22	-.950	.235	Q4	.269	.967
Q41	.471	-.380	Q23	-.403	-.627	Q3	-.872	.078
Q40	.482	-.377	Q24	-.513	-.582	Q2	.060	-.420
Q39	-.503	-.522	Q12	-.465	-.703	Q1	.710	-.099
Q38	-.022	-.398	Q13	-.042	-.723	Mardia	19.168	

Table 6

Corrected Item-Total Correlations

Items	EE	SEC	SES	CE	AE
Q1	.716	.679	.679	.640	.655
Q2	.649	.648	.607	.706	.616
Q3	.588	.617	.675	.596	.678
Q4	.685	.661	.692	.648	.729
Q5	.659	.646	.699	.603	.684
Q6	.654		.679	.627	.633
Q7	.677		.650	.675	.631
Q8	.616		.654	.548	.696
Q9	.648				.673
Q10	.654				.671
Q11	.628				.631
Q12					.687

Table 7

Factor Correlation Matrix

Factor	1	2	3	4	5
1	1.000				
2	.186	1.000			
3	.153	.147	1.000		
4	.169	.149	.168	1.000	
5	.157	.146	.163	.111	1.000

Figure 1

Scree Plot for Deciding on the Optimum Number of Factors to Be Extracted

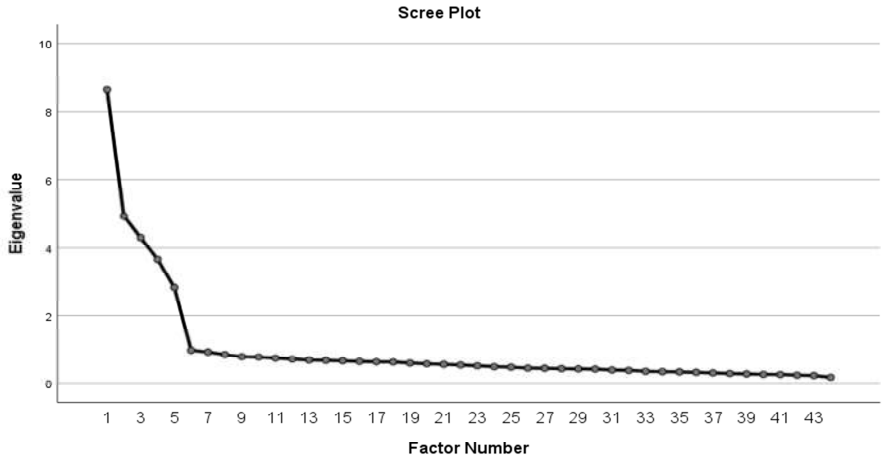


Table 8

Watkin's Parallel Analysis

Factors	Simulated	Eigenvalue	Decision	Factors	Simulated	Eigenvalue	Decision
1	1.958	8.661	KEEP	23	0.923	0.511	DROP
2	1.841	4.914	KEEP	24	0.892	0.485	DROP
3	1.760	4.300	KEEP	25	0.863	0.471	DROP
4	1.693	3.666	KEEP	26	0.836	0.443	DROP
5	1.634	2.832	KEEP	27	0.809	0.439	DROP
6	1.580	0.972	DROP	28	0.781	0.428	DROP
7	1.530	0.920	DROP	29	0.752	0.419	DROP
8	1.476	0.843	DROP	30	0.729	0.415	DROP
9	1.432	0.781	DROP	31	0.703	0.388	DROP
10	1.384	0.771	DROP	32	0.677	0.378	DROP
11	1.343	0.738	DROP	33	0.650	0.350	DROP
12	1.302	0.711	DROP	34	0.625	0.341	DROP
13	1.264	0.681	DROP	35	0.598	0.333	DROP
14	1.221	0.673	DROP	36	0.573	0.319	DROP
15	1.185	0.659	DROP	37	0.547	0.303	DROP
16	1.153	0.641	DROP	38	0.522	0.285	DROP
17	1.117	0.629	DROP	39	0.496	0.274	DROP
18	1.082	0.624	DROP	40	0.468	0.259	DROP
19	1.051	0.593	DROP	41	0.443	0.255	DROP
20	1.019	0.571	DROP	42	0.417	0.236	DROP
21	0.984	0.554	DROP	43	0.387	0.225	DROP
22	0.953	0.536	DROP	44	0.350	0.173	DROP

