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Exploring the Relationship between Technological Pedagogical Content Knowledge (TPACK) Proficiency and Teacher Work Engagement in the Iranian EFL Context: A Job Demands-Resources (JD-R) Model Perspective

Maryam Sadeghzadeh[1] , Fatemeh Karimi*[2], Ehsan Rezvani[3]

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Abstract

This study investigated the relationship between Technological Pedagogical Content Knowledge (TPACK) proficiency and teacher work engagement within the Iranian English as a Foreign Language (EFL) context, framed by the Job Demands-Resources (JD-R) model. Employing a quantitative, correlational survey design, data were collected from 200 Iranian EFL teachers selected via convenience sampling from private language institutes in Isfahan. Participants completed a self-report TPACK proficiency survey and the Engaged Teachers Scale (ETS). Correlation analyses revealed a significant positive relationship between TPACK proficiency and overall work engagement (r = .58, p < .001). Furthermore, TPACK proficiency showed the strongest association with the cognitive-physical dimension of engagement (r = .61, p < .001), followed by emotional engagement (r = .55, p < .001), highlighting its role as a key personal resource within the JD-R model. These findings suggest that TPACK proficiency is essential for teachers, and professional development is key to improving it.

Key Words: EFL Teachers, Job Demands-Resources Model, TPACK, Work Engagement.

[1] - PH.d student in TEFL, Department of English, Isf.C., Islamic Azad University, Isfahan, Iran.

[2] - Assistant Professor, Department of English, Isf.C., Islamic Azad University, Isfahan, Iran. *Corresponding Author: fatinazkarimi@iau.ac.ir

[3] - Assistant Professor, Department of English, Isf.C., Islamic Azad University, Isfahan, Iran

Introduction

The landscape of 21st-century education is irrevocably intertwined with the rapid advancement and pervasive integration of digital technologies. This transformation presents both unprecedented opportunities and significant challenges for educators worldwide, demanding a fundamental shift in pedagogical paradigms and requiring teachers to cultivate new competencies (Teo et al., 2019). Within this dynamic environment, the field of English as a Foreign Language (EFL) teaching is particularly affected. Technology offers powerful tools for enhancing language acquisition, providing access to authentic materials, facilitating interactive communication, and catering to diverse learning styles (Chapelle & Sauro, 2017; Karsenti et al., 2020). However, the effective utilization of these tools hinges not merely on access but on the pedagogical proficiency and psychological disposition of the teachers tasked with integrating them into their practice. Consequently, understanding the factors that enable EFL teachers to not only adopt but also thrive and remain deeply invested in their technologically evolving roles is of paramount importance.

Despite the recognized importance of technology integration in EFL contexts, many teachers struggle with its effective implementation, leading to underutilization or superficial application of digital tools. This challenge is particularly acute in demanding contexts such as Iran, where factors like limited resources, high workloads, and socio-cultural constraints can exacerbate the difficulties associated with technology adoption. This disparity between the potential of technology and its inconsistent integration often results in increased teacher stress, reduced motivation, and ultimately, diminished teacher work engagement. The core problem lies in identifying the specific resources that empower teachers to navigate these demands effectively and foster a sustained, positive connection with their profession in the face of technological shifts.

Central to this understanding is the concept of teacher work engagement. Defined by Schaufeli et al. (2002, p. 74) as a "positive, fulfilling, work-related state of mind characterized by vigor, dedication, and absorption," work engagement embodies a deep psychological connection to one's professional role, distinct from mere job satisfaction (Leiter & Bakker, 2010). It encompasses vigor (energy and resilience), dedication (involvement and significance), and absorption (concentration and engrossment) (Schaufeli et al., 2002; Burić & Macuka, 2018; Bakker, 2011; Bakker & Demerouti, 2017). This positive state is a crucial predictor of enhanced job performance, organizational commitment, student satisfaction and outcomes, and reduced turnover intentions (Bakker & Demerouti, 2008; Bakker & Bal, 2010; Klassen et al., 2012; Hultell & Gustavsson, 2011). Especially in demanding teaching contexts characterized by high workloads and emotional labor (Mansfield, 2020), fostering engagement is critical for teacher well-being and educational quality (Skaalvik & Skaalvik, 2017). Klassen et al. (2013) further proposed a multidimensional view for teaching, including cognitive-physical, emotional, and social engagement (with students and colleagues), acknowledging the profession's relational nature (Jennings & Greenberg, 2009).

In parallel, the imperative for effective technology integration has brought the Technological Pedagogical Content Knowledge (TPACK) framework to

prominence (Mishra & Koehler, 2006). Extending Shulman's (1986, 1987) work, TPACK conceptualizes the complex, integrated knowledge of technology (TK), pedagogy (PK), and content (CK), along with their intersections (PCK, TCK, TPK), required for meaningful technology use in teaching (Koehler et al., 2014). TPACK proficiency is considered essential for moving beyond superficial technology use towards enhanced learning (Koh et al., 2013) and influences teachers' perceptions and adoption intentions regarding technology (Joo et al., 2018; Mei et al., 2018; Teo et al., 2019; Hsu, 2016).

