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# School leadership engagement: validation of the Portuguese version of UWES scale

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The Utrecht Work Engagement Scale (UWES) is a widely used self-report scale with the original twenty-three items and its abbreviated version of nine items to assess workers' engagement. This paper reports a validation study of the UWES-17 and UWES-9 using confirmatory factor analysis, its convergent validity and invariance across gender in a sample of 921 Portuguese school leaders. The main findings support a bidimensional conceptualization of work engagement measurement. The Portuguese version of UWES-9 is proposed as a reliable and robust (CFI = 0.97; TLI = 0.95; RMSEA = 0.073) tool to assess work engagement amongst Portuguese school leadership. The 9-item UWES is a reliable instrument to assess work engagement among Portuguese school leaders and could be used as an effective screening tool in educational contexts.

## KEYWORDS

work engagement, school leadership, assessment, UWES scale, confirmatory factor analysis

## Introduction

Teacher work engagement refers to the extent to which teachers feel positively involved in their work and invest in their roles as educators. Work engagement is identified by feelings of energy, dedication, and enthusiasm towards teaching, as well as a sense of purpose and fulfilment in their work. [Schaufeli and Bakker \(2004a,b\)](#) defined work engagement as a positive, fulfilling, work-related state of mind that is characterised by vigour, dedication, and absorption. They argued that engaged employees are more likely to experience positive outcomes, such as increased job satisfaction, organisational commitment, and performance. A high number of studies have examined specifically teacher work engagement. For example, [Bakker et al. \(2005\)](#) found that teachers who were highly engaged in their work reported greater job satisfaction, commitment, and performance. Other researchers have examined the factors that contribute to teacher work engagement. [Skaalvik and Skaalvik \(2014\)](#) concluded that teacher autonomy and social support were positively related to work engagement, whilst job demands were negatively related. [Zhang et al. \(2021\)](#) provide empirical evidence of how autonomy support influences teachers' work engagement, stating that teachers with more autonomy have stronger teaching motivation and increased levels of work engagement. Similarly, [Hakanen et al. \(2006\)](#) study pointed out that job resources, such as social support and feedback, were positively related to teacher work engagement. [Hermanto and Srimulyani \(2022\)](#) also refer that the most relevant aspect of work engagement is dedication, favouring meaning and significance to the work performed, with a positive impact on the organisation oriented towards

transformation. Leaders who explore new ways of doing and innovating are transformational leaders who increase their self-motivation and self-worth through their involvement and dedication (Ahmed, 2021; Wang et al., 2023).

In summary, teacher work engagement is a positive state of mind characterised by energy, dedication, and absorption in the work of teaching. Research has consistently shown that engaged teachers are more likely to experience positive outcomes, such as job satisfaction, commitment, and performance. Factors that contribute to teacher work engagement include autonomy, social support, and job resources.

The results of school leadership studies are diverse but generally show that effective leadership engagement can have a positive impact on teacher job satisfaction, teacher collaboration, student outcomes, and overall positive school climate (e.g., Leithwood et al., 2008; Leithwood and Jantzi, 2008; Hallinger and Heck, 2010; Boberg and Bourgeois, 2016; Leithwood and Sun, 2018; Mora-Ruano et al., 2021; Tan et al., 2021). An effective leader can influence the attitudes and behaviour of teachers, thereby influencing their involvement in the work, which is critical to improving the success of organisations and ensuring educational quality (Hermanto and Srimulyani, 2022). In this way, the school leadership can create a positive school culture, improve teaching and learning practises, and promote positive student outcomes. School leadership practises, such as supportive leadership and shared leadership, are associated with increased teacher job satisfaction and organisational commitment (e.g., Hulpia et al., 2009; Liu and Werblow, 2019; Berkovich and Bogler, 2021; Mansor et al., 2021). Simbula et al. (2013) argue that teachers who are more engaged find it easier to take advantage of opportunities that arise in work situations that favour the development of their skills and the perception of the meaning of their actions. Zahed-Babelan et al. (2019) proved the belief that the principal could have an indirect effect on teachers' work engagement through indirect variables such as school culture, teacher empowerment, and job characteristics. Another relevant piece of evidence is the linkage between school leadership and student academic achievement improvement. A meta-analysis research by Tan et al. (2021) found that effective school leadership practises, such as setting clear goals and expectations, providing feedback, and creating a positive school climate have a significant positive effect on student achievement.