Figure 2

Plot for Deciding on the Optimum Number of Factors Using R Package "Psych"

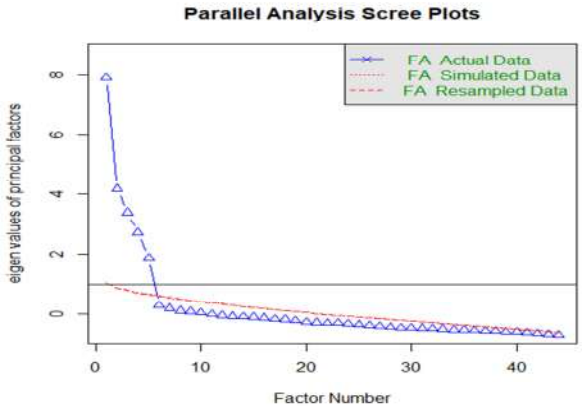


Table 9

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.886
Bartlett's Test of Sphericity	Approx. Chi-Square	4910.910
	df	946
	Sig.	.000

Table 10

Rotated Factor Matrix

	Factors
	Agentic
Q36	.759
Q40	.724
Q42	.708
Q35	.706
Q37	.696
Q41	.691
Q44	.687
Q33	.684
Q43	.669
Q38	.662
Q34	.660
Q39	.641

Table 10

Rotated Factor Matrix

Factors	
Emotional	
Q1	.746
Q4	.729
Q7	.719
Q5	.694
Q10	.691
Q2	.685
Q9	.677
Q6	.667
Q11	.665
Q8	.654
Q3	.606
Social (Students)	
Q21	.736
Q20	.726
Q17	.713
Q22	.713
Q19	.706
Q24	.692
Q23	.682
Q18	.643
Cognitive	
Q26	.766
Q31	.730
Q28	.700
Q25	.693
Q27	.654
Q30	.651
Q29	.644
Q32	.564
Social (Colleagues)	
Q12	.755
Q15	.738
Q13	.713
Q16	.699
Q14	.682

Table 11

Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	8.661	19.684	19.684	8.163	18.552	18.552	5.906	13.423	13.423
2	4.914	11.169	30.853	4.410	10.023	28.575	5.371	12.207	25.630
3	4.300	9.774	40.626	3.801	8.640	37.214	4.105	9.329	34.959
4	3.666	8.331	48.957	3.161	7.185	44.399	3.832	8.710	43.669
5	2.832	6.436	55.393	2.368	5.381	49.780	2.689	6.112	49.780
6	.972	2.209	57.602						
7	.920	2.090	59.693						
8	.843	1.916	61.608						
9	.781	1.775	63.384						
10	.771	1.752	65.135						
11	.738	1.678	66.814						
12	.711	1.616	68.430						
13	.681	1.547	69.978						
14	.673	1.529	71.506						
15	.659	1.498	73.004						
16	.641	1.457	74.461						
17	.629	1.430	75.891						
18	.624	1.418	77.308						
19	.593	1.347	78.655						
20	.571	1.298	79.953						
21	.554	1.259	81.213						
22	.536	1.218	82.431						
23	.511	1.160	83.591						
24	.485	1.103	84.694						
25	.471	1.070	85.764						
26	.443	1.007	86.771						
27	.439	.997	87.768						
28	.428	.974	88.741						
29	.419	.952	89.693						
30	.415	.944	90.637						
31	.388	.883	91.520						
32	.378	.858	92.378						
33	.350	.796	93.174						
34	.341	.774	93.948						
35	.333	.757	94.704						
36	.319	.724	95.429						
37	.303	.689	96.117						
38	.285	.648	96.766						
39	.274	.622	97.388						
40	.259	.590	97.977						
41	.255	.580	98.557						
42	.236	.537	99.094						
43	.225	.512	99.607						
44	.173	.393	100.000						

