Predicting Teachers' Stroke, through Identity, Immunity, and TPACK: Iranian EFL Teachers in Focus

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ABSTRACT

Despite extensive research on teacher qualities, a significant knowledge gap persists regarding the interplay among psychological and professional factors influencing Iranian EFL teachers' performance, particularly concerning teacher stroke. This study aims to address this gap by examining the predictive power of teacher identity, immunity, and Technological Pedagogical Content Knowledge (TPACK) on teacher stroke, within the Iranian EFL context. Participants included 124 Iranian EFL teachers, randomly selected from various regions across Iran, who completed a set of validated questionnaires. Data were collected using the Teacher Immunity Questionnaire, TPACK Questionnaire, Teacher's Identity Questionnaire, and Teachers' Stroke Scale. Statistical analysis involved Multiple Regression Analysis to explore the predictive capacity of teacher identity, immunity, and TPACK on stroke. Results revealed a statistically significant relationship among these variables, indicating that teacher identity, immunity, and TPACK collectively explain 46% of the variance in teacher stroke. These findings underscore the importance of integrating these factors into frameworks for supporting teachers' well-being and enhancing teaching effectiveness. The implications extend to stakeholders in EFL education, suggesting targeted interventions to bolster teacher development and instructional quality.

KEYWORDS: EFL teachers; Identity; Immunity; TPACK; Stroke

1. Introduction

Professionals in the field of English as a Foreign Language (EFL) education have recently become more interested in the issue of how various teacher-related factors interact to influence teaching effectiveness and student outcomes. The role of teachers in shaping educational outcomes has long been recognized as a critical determinant of student success and the overall effectiveness of educational systems (Burroughs et al., 2019; Derakhshan et al., 2020).

Among the myriad factors influencing teaching quality, teacher-related variables such as stroke, identity, immunity, and Technological Pedagogical Content Knowledge (TPACK) have emerged as crucial components that impact both teacher well-being and instructional effectiveness. Teacher stroke, defined as any action acknowledging and valuing another person's presence (Shirai, 2006), has been shown to influence teachers' professional effectiveness, student motivation, and commitment to attending classes (Pishghadam & Khajavy, 2014; Pishghadam et al., 2021). Similarly, teacher identity, which encompasses personal characteristics, relational connections, and group affiliations, plays a significant role in professional development and teaching performance (Sedikides & Brewer, 2015; Yazan, 2023). Teacher immunity, conceptualized as the defense mechanism teachers employ to mitigate negative effects on their professional identity (Hiver, 2015), is also integral to understanding educators' self-concept and resilience

(Mercer, 2018). Furthermore, TPACK represents the intersection of technological, pedagogical, and content knowledge, essential for the effective integration of technology in educational settings (Mishra & Koehler, 2006; Tseng et al., 2020).

Despite extensive research on these individual factors, there remains a significant gap in understanding how they interact within specific educational contexts, particularly among Iranian EFL teachers. Previous studies have examined teacher stroke (e.g., Afsharpour et al., (2023); Frymier et al., 2019; Pishghadam et al., 2021; Pishghadam et al., 2019; Pishghadam & Farkhondefal, 2017; Pishghadam & Khajavy, 2014; Rajabnejad et al., 2017), identity (Atai et al., 2022; Ghiasvand et al., 2023; Kalali Sani et al., 2021; Moradkhani & Ebadijalal, 2024), immunity (e.g., Azari Noughabi et al., 2024; Gooran et al., 2023; Namaziandost et al., 2023; Wang et al., 2024 to name a few), and TPACK (Najjari et al., 2021; Nessaei & Kazemi, 2024; Raygan & Moradkhani, 2022), but few have explored their interplay and collective impact on teaching practices (Kadkhodaie et al., 2023; Jiang et al., 2021). This study aims to address this gap by investigating the relationships among these variables within the Iranian EFL context, where unique challenges and opportunities exist due to limited English use outside formal educational settings (Pishghadam et al., 2019).

The rationale for selecting these variables stems from their potential to provide comprehensive insights into the multifaceted nature of teaching effectiveness. Understanding how teacher stroke, identity, immunity, and TPACK collectively influence EFL teaching can inform targeted interventions to enhance teacher well-being and instructional quality. For instance, identifying the predictive power of these factors could lead to the development of support systems that bolster teachers' professional identities and technological competencies, ultimately improving educational outcomes (Pishghadam et al., 2021).