The most popular instruments in assessing teacher work engagement are: (1) The Utrecht Work Engagement Scale (UWES, Schaufeli and Bakker, 2004a,b), which measures engagement along three dimensions: vigour, dedication, and absorption, (2) The Engaged Teachers Scale (ETS) by Klassen et al. (2013) which measures teacher engagement through a 16-item and 4-factor scale. Federici and Skaalvik (2011) used UWES as one of the tools for studying Norwegian principals' self-efficacy and work engagement. Their explanation to choose UWES fits in the Portuguese principals' work which is often described in terms of being demanding, hectic and unpredictable, in part because the curriculum and educational policy are often subject to change. This study use the UWES scale since it is a scale used in multiple contexts, including in educational settings for assessing work engagement.

## The current study

The Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002) is often used to assess worker engagement (Vecina et al., 2012).

The UWES scale measures three indicators that give back information about work engagement: vigour, dedication, and absorption. Vigour describes the perseverance shown when obstacles arise in the workplace or the willingness to find solutions in circumstances where challenges place the need for an important level of mental resilience and energy. Dedication implies a strong involvement in one's work and is associated with feelings of challenge, pride, a strong level of enthusiasm and inspiration. Finally, absorption refers to immersion and focuses on work, through which the worker loses track of time and experiences difficulties separating oneself from one's work without regard to time spent and the inability to switch off, and it is closely linked to the intrinsic motivation to perform the tasks (Schaufeli and Bakker, 2004a,b; Nerstad et al., 2009; Ahmed, 2021; Wang et al., 2023). The UWES has been validated in several European countries across diverse populations (e.g., students, health, and rescue workers), including Finland (Seppälä et al., 2008), Italy (Balducci et al., 2010; Simbula et al., 2013), Greece and the Netherlands (Xanthopoulou et al., 2012), Norway (Nerstad et al., 2009), Portugal (Teles et al., 2017; Sinval et al., 2018), Spain (Serrano et al., 2019), Perú (Merino-Soto et al., 2022).

Despite the popularity and large-scale use of the UWES (Schaufeli et al., 2006), there is no consensus on the most appropriate factorial structure of the scale. Previous studies empirically support the original three-factor solution: vigour, dedication, and absorption (Schaufeli et al., 2002; Storm and Rothmann, 2003; Nerstad et al., 2009; Simbula et al., 2013). Nerstad et al. (2009) point out the possibility that work engagement can be conceptualized with two central concepts – vigour and dedication – with the concept of absorption being considered a separate but related factor. However, other studies failed to support this factorial structure (Sonnentag, 2003; Wefald and Downey, 2009), arguing that the UWES can be more represented through a unidimensional organisation (Christian and Slaughter, 2007; Shimazu et al., 2008; Serrano et al., 2019; Merino-Soto et al., 2022). In several other studies, the UWES has been shortened to fifteen items (Storm and Rothmann, 2003; Salanova et al., 2005) and even to nine items (Fong and Ng, 2012). Even with these shortened versions, there is insufficient evidence on whether the scale is more robust as a unidimensional or multidimensional measure of work engagement (Fong and Ng, 2012; Mills et al., 2012; Vecina et al., 2012; Serrano et al., 2019).

This article reports the results of a study that aimed to address two objectives. Firstly, it sought to examine the factorial validity of the UWES amongst Portuguese teachers performing leadership roles. Secondly, this study thoroughly examined the 9-item version as a choice to the 17-item UWES in assessing school leaders' work engagement.