The TEQ model consists of five measurement models Emotional Engagement (EE), Social Engagement Colleagues (SEC), Social Engagement Students (SEs), Cognitive Engagement (CE), and Agentic Engagement (AE). Before discussing the results, two points should be clarified. First, for each of the measurement models and also for the main TEQ model, five fit indices of chi-square, degree of freedom, NFI, CFI, and RMSEA are reported. These fit indices were suggested by APA manual seventh edition. Second, since structural equation modeling is a sample-demanding analysis; the results of the chi-square test can become significant even if all other fit indices support the fit of the model. As noted by Khine (2013, p. 14), "The $\chi 2$ also tends to be greater when the number of observed variables increases. Consequently, a nonsignificant *p*-level is uncommon, although the model may be a close fit to the observed data. For this reason, the $\chi 2$ cannot be used as a sole indicator of model fit in SEM". Bowen and Guo (2011) have also significant results of the chi-square being ignored only if other fit indices support the fit of the model. Figure 3 displays the measurement model for emotional engagement. All items had large; i.e., > = .50 contributions to EE. Although the APA manual suggested five fit indices to be reported, i.e., the chi-square test and its degree of freedom, CFI, NFI, and RMSEA, the NFI index was not reported. As noted by Byrne (2010) CFI is the revised version of NFI which has taken into account the sample size; moreover, she suggested CFI be preferred over NFI.

Table 12

Chi-Square, NFI, CFI, and RMSEA Fit Indices of TEQ and its Components

Models	Chi-Square	df	NFI	CFI	RMSEA
EE	49.48	44	.99	1.00	.023
SEC	2.17	5	1.00	1.00	.000
SES	7.85	20	1.00	1.00	.000
AE	75.93	54	.98	1.00	.042
CE	37.45	20	.98	.99	.061
TEQ Model	769.58	896	1.00	1.00	.000

The chi-square badness of fit should be non-significant; i.e., > .05 to support the fit of the model. The NFI and CFI indices should be equal to or higher than .95. The RMSEA fit indices between .05 to.08 support a good fit (Byrne, 2010; Kline, 2016). The results are discussed below for each measurement model.

The EE measurement model enjoyed a good fit (Table 12). The chi-square test of the badness of fit was not significant (χ^2 (44) = 45.48, p > .05). The NFI and CFI indices of .99 and 1.00 were higher than .95, and finally, the RMSEA index of .023 was between .05 and .08. All these indices supported the fit of the EE measurement model.