This study holds significant implications for stakeholders in EFL education. With the increasing availability and widespread utilization of technology, educators recognize the significance of incorporating it into the curriculum and pedagogical practices. Moreover, the potential effects of technology on the professional growth and performance of EFL teachers have become particularly significant. By elucidating the complex interactions among teacher stroke, identity, immunity, and TPACK, the current research offers valuable insights for teacher training programs, educational policymakers, and practitioners. The findings could inform the design of professional development initiatives that address the specific needs of Iranian EFL teachers, thereby enhancing their teaching effectiveness and contributing to broader educational reforms (Derakhshan et al., 2020).

2. Literature review

Teaching English as a foreign language (TEFL) is a challenging profession that requires a range of competencies, including linguistic proficiency, pedagogical knowledge, and teaching skills. However, effective teaching is not solely determined by these factors, as personal as well as environmental variables can also have a big impact on teachers' well-being and teaching effectiveness (Kyriacou, 2001). In this literature review, we will explore the literature on stroke, teacher's identity, teacher's immunity, and TPACK in the context of EFL instruction, with a focus on Iranian EFL teachers.

2.1. Teacher stroke

The existing literature on teacher stroke is extensive and focuses particularly on educational settings. Teacher stroke enacted by appreciating and recognizing the students' presence can, among other things, promote interpersonal skills, motivation, learning, and stress reduction in the educational setting (Peng & Woodrow, 2010; Pierson, 2003). One of the most important techniques for studying interpersonal connections between teachers and students is Berne's (1988) Transactional Analysis (TA), which is described as "a theory of personality and a systematic psychotherapy for personal growth and personal change" (Stewart & Joines, 1987, p. 3). Particularly in educational settings, the use of TA yields more effective and transparent teacher-student exchanges (Stewart & Joines, 1987). According to Berne (1988), TA theory incorporates aspects of interactions, self-worth status, social status, temporal systems, and stroke. Any action that indicates an awareness of another person's presence is referred to as a unit of recognition, and the stroke component expresses this (Shirai, 2006). Stroke, specifically in an educational setting, refers to instructors' concern for and attention to their students (Rajabnejad et al., 2017).

Positive and negative, verbal and nonverbal, and conditional and adversative strokes are all possible. Positive strokes produce the strokee's happiness and delight in this regard, whilst negative strokes cause the strokee to feel unsatisfied (Song et al., 2022). The exchange of communication, which might take the form of one word or an extended conversation, is referred to as verbal strokes (Berne, 1988). Contrarily, non-verbal cues include actions like smiling, nodding, and caressing among others. Unconditional strokes are more concerned with what individuals are, as opposed to conditional strokes, which are related to people's behaviors (Sauter, 2017).

Since it can encourage pupils to do well and increase the likelihood that the stroked action will recur, stroke plays a crucial function in the classroom (Stewart & Joines, 1987). Researchers have taken note of the stroke concept, based on an analysis of the pertinent literature, and various studies have looked at how it interacts with other factors. The EFL students' academic achievement (Khorsand & Modarresi, 2023), motivation of students (Pishghadam & Khajavi, 2014), students' socioeconomic status (Irajzad & Shahriari, 2017), teacher burnout (Yazdanpour, 2015), teacher gender identity (Noorbakhsh et al., 2018), and teacher success (Pishghadam et al., 2019), for instance, have all been linked to teacher stroke. In the EFL context, past literature reveals an association between a teacher's stroke with L2 students' achievement (Freedman, 1993), L2 education, and dedication to classroom attendance (Namaghi, 2016; Pishghadam et al., 2021), in addition to the teacher's stroke typology conducted by Pishghadam and Farkhondehfal (2017).

While some studies emphasize the positive impact of teacher stroke on student motivation (Pishghadam & Khajavy, 2014; Rajabnejad et al., 2017), others argue that its effects may vary depending on contextual factors such as cultural norms and classroom dynamics. A better understanding of the nature of a teacher's stroke could be developed by finding the other teacher's variables that can affect the function and influence of teacher stroke. Language Teacher's immunity, among other teacher variables, that has been studied (Azari Noughabi et al., 2024; Gooran et al., 2023; Namaziandost et al., 2023) in the EFL contexts per se is a well-being teacher's variable whose association with EFL teacher's stroke is still unexplored. This study is, therefore, an attempt to cast further light on this unexplored research area.