## Method

### Participants

Participants were Portuguese teachers with leadership roles in elementary to secondary schools in several districts from Portugal's mainland, the Azores and Madeira islands. Participants were selected by a non-probabilistic sampling method (Cohen et al., 2018). The total number of participants in the entire dataset was 919. Of these, 555

(60%) are female and 364 (40%) are male, and ages ranged from 24 to 68 years, with an average age of 53 years old. Years of experience in leadership roles ranged from 1 to 39 years ( $M = 11.80$ ,  $SD = 8.73$ ) and 43.4% of participants have leadership training.

## Measures

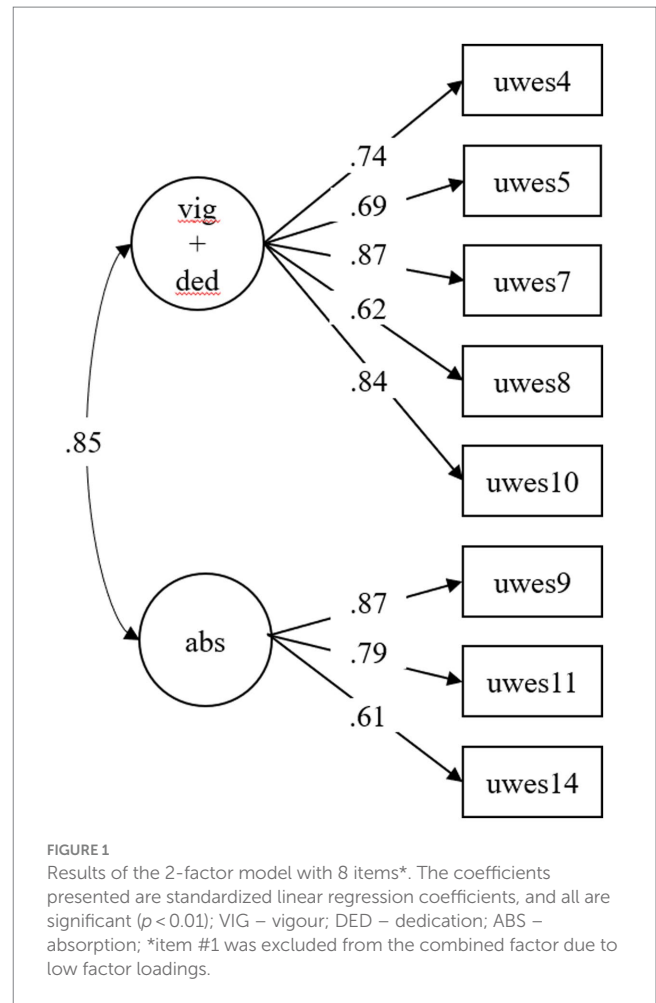
School leaders' work engagement was assessed with the Utrecht Work Engagement Scale (UWES; [Schaufeli and Bakker, 2004a,b](#)). The UWES ([Schaufeli and Bakker, 2004a,b](#)) consists of statements measuring how teachers feel at work. Teachers are asked to indicate how often they feel (e.g., "At my work, I feel bursting with energy") by crossing the number (from 1 to 6) that best describes how frequently they feel that way. Several forms of the questionnaire exist, of which, a 17-item and 9-item version is particularly widely used. These two versions have been shown to have good psychometric properties, especially the 9-item version ([Schaufeli et al., 2002, 2006](#)). Confirmatory factor analyses showed that a three-factor structure, constituted by vigour, dedication, and absorption, is more adequate to evaluate work engagement than a one-factor solution. Concerning the 17-item version, the reliabilities of the original version were 0.83 for vigour, 0.92 for dedication, 0.82 for absorption, and 0.93 for the total score. For the 9-item version, these coefficients were .84 for vigour, 0.89 for dedication, 0.79 for absorption, and 0.93 for the total score ([Schaufeli and Bakker, 2004a,b](#)). One of the aims of this paper is to establish the psychometric properties of the Portuguese version of the UWES-17 and the UWES-9 in a sample of school leaders.

All the items of the survey were translated to Portuguese, and then backtranslated to English to ensure the equivalence of the versions. To validate the content of the instrument, an expert panel reviewed it in terms of its clarity, conciseness, and readability. The five members of this panel ([Oluwatayo, 2012](#)) were chosen according to a wide range of criteria, such as their expertise about school leadership and work engagement.