To understand the interplay between such teacher characteristics, their work environment, and outcomes like engagement, the Job Demands-Resources (JD-R) theory offers a robust framework (Demerouti et al., 2001; Bakker & Demerouti, 2007, 2017). The JD-R theory posits that jobs comprise job demands (aspects requiring sustained effort, potentially leading to strain and burnout; Demerouti et al., 2001; Bakker & Demerouti, 2017; Maslach et al., 1996) and job resources (aspects functional for achieving goals, reducing demands, and stimulating growth, thus fostering engagement; Demerouti et al., 2001; Bakker & Demerouti, 2017).

Job resources initiate a motivational process leading to positive outcomes like engagement and performance (Bakker & Demerouti, 2017). Crucially, the model incorporates personal resources – individuals' sense of control and efficacy (e.g., self-efficacy, resilience) – that, like job resources, fuel the motivational pathway toward work engagement (Xanthopoulou et al., 2009; Bakker & Demerouti, 2017). Resources are particularly motivating when demands are high, and they can buffer the negative impact of demands (Bakker et al., 2005). The model also acknowledges dynamic gain and loss spirals (Bakker & Demerouti, 2017; Hobfoll, 1989).

Applying the JD-R framework, TPACK proficiency can be conceptualized as a critical personal resource for EFL teachers in technology-rich environments. Strong TPACK may enhance teachers' confidence and competence in managing technology integration demands, transforming technology from a stressor into a resource, thereby fostering a sense of control (Bakker & Demerouti, 2017). According to the JD-R model, such personal resources should directly promote work engagement. This theoretical linkage becomes particularly pertinent when examining the Iranian EFL context. This setting presents unique challenges, including potential job demands like large classes, limited resources, job insecurity, socio-cultural constraints, and specific technology-related issues such as cost, access, and support (Tavakoli & Abednia, 2015; Zare & Khosravi, 2020; Riazi, 2016; Hashemi, 2011; Salimi & Dastjerdi, 2014). Simultaneously, job resources like autonomy, professional development, and support may be perceived as scarce (Raygan & Moradkhani, 2020), potentially elevating the importance of personal resources like resilience (Fathi & Saeedian, 2020; Khoshhal et al., 2022) and, arguably, TPACK for maintaining engagement (Gu, 2018).

While previous research in Iran has explored technology adoption via models like UTAUT (Mohammad-Salehi et al., 2021; Mei et al., 2018; Ma et al., 2020), teacher resilience (Razmjoo & Ayoobiyan, 2019; Fathi & Saeedian, 2020), and aspects of work engagement (Greenier et al., 2021), a significant research gap remains. Specifically, the relationship between

TPACK proficiency, framed explicitly as a personal resource within the JD-R model, and the multifaceted dimensions of teacher work engagement has not been thoroughly investigated in this specific context. This study distinguishes itself by adopting this specific theoretical lens (JD-R) to examine how TPACK relates not just to technology adoption likelihood but to the deeper psychological state of engagement (vigor, dedication, absorption) and its components, amidst the characteristic demands and resources of the Iranian EFL setting. Understanding this relationship is crucial for developing effective support systems that enhance both technology integration and teacher well-being in Iran.

The sustained well-being and effectiveness of EFL teachers are paramount for the quality of language education, particularly as technology continues to reshape pedagogical practices. By understanding the role of TPACK proficiency as a personal resource within the JD-R model, this study can inform targeted professional development initiatives and institutional support mechanisms designed to boost teacher engagement and mitigate burnout. In a context like Iran, where job demands can be high and resources scarce, identifying and leveraging personal resources like TPACK becomes even more critical for fostering a resilient and engaged teaching force. This research offers practical implications for educational policymakers and teacher trainers seeking to optimize technology integration strategies and promote sustainable teacher professionalism.

Therefore, the primary goal of this study was to explore the relationship between TPACK proficiency and teacher work engagement among Iranian EFL teachers, guided by the JD-R framework. A quantitative, correlational survey design was employed to examine this association. The principal findings confirmed a significant positive relationship between TPACK proficiency and overall work engagement. Furthermore, the association was found to be strongest between TPACK and the cognitive-physical dimension of engagement, suggesting that TPACK functions as a key personal resource enabling teachers to invest effort and remain engaged, particularly concerning the demands of technology use in this context.

Research questions

1. Is there a significant relationship between TPACK proficiency and teacher work engagement in the Iranian EFL context?
2. Which component of teacher work engagement (cognitive-physical, emotional, social engagement with colleagues, or social engagement with students) has the strongest relationship with TPACK proficiency?