2.2. Language teacher immunity

The immunity of language teachers is a significant factor that has a profound impact on their behavior, attitude toward their profession, and professional identity, as indicated by several studies (Haseli et al., 2018; Hiver, 2015, 2016). Essentially, the immunity of English language instructors refers to the defense mechanisms that language teachers employ to mitigate the negative effects of disruptions on their professional identity as L2 teachers (Hiver & Dörnyei, 2017). In simpler terms, teacher immunity serves as a shield for teachers, equipping them with the necessary tools to handle stress in complex situations and provide successful teaching (Hiver, 2017).

Similar to physiological immunity, the defense mechanism of language teachers manifests in two ways when faced with difficult circumstances: productive and maladaptive. When language instructors are passionate, resilient, and motivated, they are said to have productive immunity, which secures them from adverse situations. On the contrary, teachers who have maladaptive immunity experience emotional fatigue, negativity, and apathetic conditions (Hiver & Dörnyei, 2017). In Iran, Haseli et al. (2018) investigated the most common form of immunity across the English instructors' community and checked how they obtained their immunity. The study revealed that maladaptive immunity predominated among Iranian EFL teachers, but did not specify the factors that influence the different types of immunity during various stages of immunity development. Rahmati et al. (2019) examined how immunity developed among Iranian EFL instructors and found that instructors' poor confidence in themselves, low earnings, low student enthusiasm, constraints on time, and substantial parental demands were the main disruptions that sparked their immunity.

While Hiver (2017) highlights the dual nature of teacher immunity as both protective and restrictive, Noughabi et al. (2020) suggest that immunity's influence is more nuanced, particularly when mediated by variables like teacher engagement and professional identity. As language teacher immunity significantly impacts teachers' career choices and actions (Hiver, 2015), investigating its relationship with teachers' identity and stroke provides valuable insights (Hiver & Dörnyei, 2017). Despite this, the pertinent literature has not explored the factors that, along with immunity, can predict the EFL instructors' stroke. Hence, there is a need to conduct research on the predictive power of the immunity of language instructors and its relationship with their job identity (Hiver, 2016) in an EFL context.

2.3. Teacher professional identity

Recent research on teacher development has given more attention to the concept of professional identity (Moradkhani & Ebadijalal, 2024). This has led to investigations into teachers' perspectives, narratives, and biographies (Rodgers & Scott, 2008), which provide insights into the factors that influence an individual's inclination toward a particular job (Tsakissiris, 2015). According to Tsakissiris (2015), people form their identities based on their individual characteristics, relational connections, and group affiliations. As Skorikov and Vondracek (2011) maintain a person's concept of individual identity heavily depends on their sense of job or professional identity. Professional identity plays a significant role in the growth and development of a nation (Low et al., 2012). The process of developing a professional identity is thought to be influenced by a variety of situations and personal factors, and by external factors such as political, social, and cultural circumstances, as well as interactions with others, being critical in shaping a person's identity (Bressler & Rotter, 2017).

Language teacher professional identity has recently heeded much from L2 teacher researchers (De Costa & Norton, 2017). Teacher identity development is now seen as an essential component of instructor education and is a prominent area of research in the training of teachers (Tsui, 2003). According to Morgan and Clarke (2011), the identity of language teachers is a crucial aspect of the ongoing reconstruction of their expertise and abilities in the field of language instruction. Such a perspective aligns with the recent sociocultural trends in the field of SLA teaching, which aim to present instructor expertise not as a solitary array of intellectual abilities but as inherently associated with factors such as the growth and identity of instructors (Johnston et al., 2005). This approach suggests that investigating the development of teachers' identities can provide insight into how language teachers develop as experts as they transition from a student self to an instructor self.

Language education studies, in recent years, have focused on the construction and development of teacher professional identity (Atai et al., 2022; Ghiasvand et al., 2023; Kalali Sani et al., 2021) and on investigating different aspects of language instructors' job identity development in both L2 instruction and teacher preparation. Scholars have explored the connection between language teacher identity and their linguistic identities, race, and gender (Aneja, 2016; Huang, 2014; Kayi-Aydar, 2015; Rudolph, 2016; Park, 2017; Yazan, 2017; Vitanova, 2016). Moreover, they have examined how language teachers negotiate discourses in communities of practice, the impact of internships in developing identity, teachers' positioning and agency in teaching contexts, the role of emotions in identity development, and how teacher education courses affect identity negotiation (Trent, 2017; Wolff & De Costa, 2017; Yazan, 2017, 2018). While teacher professional identity is a well-established research line studied from various

perspectives as briefly reviewed above, its association with teacher stroke in the development of a conceptual model that is a major objective for the current study is still calling for further studies.