Figure 3

Measurement Model of Emotional Engagement

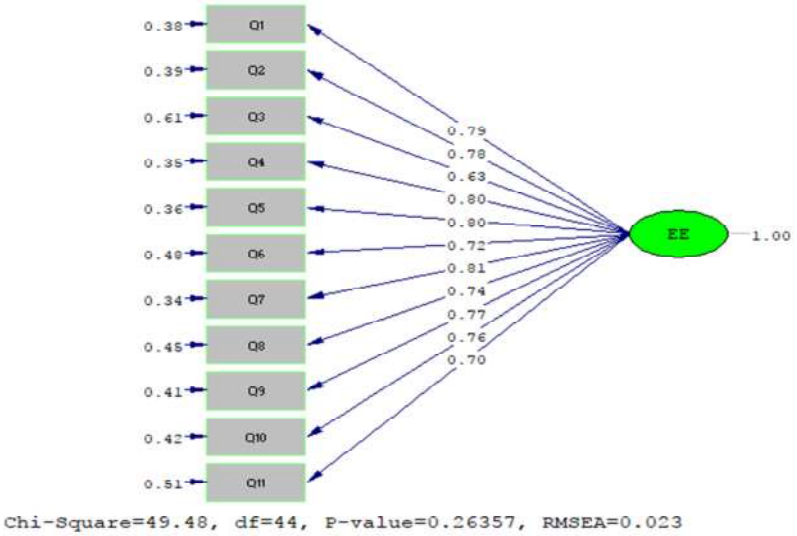


Figure 4 displays the measurement model for social engagement (colleagues). All items had large; i.e., > = .50 contributions to SEC. The model enjoyed a good fit (Table 12). The chi-square test of the badness of fit was not significant (χ^2 (5) = 2.17, p > .05). The NFI and CFI indices of 1.00 were higher than .95; and finally, the RMSEA index of .000 was between .05 and .08. All these indices supported the fit of the SEC measurement model.

Figure 4

Measurement Model of Social Engagement (Colleagues)

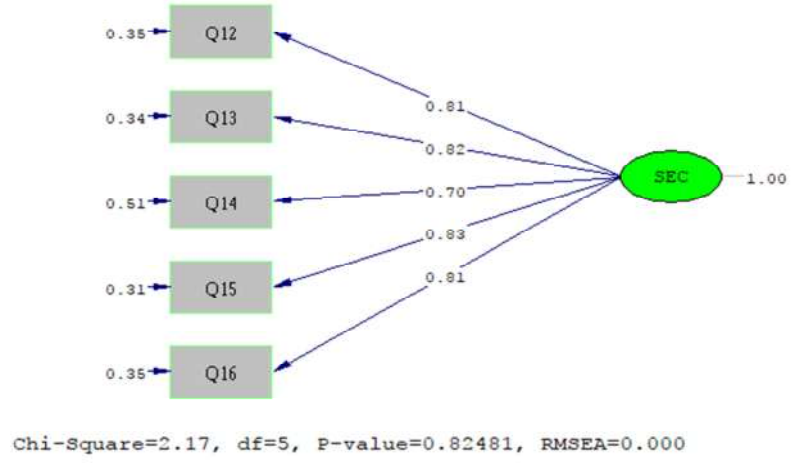


Figure 5 displays the measurement model for students. All items had large; i.e., > = .50 contributions to SES. The model enjoyed a good fit (Table 12). The chi-square test of the badness of fit was not significant (χ^2 (20) = 7.85, p > .05). The NFI and CFI indices of 1.00 were higher than .95; and finally, the RMSEA index of .000 was between .05 and .08. All these indices supported the fit of the SES measurement model.

Figure 5

Measurement Model of Social Engagement (Students)