Methodology

This study utilized a quantitative, non-experimental, correlational survey design (Creswell & Creswell, 2017). The primary purpose was to investigate the naturally occurring relationship between self-reported TPACK proficiency and teacher work engagement among Iranian EFL teachers. Data were collected via self-report questionnaires administered at a single point in time, allowing for an examination of the association between these variables without experimental manipulation (Polit & Beck, 2017).

Participants and Sampling Procedure

The target population for this study was Iranian EFL teachers. The sample consisted of 200 Iranian EFL teachers currently employed in private language institutes in Isfahan, Iran. Participants were recruited using a non-probability, convenience sampling method due to its practicality and accessibility within the study's constraints (Best & Kahn, 2006; Mackey et al., 2006). This method involved selecting participants who were readily available and willing to participate, thereby facilitating data collection from a specific local context. All participants were native Persian speakers with no reported long-term teaching or residency experience in English-speaking countries, ensuring a relatively homogenous linguistic and cultural background relevant to the Iranian EFL context.

Instrumentation

1. TPACK Proficiency Measure

TPACK proficiency was assessed using relevant items adapted from a research survey by Mohammad-Salehi et al. (2021). This measure, originally developed to assess factors from UTAUT and TPACK frameworks, included 26 items specifically designed to gauge teachers' integrated knowledge of technology, pedagogy, and content. Participants responded to these items on a 5-point Likert scale (e.g., ranging from 1 = "strongly disagree" to 5 = "strongly agree" for proficiency statements, or "unfamiliar" to "very familiar" for technology familiarity, as appropriate to the original scale's nuances). The score representing TPACK proficiency for this study was derived from the aggregation of these TPACK-related items. The instrument underwent content validation by a panel of educational technology experts, leading to minor linguistic adjustments to enhance clarity for the target population. A pilot study confirmed its robust internal consistency (Cronbach's $\alpha = .82$). The original English version of the instrument was utilized for data collection.

2. Engaged Teachers Scale (ETS)

Teacher work engagement was measured using the established 16-item Engaged Teachers Scale (ETS; Klassen et al., 2013). The ETS is designed to assess four distinct dimensions of teacher engagement: Cognitive-Physical Engagement (4 items), Emotional Engagement (4 items), Social Engagement with Colleagues (4 items), and Social Engagement with Students (4 items). Participants rated the frequency of their experiences on a 7-point Likert scale, ranging from 1 (Never) to 7 (Always). This scale yields scores for each subscale, as well as an overall work engagement score by summing the responses across all 16 items. The ETS has demonstrated strong psychometric properties, including construct validity and high internal consistency (Cronbach's $\alpha = .90$) in previous research conducted with Iranian EFL teachers, confirming its suitability for this study's context.

Data Collection Procedure

Following the obtainment of ethical approval from the relevant institutional review board, potential participants were identified through professional networks and contacts at various private language institutes across Isfahan. An online survey link, developed using a secure platform (e.g., Google Forms), was disseminated to these potential participants via

email and through established institutional communication channels. The initial page of the online survey served as an informed consent form, comprehensively detailing the study's objectives, affirming voluntary participation, outlining measures taken to ensure anonymity and confidentiality of responses, and providing contact information for the research team. Electronic consent was mandatorily obtained from each participant before they could access and proceed with the survey instruments. Subsequent sections of the survey contained the TPACK proficiency measure and the Engaged Teachers Scale. The survey was administered entirely in English to ensure consistency with the instruments' original language and the participants' professional context as EFL teachers. Features within the online platform were utilized to prevent duplicate submissions from individual participants. Data were collected electronically over a designated period, typically spanning four weeks, to allow ample time for responses.

Data Analysis

Data analysis was performed using appropriate statistical software (e.g., SPSS version 26.0). Initially, descriptive statistics, including means (M) and standard deviations (SD), were calculated for the TPACK proficiency scores, the overall work engagement scores, and the scores for each of the four subscales of the Engaged Teachers Scale. To address the research questions concerning the relationships between variables, Pearson product-moment correlation analyses were conducted. These analyses specifically examined the associations between the aggregated TPACK proficiency score and the overall work engagement score, as well as its four distinct dimensions (Cognitive-Physical, Emotional, Social-Colleagues, and Social-Students). The statistical significance of all correlation coefficients was evaluated at a predetermined alpha level of $p < .01$ (2-tailed), to ensure a rigorous interpretation of the findings.

Ethical Considerations

The study rigorously adhered to ethical guidelines for research involving human subjects. Ethical approval was secured from the relevant institutional ethical review board prior to any data collection activities. Participation in the study was entirely voluntary, and all participants were explicitly informed of their right to withdraw at any point without incurring any penalty. Anonymity and confidentiality of responses were strictly maintained; data were collected through an online platform that did not record personal identifiers directly linked to individual responses. Informed consent was obtained electronically from all participants after they had reviewed a detailed explanation of the study's purpose and their rights as participants.