The factor structures of the 17 and 9-item of the UWES were assessed using traditional CFA techniques. We have assessed three alternative models representing the latent structure of both versions of the UWES. Model 1 represented the UWES as a unidimensional structure in which all items are loaded onto a single engagement factor. Model 2 reflected the original three-factor model of vigour, absorption, and dedication. Vigour and Dedication were found to be highly correlated ( $r = 0.86$ , 95% C.I. = 0.84 to 0.87) and we decided to merge both in a single factor. Model 3 was the proposed bidimensional model, which combines the factors of Vigour and Dedication (see [Figure 1](#)).

## Data analysis

To examine the factorial structure of both the UWES-17 and the UWES-9, a series of CFA were run using Mplus 8 ([Muthén and Muthén, 1998–2017](#)). Measuring models were estimated with robust maximum likelihood estimation (MLR), given the strong non-normality and with weighted least square mean and variance corrected (WLSMV) considering the ordinal nature of the data. Both types of estimation work well with non-normal data, but WLSMV works better with non-normal and ordinal data ([Yuan and Bentler,](#)



[2000; Finney and DiStefano, 2006](#)). Following the method used by [Balducci et al. \(2010\)](#), three models were calculated for each version of the questionnaire: a one-factor solution, for which all the items were associated with a general work engagement factor; a three-factor model, and an alternative bidimensional model combining Vigour and Dedication in a single factor and a second factor including Absorption. The fit of the model was considered acceptable when the comparative fit index (CFI) and the Tucker-Lewis index (TLI) reached values equal to or lower than 0.90, and when the root mean square error of approximation (RMSEA) and the standardized root mean square residual (SRMR) reached values equal or lower than 0.08 ([Hu and Bentler, 1999](#)). In addition, Cronbach's alpha, McDonald's omega, and composite reliability (CR) indexes were used to estimate the internal consistency of the scale. Data analyses were conducted with SPSS 28 ([IBM Corp, 2021](#)) and Mplus 8 ([Muthén and Muthén, 1998–2017](#)).

## Results

### CFA of the UWES-17

The CFA results suggested that both the unidimensional and the three-factor models provided a satisfactory representation of the data with the CFI and TLI indices above 0.90 indicating a reasonable

TABLE 1 Model fit indices for the alternative models of the UWES-17.

Models	$\chi^2$	df	CFI	TLI	RMSEA 90% CI	SRMR	AIC	BIC
Model 1 (1-factor)	969.815	116	0.929	0.916	0.089 [0.084,0.095]	0.042	37,798	38,058
Model 2 (2-factor)	538.906	86	0.938	0.924	<b>0.076</b> [0.070,0.082]	0.035	31,986	32,222
Model 3 (3-factor)	894.672	114	0.906	0.888	0.086 [0.081,0.092]	0.056	38,063	38,333

N=921;  $\chi^2$  = chi-square goodness of fit statistic; df, degrees of freedom; RMSEA, Root-Mean-Square Error of Approximation with 90% Confidence Intervals; AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; CFI, Comparative Fit Index; TLI, Tucker Lewis Index; SRMR = Standardized Square Root Mean Residual.

TABLE 2 Model fit indices for the alternative models of the UWES-9.

Models	$\chi^2$	df	CFI	TLI	RMSEA 90% CI	SRMR	AIC	BIC
Model 1 (1-factor)	216.014	26	0.945	0.924	0.089 [0.078,0.100]	0.038	21,715	21,850
Model 2 (2-factor)	100.586	17	0.970	0.952	<b>0.073</b> [0.060,0.087]	0.026	18,698	18,829
Model 3 (3-factor)	205.334	23	0.947	0.918	0.093 [0.081,0.105]	0.037	21,707	21,856

N = 921;  $\chi^2$  = chi-square goodness of fit statistic; df = degrees of freedom; RMSEA, Root-Mean-Square Error of Approximation with 90% Confidence Intervals; AIC, Akaike Information Criterion; BIC, Bayesian Information Criterion; CFI, Comparative Fit Index; TLI, Tucker Lewis Index; SRMR, Standardized Square Root Mean Residual.

goodness of fit (see Table 1). Overall, the 2-factor model (Model 2) produced the most superior model fit indices of the three tested models. Based on these findings, the bi-dimensional structure of UWES-17 does appear to be a valid measure of work engagement for Portuguese school leadership.