2.4. Teacher TPACK

In the field of education, TPACK is a conceptual model (Mishra & Koehler, 2006) that explains how teachers can incorporate technology into their instruction. TPACK is derived from Shulman's Pedagogical Content Knowledge (PCK) (1986), serving as its foundation. According to Shulman, a teacher's effectiveness depends on their knowledge of content and pedagogy. TPACK extends Shulman's PCK and proposes that teachers must cultivate three essential knowledge domains: technological knowledge (TK), pedagogical knowledge (PK), and content knowledge (CK). By developing these domains, teachers can effectively teach subject matter content using specific instructional methods and technology in various contexts (Bostancıoğlu & Handley, 2018).

Educators and researchers have taken an interest in the TPACK framework, with around 600 publications currently listed in the Scopus database and a number of papers in the Web of Science, as reviewed by Tseng et al. (2020). The researchers conducted a critical evaluation of TPACK studies and identified several implications for future research, including exploring the relationship between TPACK and other teacher-related variables. Numerous investigations have been carried out in this field, assessing teacher TPACK knowledge (Najjari et al., 2021; Raygan & Moradkhani, 2022), and also examining the link between instructors' TPACK, their professional development, educational ideas, and self-efficacy (Chai et al., 2013; Kavanoz et al. 2015; Liu & Kleinsasser, 2015; Nessaei & Kazemi, 2024; Mei et al., 2018; Saudelli & Ciampa, 2016; Yang, 2018). However, there is a lack of understanding of the findings in TPACK research related to other teacher-related factors such as teachers' immunity, professional identity, and stroke, particularly in an EFL context like Iran.

Previous research has highlighted the significance of the teacher's identity, immunity, and TPACK in EFL teaching effectiveness (e.g., Jiang et al., 2021; Koehler & Mishra, 2009). However, few studies have examined the relationships among these factors and their potential interactions with stroke in the Iranian EFL context. As noted by Pishghadam et al. (2018), understanding the complex interplay between different factors affecting EFL teachers in Iran is crucial for developing effective support systems and interventions that can enhance their well-being and teaching effectiveness. Therefore, the present study aims to explore the relationships between teacher stroke, identity, immunity, and TPACK in Iranian EFL teachers. Moreover, it is an attempt to examine the predictive role that the teacher identity, immunity, and TPACK probably play on the variation of stroke. Such a framework can inform the development of effective interventions and support systems that can enhance EFL teachers' well-being and teaching effectiveness in Iran. Understanding the intricate nature of EFL teaching will be made easier with the help of this research and it can provide insights for teacher training programs and educational policymakers. Therefore, the current study seeks to answer the following qustions:

1. Is there a significant association among Iranian EFL teacher stroke, Identity, Immunity, and TPACK?
2. Do Immunity, Identity, and TPACK significantly predict Iranian EFL teacher stroke?

3. Methodology

3.1. The design of the study

This study employed a quantitative, non-experimental research design to investigate the relationships among variables under investigation. The research design was structured around a correlational framework, which allowed for the examination of associations among the variables without manipulating them. Specifically, the study aimed to determine the extent to which teachers' immunity, TPACK, and identity predict their stroke, as well as to explore the interplay among these constructs. This approach enabled the creation of a robust model that not only identified significant predictors but also quantified their contributions to the variance in the dependent variable.

3.2. Participants and settings

The study involved a total of 124 EFL teachers, selected non-randomly based on their availability and their consent to have a sample of Iranian EFL instructors from various regions in Iran, ensuring geographic and institutional diversity. Among the participants, 68 were male (54.8%) and 56 were female (45.2%), reflecting a relatively balanced gender distribution. The mean age of the participants was 34.2 years ($SD = 7.8$), indicating a diverse range of teaching experience levels.

3.3. Research instruments

This study employed four instruments to collect the required data as follows.

3.3.1. Teacher immunity questionnaire

The study's quantitative data were collected using a teacher immunity questionnaire, created by Hiver (2016), which consists of two sections. Demographic information was gathered in the first section, including teaching experience, gender, and age. The

second section of the questionnaire consisted of 39 items divided into seven subscales, including coping, self-efficacy of instructor, burnout, resilience, views on instruction, willingness to change, and affectivity. These items were measured using a seven-point Likert scale, ranging from *Strongly Disagree* to *Strongly Agree*. The questionnaire displayed an overall Cronbach's alpha index of 0.85, indicating strong internal consistency (Haseli Songhori et al., 2018). This instrument was translated into Persian by Haseli Songhori et al. (2018), and inter-coder reliability was established through back-translation by two professional translators, with a reported Cohen's Kappa of 0.88, indicating high reliability.