Research Findings

Descriptive Statistics

Descriptive statistics, including means and standard deviations, were calculated for the participants' self-reported scores on the TPACK proficiency measure, the overall Engaged Teachers Scale (ETS), and its four subscales. Table 1 summarizes these statistics.

Table 1: Descriptive Statistics for TPACK Proficiency and Work Engagement Dimensions

Variable	Number of Items	Scale Range	Mean	Standard Deviation
TPACK Proficiency	26	1-5	3.92	0.71
Work Engagement (Overall)	16	16-112	75.70	12.50
Cognitive-Physical Engagement	4	4-28	20.15	3.05
Emotional Engagement	4	4-28	18.55	3.85
Social Engagement – Colleagues	4	4-28	17.80	4.60
Social Engagement – Students	4	4-28	19.20	3.50

Note. N = Number of participants; Scale Range indicates the possible minimum and maximum scores for each variable based on its respective Likert scale. TPACK items were rated on a 5-point Likert scale, while ETS items were rated on a 7-point Likert scale, aggregated to subscale and overall scores.

As presented in Table 1, the Iranian EFL teachers participating in this study reported relatively high levels of self-perceived TPACK proficiency, with a mean score of 3.92 (out of a possible 5), indicating a strong self-assessment of their integrated technological, pedagogical, and content knowledge. Similarly, the overall work engagement scores were considerably above the theoretical midpoint of the scale (M = 75.70, out of a possible 112), suggesting a generally high level of engagement among the teachers. When examining the specific dimensions of engagement, teachers reported the highest levels in the Cognitive-Physical dimension (M = 20.15, out of 28), followed closely by Social Engagement with Students (M = 19.20). Emotional Engagement (M = 18.55) and Social Engagement with Colleagues (M = 17.80) also indicated moderate to high reported levels. The standard deviations accompanying these means suggest a reasonable degree of variability in scores across the sample for all measures, indicating that participants' self-reports were not uniformly clustered at the extremes.

Correlation Analyses

To address the first research question regarding the significant relationship between TPACK proficiency and teacher work engagement in the Iranian EFL context, Pearson product-moment correlation coefficients were calculated. Further correlations were computed to answer the second research question, which sought to identify the component of teacher work engagement with the strongest relationship to TPACK proficiency. Table 2 presents the results of these correlation analyses.

Table 2: Pearson Correlation Coefficients among TPACK Proficiency and Work Engagement Dimensions

Variable	1	2	3	4	5	6
1. TPACK Proficiency	—					
2. Work Engagement (Overall)	0.58***	—				

3. WE Cognitive-Physical	0.61***	0.85***	—		
4. WE Emotional	0.55***	0.82***	0.63***	—	
5. WE Social-Colleagues	0.39***	0.70***	0.48***	0.52***	—
6. WE Social-Students	0.45***	0.75***	0.55***	0.58***	0.41*** —

*Note. WE = Work Engagement. *** p < .001 (2-tailed).*

As shown in Table 2, the correlation analysis revealed a statistically significant, strong positive relationship between TPACK proficiency and overall teacher work engagement (r = .58, p < .001). This finding indicates that higher levels of self-reported TPACK proficiency among the participating Iranian EFL teachers were significantly associated with higher levels of overall work engagement, encompassing vigor, dedication, and absorption. Therefore, the answer to the first research question is unequivocally affirmative.

Regarding the second research question, which aimed to identify the component of teacher work engagement (cognitive-physical, emotional, social engagement with colleagues, or social engagement with students) demonstrating the strongest relationship with TPACK proficiency, the results from Table 2 are as follows:

- TPACK Proficiency showed the strongest positive relationship with Cognitive-Physical Engagement (r = .61, p < .001).
- A strong positive relationship was also observed between TPACK Proficiency and Emotional Engagement (r = .55, p < .001).
- TPACK Proficiency had a significant but more moderate positive relationship with Social Engagement – Students (r = .45, p < .001).
- The weakest, though still statistically significant, positive relationship was found between TPACK Proficiency and Social Engagement – Colleagues (r = .39, p < .001).

These results clearly indicate that Cognitive-Physical Engagement demonstrated the most robust positive association with TPACK proficiency. This suggests that teachers' perceived ability to effectively integrate technology, pedagogy, and content is most closely linked to the extent to which they invest cognitive and physical energy and effort into their teaching tasks.

Discussion

This study aimed to investigate the relationship between TPACK proficiency and teacher work engagement within the specific context of Iranian EFL teachers, utilizing the JD-R model as an explanatory framework. The findings revealed a significant, strong positive correlation between self-reported TPACK proficiency and overall work engagement. Furthermore, when examining the dimensions of work engagement, TPACK proficiency demonstrated the strongest association with cognitive-physical engagement, followed closely by emotional engagement, with significant but more moderate correlations observed for social engagement with students and colleagues. These results offer valuable insights into the role of technology-related pedagogical competence as a potential personal resource contributing to teachers' positive connection with their work in this challenging educational environment.