### CFA of the UWES-9

Later the latent structure of the 9-item UWES was assessed by comparing Models 1–3. As displayed in Table 2, the three models provided an acceptable representation of the data and models 1 and 3 exhibited similar fit statistics. For each model, the CFI and TLI indices suggested an acceptable fit, and the SRMR results indicated an excellent fit. Only the RMSEA indices failed to satisfy minimally acceptable levels for acceptable fit for Models 1 and 3. The AIC and BIC suggested the statistical superiority of the 2-factor solution since has the best goodness of fit indices amongst the models. Overall, the AIC and BIC indices were lower for the 2-factor model, suggesting that merging the factors ‘Vigour’ and ‘Dedication’ in a single factor, together with the factor ‘Absorption’ increase the model complexity and contributes to a greater representation of the UWES-9 (Figure 1).

Analyses of the AVE showed that all dimensions presented values above the threshold of 0.50 (Fornell and Larcker, 1981; Cheung and Chang, 2017), indicating a high proportion of variance. Also, the composite reliability values and correlation between dimensions scored high.

Findings obtained in the multigroup CFA for the demographic variables suggested that the UWES-9 measures the same construct across gender. The configural (structural equivalence), metric (invariant factor loadings), and scalar (invariant intercepts) invariance models indicated good fit indices, as detailed in Table 3. The difference in CFI and RMSEA indices between metric versus configural and between metric versus scalar was below the thresholds of 0.010 and 0.015, respectively (Chen, 2007). These results support the metric and scalar invariance of gender, meaning that the scale means are comparable across gender.

We tested for group differences in work engagement scores across gender and training in school leadership. UWES mean scores

were compared across gender and no differences were found. In an opposite direction, significant differences in mean scores were identified when comparing participants according to school leadership training. Participants who had training scored higher than those who had no training in school leadership [ $t$  (Absorption) = 4.558,  $p = 0.00$ ;  $t$  (Dedication and Vigour) = 4.128,  $p = 0.00$ ].

### Discussion

The present study performed a systematic examination of the dimensionality and validation of the UWES-9 and UWES-17 to Portuguese school leaders. The main findings indicated that the 2-factor solution fits better than the one and three-factor solution for both the 17-item and the 9-item versions of the UWES. Better fit indices were generally observed for the UWES-9. Combining the factors of ‘Vigour’ and ‘Dedication’ into a single factor, along with the factor ‘Absorption’, not only increases the complexity of the model but also contributes to a greater representation of the UWES-9. The 2-factor structure makes the UWES-9 a more robust assessment tool than the original version.

Nerstad et al. (2009) investigated across occupational groups in Norway the factorial validity of the Utrecht Work Engagement Scale (UWES) amongst 1,266 participants. Confirmatory factor analyses, as well as multi-group and individual analyses, indicated that a three-dimensional model of both the UWES-17 and the short version, UWES-9, provided a better fit to the data than a one- and two-dimensional model. The results of multi-group analyses and analyses of each of the groups separately indicated that with a few exceptions, the three-factor model of work engagement provided the best fit.

As in the Japanese sample for the short UWES-9 and the UWES-17 versions (Shimazu et al., 2008), results from the factorial validity of the Utrecht Work Engagement Scale (UWES) in a 475 Korean student sample have shown that the UWES 17 and 9-items short version has a better fit on one single dimension than on three-dimensional scales (Römer, 2016). Römer (2016) emphasised that the covariance matrix of the three latent variables Vigour, Absorption, and Dedication was far from definitive. One reason for the model’s misspecification could be the high intercorrelation between the three factors.

TABLE 3 Measurement invariance results for gender.