3.3.2. TPACK questionnaire

In this study, Bagheri's (2020) TPACK tool was utilized because its validity and reliability have been established in an EFL context. The tool included 31 items that utilized a seven-point Likert scale, measuring three sources of knowledge: CK, PK, and TK. Interactions between these three sources created four additional knowledge sources: technological pedagogical knowledge (TPK), technological content knowledge (TCK), pedagogical content knowledge (PCK), and technological pedagogical content knowledge (TPACK). Additionally, the questionnaire evaluated teachers' self-assessed confidence in utilizing web-based teaching and searching for subject-specific web materials. These items were incorporated under a new category called web content knowledge (WCK). In the current study, the total Cronbach's alpha for the questionnaire was determined to be 0.86.

3.3.3. Teacher's identity questionnaire

The third survey used in the study was the teacher's identity questionnaire, adapted from Liou (2008). The questionnaire comprises two parts. The first part, Section A, included eight questions that were designed based on the components of professional identity for non-native English teachers and focused on their views regarding the social status of their job, their job commitment and evaluation, and their perceptions of their pupils' ideas about their instructions. Following the initial section, Section B included 18 questions intended to gauge respondents' views on language proficiency in different contexts, such as grammar and pronunciation, their preferences in teaching content, and whether they believe the purpose of learning English is to achieve language proficiency and accuracy or intelligibility in communication. The teacher's identity questionnaire demonstrated a reliability of 0.85.

3.3.4. Teachers' stroke scale

This questionnaire was developed and validated by Kadkhodaie et al. (2023) to measure the EFL teacher's perceived stroke practice. The scale consists of 34 items, with choices varying between *Strongly Disagree* and *Strongly Agree*, as a five-point Lickert scale. The items on the scale assess various aspects of teachers' classroom behavior and interactions with students, such as their ability to greet and motivate students, their use of disciplinary measures, their relationship with students, and their use of up-to-date and real-life teaching materials. The construct validity of the Teacher Stroke Scale was checked by Kadkhodaie et al. (2023) using two methods: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). The convergent validity was established by examining the correlations between the items on the scale and their respective factors, which were found to be significant and in the expected direction (Kadkhodaie et al., 2023). The scale demonstrated strong internal consistency, as evidenced by a Cronbach's alpha coefficient of .87, indicating that the items in the scale effectively measured a shared concept. The Teacher Stroke Scale provides an overall estimate of EFL teachers' perceived stroke practice stroke based on teachers' classroom behavior and interactions with students.

3.4. Data collection procedure

The procedure began on March 15, 2023, with circulating a consent letter describing a detailed explanation of the study's objectives, the purpose of the questionnaires, and the ethical considerations, including the confidentiality of responses and the voluntary nature of participation. Participants, contacted in person or via email and social media, were assured that the data collected would be used solely for research purposes.

The research instruments were distributed to 200 EFL teachers who had expressed their willingness to participate. These teachers were from various language schools across Iran's central, eastern, western, northern, and southern regions to ensure geographic diversity and a representative sample. The data collection spanned over a three-month period, until June 20, 2023. This timeline allowed participants sufficient time to complete the questionnaires thoughtfully and return them without feeling rushed.

Out of the 200 distributed questionnaires, 124 were successfully completed and returned, achieving a response rate of 62%. Upon receiving the completed questionnaires, the data were carefully reviewed for completeness and accuracy before statistical analysis (Creswell & Creswell, 2017).

3.5. Data analysis

The data analysis phase involved a comprehensive approach to examine the relationships, using the Statistical Package for the Social Sciences (SPSS, version 26), among the study's key variables. To achieve this, Pearson Product Moment Correlation was

used to check the associations among variables; moreover, Multiple Regression Analysis was employed for the exploration of predictive power, enabling the creation of a model that quantifies the contributions of independent variables (teacher identity, immunity, and TPACK) to the dependent variable (stroke) (Hahs-Vaughn & Lomax, 2020). The analysis aimed to determine the extent to which these factors collectively explain the variance in teacher stroke and identify their relative significance as predictors.