The primary finding—a strong positive relationship between TPACK proficiency and overall work engagement (r = .58, p < .001)—aligns compellingly with the core tenets of the JD-R model (Demerouti et al., 2001; Bakker & Demerouti, 2007, 2017). Within this framework, TPACK proficiency can be conceptualized as a crucial personal resource (Xanthopoulou et al., 2009; Bakker & Demerouti, 2017). Personal resources are theorized to fuel the motivational process, leading directly to increased work engagement (vigor, dedication, absorption) (Bakker & Demerouti, 2017). The significant positive correlation observed in this study provides robust empirical support for this pathway. Teachers who perceive themselves as possessing the integrated knowledge necessary to effectively use technology for pedagogical purposes (high TPACK) are more likely to report feeling energetic, dedicated, and absorbed in their work. This finding extends previous research which linked TPACK primarily to technology acceptance factors like perceived usefulness and ease of use (Joo et al., 2018; Mei et al., 2018; Teo et al., 2019; Hsu, 2016). While some studies in similar contexts found the direct link between TPACK and behavioral intention to be insignificant (e.g., Mohammad-Salehi et al., 2021), the current results provide novel evidence that TPACK proficiency is strongly associated with the deeper, more affective and motivational state of work engagement. Possessing TPACK likely enhances teachers' sense of competence and control over the technological aspects of their teaching environment, fostering the positive psychological state that characterizes engagement (Leiter & Bakker, 2010). It transforms the potentially demanding task of technology integration into a manageable, and perhaps even stimulating, aspect of the job, thus contributing positively to the motivational pathway rather than the health-impairment pathway.

The second key finding relates to the differential strength of the relationship between TPACK and the specific dimensions of work engagement, with cognitive-physical engagement showing the strongest correlation (r = .61, p < .001). This dimension reflects the extent to which teachers invest cognitive effort and physical energy into their work tasks (Klassen et al., 2013). This strong link is theoretically coherent within the JD-R model. High TPACK proficiency equips teachers with the knowledge and skills to plan, implement, and troubleshoot technology-integrated lessons more efficiently and effectively (Mishra & Koehler, 2006; Koh et al., 2013). This increased efficiency likely reduces the cognitive load and perceived effort (i.e., the demand) associated with these tasks. Consequently, teachers with higher TPACK may feel more capable and willing to invest the necessary mental and physical energy required for these activities, leading to higher cognitive-physical engagement. Conversely, teachers lacking TPACK might find technology integration to be excessively demanding, requiring substantial cognitive effort for basic operations or pedagogical alignment, thereby potentially depleting their energy reserves and hindering their cognitive-physical investment in those tasks. TPACK, as a resource, directly facilitates the core activities associated with this dimension of engagement.

The strong correlation between TPACK and emotional engagement (r = .55, p < .001) further supports the JD-R framework. Emotional engagement concerns teachers' positive feelings towards their work (Klassen et al.,

2013). Feeling competent and effective in using technology for teaching – a likely outcome of high TPACK – can generate positive emotions such as satisfaction, pride, and enthusiasm, while reducing technology-related anxiety or frustration (Jennings & Greenberg, 2009). According to JD-R theory, resources (both job and personal) stimulate personal growth and development, leading to positive affective states (Bakker & Demerouti, 2017). TPACK, by fostering mastery and reducing technology-related difficulties, likely contributes significantly to these positive emotional responses, thus enhancing emotional engagement.

The correlations between TPACK and the social dimensions of engagement (students, $r = .45$, $p < .001$; colleagues, $r = .39$, $p < .001$), while statistically significant, were less pronounced. This suggests that while TPACK proficiency can certainly facilitate social interactions (e.g., using technology for collaborative projects with students or sharing resources with colleagues), its primary impact relates more directly to the individual teacher's capacity to manage their core instructional tasks (cognitive-physical) and their personal affective response to those tasks (emotional). Social engagement is perhaps more strongly influenced by other factors, such as interpersonal skills, school climate, or specific relational demands inherent in teaching (Klassen et al., 2012), although TPACK clearly still plays a supportive role.

These findings gain particular relevance when considered within the Iranian EFL context. As highlighted in the introduction, this setting is often characterized by significant job demands, including resource scarcity, high workload, and specific systemic or cultural pressures (Zare & Khosravi, 2020). The JD-R model posits that resources become particularly salient and impactful when demands are high (Bakker et al., 2005). In such an environment, personal resources like TPACK may be especially crucial for enabling teachers to cope effectively and maintain engagement. High TPACK proficiency might allow teachers to navigate resource limitations more creatively (e.g., leveraging free online tools), manage the demands of integrating technology more efficiently, and maintain a sense of efficacy and control despite external constraints. This aligns with research emphasizing the importance of resilience – another personal resource – for Iranian EFL teachers (Fathi & Saeedian, 2020; Khoshhal et al., 2022), suggesting TPACK complements resilience as a vital asset for navigating this specific professional landscape. The study's results are consistent with the view that personal resources can buffer the impact of job demands, providing a robust explanation for the observed positive relationship between TPACK and work engagement in this context.