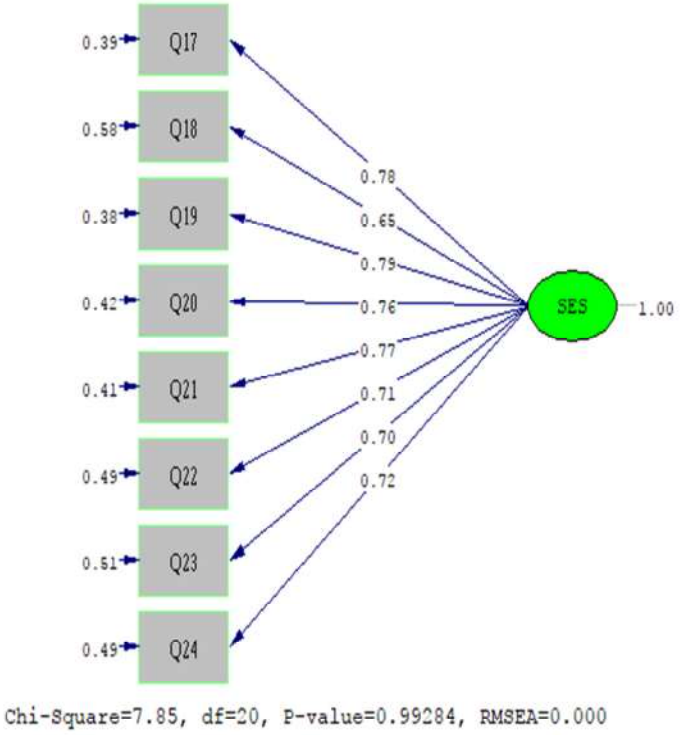
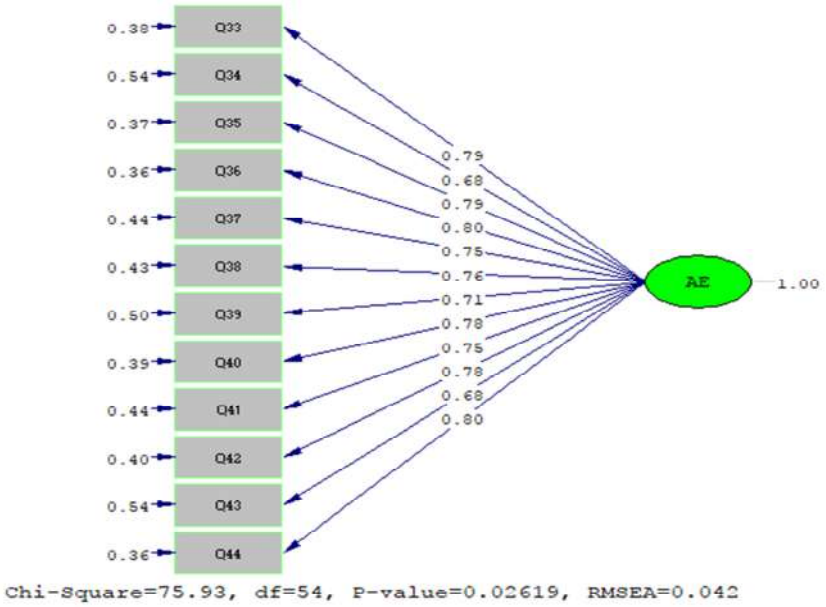


Figure 6 displays the measurement model for agentic engagement. All items had large; i.e., > = .50 contributions to AE. The model enjoyed a good fit (Table 12). The chi-square test of the badness of fit was significant (χ^2 (54) = 75.93, p < .05); these results can be ignored since other fit indices supported the fit of the AE model. The NFI and CFI indices of .98 and 1.00 were higher than .95; and finally, the RMSEA index of .042 was between .05 and .08. All these indices supported the fit of the AE measurement model.

Figure 6

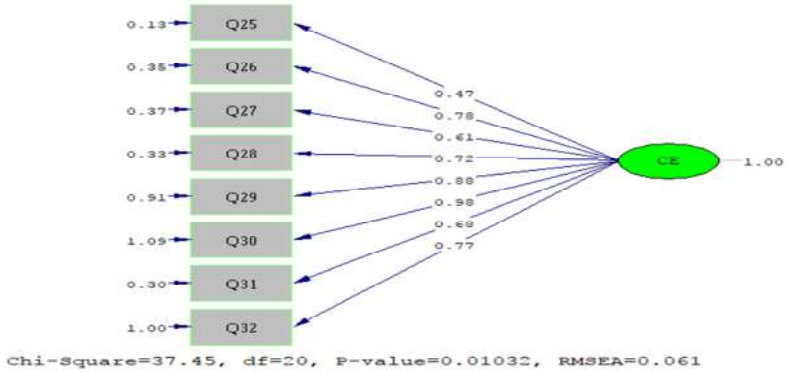
Measurement Model of Agentic Engagement



The fit of the cognitive engagement measurement model also proved the chi-square test of the badness of fit was significant (χ^2 (20) = 37.45, p < .05); these results can be ignored since other fit indices supported the fit of the CE model. The NFI and CFI indices of .98 and .99 were higher than .95; and finally, the RMSEA index of .061 was between .05 and .08 (Table 12). All these indices supported the fit of the CE measurement model (Fig. 7)

Figure 7

Measurement Model of Cognitive Engagement



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