	$\chi^2$	df	CFI	TLI	RMSEA	RMSEA 95% CI
<b>Gender</b>						
Configural	90.879	48	0.922	0.883	0.093	[0.82,1.05]
Metric	90.859	54	0.922	0.896	0.086	[0.75,0.98]
Scalar	103.660	60	0.921	0.905	0.082	[0.71,0.94]

Further analysis on the use of the UWES still needs to consider the differences between Europe and Asian/African countries, especially due to cultural reasons. The findings of the study conducted by [Sonntag \(2003\)](#) raise concerns about the three-factor structure of UWES. It is thus not surprising that the current research literature on this topic does not reveal any incremental use of the three-factor model. Nevertheless, future studies need to explore these results in detail, as recommended by [Schaufeli et al. \(2006\)](#).

The present study also revealed that there were statistically significant strong positive correlations for each of the three subscales of UWES. These findings are consistent with the previous study findings ([Römer, 2016](#); [Tsubakita et al., 2017](#); [Sinval et al., 2018](#)). [Sinval et al. \(2018\)](#) used a sample of 3,887 rescue workers to assess the validity of evidence related to the internal structure of the Portuguese versions of the UWES-17 and UWES-9, namely, dimensionality, measurement invariance between occupational groups, and reliability of the scores. Psychometric properties were evaluated in the three-factor original structure revealing an acceptable fit to the data in the UWES-17, although the UWES-9 had better psychometric properties.

Findings obtained in the multigroup CFA for the demographic variables suggested that the UWES-9 measures the same construct across gender. These results support the metric and scalar invariance of gender, meaning that the scale means are comparable across gender. [Dominguez-Salas et al. \(2022\)](#) found the same result, i.e., the factorial invariance across gender in different factor solutions with and without the modification indexes. The factorial structure of the UWES showed strict invariance by gender. The invariance according to gender was also pointed out by [Lovakov et al. \(2017\)](#) in Russian workers. Greater consensus exists regarding the invariance of the scale according to other sample characteristics, such as its transcultural invariance ([Balducci et al., 2010](#); [Sinval et al., 2018](#)).

Our study revealed significant differences in mean scores when comparing participants according to school leadership training. Participants who had training scored higher than those who had no training in school leadership. [Weigl et al. \(2014\)](#) confirmed that the relation between job autonomy and work engagement is mediated by the selection optimization compensation (SOC) strategies developed by training. Literature also indicates that better self-perceived professional status was related to greater work engagement ([Van Dorssen-Boog et al., 2020](#)) and a greater sense of coherence ([Derbis and Jasiński, 2018](#)).

This study accompanies the existing literature analysing the psychometric properties of the UWES, providing results in favour of the use of this scale in the field of education. The limitation could lie in the sampling procedure which does not guarantee that the sample is representative of the school leaders in Portugal, although the high sample number obtained might mitigate this effect. The generalisation

of the findings to other populations should also be done with caution, considering the diversity in educational and cultural contexts.

## Conclusion

The findings of this study support the use of the UWES-9 to assess the work engagement of school leaders and the constructs that comprise it. In this sense, the data provided could be useful for school leaders as they allow identifying areas of improvement which are specific to teachers. The 9-item UWES is a valid and reliable instrument to assess work engagement among school leaders and the easy administration and sound psychometric properties, could be used as an effective screening tool in educational contexts. Considering the superior fit indices of UWES-9, we recommend its usage over the UWES-17 version.

Improvements in work engagement and, therefore in school climate, will allow for a better quality of teaching. Until different results can be found for the work engagement subscales, our study reveals that the UWES 9 is the best option as a scale to measure work engagement in Portugal. Additionally, socio-demographic variables should be included and valued in future studies of work engagement.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Ethics statement

Ethical approval was not required for the study involving human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was not required from the participants in accordance with the national legislation and the institutional requirements.

## Author contributions

JC, MF, PP, and AA: theoretical conceptualization, data collection, data analyses, and contributing to the writing process. All authors contributed to the article and approved the submitted version.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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