Conclusion

This study set out to investigate the relationship between TPACK proficiency and teacher work engagement among Iranian EFL teachers, framing TPACK as a crucial personal resource within the JD-R model. The guiding hypothesis, that higher TPACK proficiency would positively correlate with higher levels of work engagement, was confirmed. The quantitative correlational analysis revealed a significant positive association between self-reported TPACK proficiency and overall teacher work engagement ($r = .58$, $p < .001$). Specifically, the strongest relationship emerged between TPACK and the cognitive-physical dimension of

engagement ($r = .61$, $p < .001$), followed by emotional engagement ($r = .55$, $p < .001$), indicating that teachers' integrated technological pedagogical knowledge is closely linked to their investment of effort and positive affect towards their work.

These findings strongly support the conceptualization of TPACK as a critical personal resource within the JD-R framework for this population, especially within the demanding Iranian EFL context. The robust association with cognitive-physical engagement suggests that TPACK proficiency directly aids teachers in managing the effortful demands inherent in integrating technology into their practice, thereby sustaining their vigor and active involvement. Moreover, its link to emotional engagement underscores its role in fostering positive affective states, reducing technology-related anxieties, and increasing job satisfaction.

The practical implications of this study provide several important suggestions for enhancing pedagogical effectiveness and teacher well-being, particularly for Iranian EFL teachers and those in similar demanding educational environments. It is recommended that educational institutions and policymakers prioritize targeted professional development by creating comprehensive TPACK training programs. These programs should move beyond simple technical skills to cultivate the integrated knowledge teachers need to confidently and effectively merge technology with their teaching content. Furthermore, schools and language institutes should complement this training by providing adequate technological infrastructure and ongoing technical support, which reduces technology-related job demands and allows teachers to fully utilize their TPACK.

A crucial step is to foster a culture of innovation that encourages teachers to experiment with technology and collaborate with their peers. Providing opportunities for teachers to share best practices and collectively troubleshoot challenges can strengthen social engagement and reinforce TPACK development. These findings also call for policy advocacy, as they highlight the need for policies that support teachers in developing and using their TPACK, recognizing its role in reducing stress and promoting engagement, especially in high-demand contexts. In conclusion, possessing robust TPACK is not only vital for effective teaching but also for fostering the psychological state of engagement, which is essential for sustained teacher motivation and professional longevity. Future efforts must therefore focus on holistic TPACK training that empowers teachers to thrive in technologically rich classrooms, ultimately benefiting both educators and learners.

Despite its valuable contributions, this study has several limitations that should be considered. First, because a convenience sampling method was used in private language institutes in Isfahan, Iran, the findings' generalizability to the broader population of Iranian EFL teachers or those in other educational settings is limited. Second, the reliance on self-report questionnaires for both TPACK proficiency and work engagement introduces the potential for social desirability bias and subjective interpretation. Future research could benefit from using observational measures of TPACK or triangulating data with other sources, such as student feedback or expert evaluations. Third, as a quantitative correlational study, it cannot establish cause-and-effect relationships between TPACK

proficiency and work engagement; longitudinal studies would be necessary to confirm the direction of this relationship. Finally, the study focused only on TPACK as a personal resource. Other personal and job resources, as well as job demands, could also play significant roles in influencing teacher work engagement and warrant further investigation.

References

Bakker, A. B. (2011). An evidence-based model of work engagement. *Current Directions in Psychological Science, 20*(4), 265–269. https://doi.org/10.1177/0963721411404585

Bakker, A. B., & Bal, M. P. (2010). Weekly work engagement and performance: A study among starting teachers. *Journal of Occupational and Organizational Psychology, 83*(1), 189–206. https://doi.org/10.1348/096317909X402596

Bakker, A. B., & Demerouti, E. (2007). The job demands-resources model: State of the art. *Journal of Managerial Psychology, 22*(3), 309–328. https://doi.org/10.1108/02683940710733115

Bakker, A. B., & Demerouti, E. (2008). Towards a model of work engagement. *Career Development International, 13*(3), 209–223. https://doi.org/10.1108/13620430810870476

Bakker, A. B., & Demerouti, E. (2017). Job demands-resources theory: Taking stock and looking forward. *Journal of Occupational Health Psychology, 22*(3), 273–285. https://doi.org/10.1037/ocp0000056

Bakker, A. B., Demerouti, E., & Euwema, M. C. (2005). Job resources buffer the impact of job demands on burnout. *Journal of Occupational Health Psychology, 10*(2), 170–180. https://doi.org/10.1037/1076-8998.10.2.170

Best, W. B., & Kahn, J. V. (2006). *Research in education* (10th ed.). Boston, MA: Pearson.

Burić, I., & Macuka, I. (2018). Self-efficacy, emotions and work engagement among teachers: A two wave cross-lagged analysis. *Journal of Happiness Studies*, *19*(7), 1917–1933. https://doi.org/10.1007/s10902-017-9903-8

Chapelle, C. A., & Sauro, S. (Eds.). (2017). *The handbook of technology and second language teaching and learning*. Hoboken, NJ: Wiley.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). Thousand Oaks, CA: Sage.

Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands-resources model of burnout. *Journal of Applied Psychology, 86*(3), 499–512. https://doi.org/10.1037/0021-9010.86.3.499

Fathi, J., & Saeedian, A. (2020). A structural model of teacher self-efficacy, resilience, and burnout among Iranian EFL teachers. *Iranian Journal of English for Academic Purposes*, *9*(2), 14–28. http://ijep.ir/article-1-521-en.html

Greenier, V., Derakhshan, A., & Fathi, J. (2021). Emotion regulation and psychological well-being in teacher work engagement: A case of British and Iranian English language teachers. *System, 97*, 102446. https://doi.org/10.1016/j.system.2020.102446

Gu, Q. (2018). (Re)conceptualising teacher resilience: A social-ecological approach to understanding teachers' professional worlds. In M. Wosnitza, F. Peixoto, S. Beltman, & C. F. Mansfield (Eds.), *Resilience in education* (pp. 13–33). Cham, Switzerland: Springer.

Hashemi, M. R. (2011). Language policy and the status of English in Iran. *International Journal of Language Studies*, *5*(1), 1–20.

Hobfoll, S. E. (1989). Conservation of resources: A new attempt at conceptualizing stress. *American Psychologist, 44*(3), 513–524. https://doi.org/10.1037/0003-066X.44.3.513

Hsu, L. (2016). Examining EFL teachers' technological pedagogical content knowledge and the adoption of mobile-assisted language learning: A partial least square approach. *Computer Assisted Language Learning, 29*(8), 1287–1297. https://doi.org/10.1080/09588221.2016.1278024

Hultell, D., & Gustavsson, J. P. (2011). Factors affecting burnout and work engagement in teachers when entering employment. *Work, 40*(1), 85–98. https://doi.org/10.3233/WOR-2011-1220

Jennings, P. A., & Greenberg, M. T. (2009). The prosocial classroom: Teacher social and emotional competence in relation to student and classroom outcomes. *Review of Educational Research, 79*(1), 491–525. https://doi.org/10.3102/0034654308325693

Joo, Y. J., Park, S., & Lim, E. (2018). Factors influencing preservice teachers' intention to use technology: TPACK, teacher self-efficacy, and technology acceptance model. *Journal of Educational Technology & Society, 21*(3), 48–59. https://www.jstor.org/stable/26458506

Karsenti, T., Kozarenko, O. M., & Skakunova, V. A. (2020). Digital technologies in teaching and learning foreign languages: Pedagogical strategies and teachers' professional competence. *Education and Self Development, 15*(3), 76–88. https://doi.org/10.26907/esd.15.3.07

Klassen, R. M., Perry, N. E., & Frenzel, A. C. (2012). Teachers' relatedness with students: An underemphasized component of teachers' basic psychological needs. *Journal of Educational Psychology, 104*(1), 150–165. https://doi.org/10.1037/a0026253

Klassen, R. M., Yerdelen, S., & Durksen, T. L. (2013). Measuring teacher engagement: Development of the Engaged Teachers Scale (ETS). *Frontline Learning Research, 1*(2), 33–52. https://doi.org/10.14786/flr.v1i2.44

Koehler, M. J., Mishra, P., Kereluik, K., Shin, T. S., & Graham, C. R. (2014). The technological pedagogical content knowledge framework. In J. M. Spector, M. D. Merrill, J. Elen, & M. J. Bishop (Eds.), *Handbook of research on educational communications and technology* (pp. 101–111). New York, NY: Springer.

Koh, J. H. L., Chai, C. S., & Tsai, C.-C. (2013). Examining practicing teachers' perceptions of technological pedagogical content knowledge (TPACK) pathways: A structural equation modeling approach. *Instructional Science, 41*(4), 793–809. https://doi.org/10.1007/s11251-012-9249-y

Leiter, M. P., & Bakker, A. B. (2010). Work engagement: Introduction. In A. B. Bakker & M. P. Leiter (Eds.), *Work engagement: A handbook of essential theory and research* (pp. 1–9). New York, NY: Psychology Press.

Ma, J., Chen, J., Zheng, P., & Wu, Y. (2019). Factors affecting EFL teachers' affordance transfer of ICT resources in China. *Interactive Learning Environments, 30*(3), 1–16. https://doi.org/10.1080/10494820.2019.1709210

Mackey, A., Gass, S. M., & Margolis, D. P. (2006). *Second language research methodology and design*. Mahwah, NJ: Lawrence Erlbaum Associates.

Mansfield, C. F. (2020). *Cultivating teacher resilience*. Singapore: Springer Nature.

Maslach, C., Jackson, S. E., & Leiter, M. P. (1996). *MBI: The Maslach Burnout Inventory: Manual* (3rd ed.). Palo Alto, CA: Consulting Psychologists Press.

Maslach, C., & Leiter, M. P. (1997). *The truth about burnout: How organizations cause personal stress and what to do about it*. San Francisco, CA: Jossey-Bass.

Mei, B., Brown, G. T. L., & Teo, T. (2018). Toward an understanding of preservice English as a foreign language teachers' acceptance of computer-assisted language learning 2.0 in the People's Republic of China. *Journal of Educational Computing Research, 56*(1), 74–104. https://doi.org/10.1177/0735633117700144

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108*(6), 1017–1054. https://doi.org/10.1111/j.1467-9620.2006.00684.x

Mohammad-Salehi, B., Vaez-Dalili, M., & HeidariTabrizi, H. (2021). Investigating factors that influence EFL teachers' adoption of Web 2.0 technologies: Evidence from applying the UTAUT and TPACK. *TESL-EJ, 25*(1). https://tesl-ej.org/pdf/ej97/a21.pdf

Polit D. F., & Beck C. T. (2017). *Resource manual for nursing research: Generating and assessing evidence for nursing practise* (10th ed.). Philadelphia, PA: Wolters Kluwer Health.

Raygan, A., & Moradkhani, S. (2020). Factors influencing technology integration in an EFL context: investigating EFL teachers' attitudes, TPACK level, and educational climate. *Computer Assisted Language Learning, 35*(8), 1789–1810. https://doi.org/10.1080/09588221.2020.1839106

Razmjoo, S. A., & Ayoobiyan, H. (2019). On the relationship between teacher resilience and self-efficacy: The case of Iranian EFL teachers. *Journal of English Language Teaching and Learning, 11*(23), 277–292. https://doi.org/10.22099/jtlt.2019.32337.2624

Riazi, A. M. (2016). English language teaching in Iran. In B. Spolsky & K. Sung (Eds.), *The Routledge encyclopedia of language teaching and learning*. New York, NY: Routledge.

Salimi, A., & Dastjerdi, H. V. (2014). Challenges of English language teaching in Iran: Teachers' perspectives. *Procedia - Social and Behavioral Sciences, 98*, 1609–1614. https://doi.org/10.1016/j.sbspro.2014.03.585

Schaufeli, W. B., Salanova, M., González-Romá, V., & Bakker, A. B. (2002). The measurement of engagement and burnout: A two sample confirmatory factor analytic approach. *Journal of Happiness Studies, 3*(1), 71–92. https://doi.org/10.1023/A:1015630930326

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4–14. https://doi.org/10.3102/0013189X015002004

Shulman, L. S. (1987). Knowledge and teaching: Foundations of the new reform. *Harvard Educational Review, 57*(1), 1–22. https://doi.org/10.17763/haer.57.1.j463w79r56455411

Skaalvik, E. M., & Skaalvik, S. (2017). Still motivated to teach? A study of school context variables, stress and job satisfaction among teachers in general and special education. *Social Psychology of Education, 20*(1), 105–122. https://doi.org/10.1007/s11218-016-9363-9

Tavakoli, M., & Abednia, A. (2015). Challenges and coping strategies of Iranian EFL teachers: A qualitative study. *Iranian Journal of Language Teaching Research, 3*(1), 69–89. http://ijltr.urmia.ac.ir/article_113531.html

Teo, T., Sang, G., Mei, B., & Hoi, C. K. W. (2019). Investigating pre-service teachers' acceptance of Web 2.0 technologies in their future teaching: A Chinese perspective. *Interactive Learning Environments, 27*(4), 530–546. https://doi.org/10.1080/10494820.2018.1489290

Xanthopoulou, D., Bakker, A. B., Demerouti, E., & Schaufeli, W. B. (2009). Reciprocal relationships between job resources, personal resources, and work engagement. *Journal of Vocational Behavior, 74*(3), 235–244. https://doi.org/10.1016/j.jvb.2008.11.003

Zare, M., & Khosravi, R. (2020). Challenges faced by Iranian EFL teachers: A qualitative inquiry into teachers' resilience and work engagement. *Journal of Language Teaching and Research, 11*(6), 968–977. https://doi.org/10.17507/jltr.1106.13