4. Results

4.1. The association among variables

The first research question addressed the correlation among the main variables of the study. To answer the question, Pearson Correlation Coefficient was run, after ensuring that the data was normally distributed and there was no significant outlier. As the results presented in Table 1 indicate a series of significant associations among Iranian EFL teachers' stroke, identity, immunity, and TPACK were observed. This conclusion was supported by robust evidence derived from the Pearson correlation coefficients (r), which revealed that all correlations between the main variables are positive and statistically significant ($p < .001$ for all correlations). Specifically, Teachers' Stroke demonstrated strong correlations with Identity ($r = .516$), Teachers' TPACK ($r = .546$), and Teachers' Immunity ($r = .582$). Similarly, Identity was significantly correlated with Teachers' TPACK ($r = .454$) and Teachers' Immunity ($r = .448$), while Teachers' TPACK showed a notable correlation with Teachers' Immunity ($r = .527$). The significance levels (Sig. 1-tailed) for all correlations were reported as $p < .000$, indicating that the observed associations are highly unlikely to have occurred by chance. These findings provide compelling evidence of statistically significant relationships among the variables.

Table 1. Correlations among main Variables

		Teacher Stroke	Teacher Identity	Teacher TPACK	Teacher Immunity
Pearson Correlation	Teacher Stroke	1.000	.516	.546	.582
	Teacher Identity		1.000	.454	.448
	Teacher TPACK			1.000	.527
	Teacher Immunity				1.000

Furthermore, the strength of the correlations ranges from moderate (.448 to .527) to strong (.546 to .582), suggesting meaningful and substantive associations among the variables. For instance, the strongest correlation is observed between Teachers' Stroke and Teachers' Immunity (r = .582), followed closely by the correlation between Teachers' Stroke and Teachers' TPACK (r = .546). Understanding the relationships among these variables can inform targeted interventions aimed at enhancing EFL teachers' professional development and instructional quality.

4.2. The predictive power of independent variables

To answer the second research question that was raised regarding the predictive power of teacher identity, immunity, and TPACK on stroke, Multiple Regression analysis was run. In order to guarantee the validity and reliability of the findings derived from a Multiple Regression analysis, specific assumptions described by Hahs-Vaughn and Lomax (2020) were checked in the current study. To check one of the assumptions the Cook's Distance statistic was run for each participant. Typically, values of the Cook's Distance statistic exceeding 1 are regarded as significant outliers that could exert excessive influence on the regression model, necessitating their removal. The current study did not identify any such outliers, confirming that the assumption was satisfied. Moreover, the data presented in Table 1 demonstrated a linear relationship between the independent variables and the dependent variable, thereby fulfilling the requirement of another assumption for running Multiple Regression analysis.

To verify an additional assumption, which is collinearity, before conducting the Multiple Regression analysis, it is crucial to ensure that the predictors (or independent variables) do not exhibit excessively high correlation. This can be accomplished through two methods. Firstly, by examining the correlation table provided above, it is important to observe that no correlations exceed 0.8 among the predictors. In this study, there was no concern regarding this matter, as the strongest correlation observed was $r = .582$. Moreover, the two collinearity diagnostic tests, namely *Tolerance* or *VIF* (Variance Inflation Factor) could also be used as the second more objective way of testing the collinearity assumption. A threshold for VIF that is often regarded as indicating more substantial collinearity among predictors is 10 (Pituch & Stevens, 2016) which would correspond to a tolerance of 0.2. Hence, in order to satisfy the collinearity assumption, the VIF test values should be significantly lower than 10, and the Tolerance test value scores should be above 0.2. These conditions were successfully met in the present study.

Regarding the subsequent assumption, which necessitated that the residuals exhibit a normal distribution, a normal P-P plot of Regression Standardized Residual was used. The results indicated that the majority of the data points closely align with the line, indicating the fulfillment of another assumption. The Durbin-Watson test was used for checking the next assumption. The Durbin-Watson statistic is utilized to verify the independence assumption of the residuals. This statistic falls within the range of 0 to 4, and to satisfy the assumption, the value should be close to 2. In this research, however, the Durbin-Watson value was quite near 2 (*Durbin-Watson* = 1.954), indicating that the assumption has been satisfied.

The R-value indicated the magnitude of the association between the dependent variable, which is the teacher stroke, and the collective predictor variables, such as immunity, identity, and TPACK. In the present research, the R-value was 0.68, denoting a robust relationship (Cohen, 1988). The R-square value ($R^2 = .463$) illustrated the proportion of variability in the dependent variable, that is accounted for by the included predictors. The combination of predictors, including immunity, identity, and TPACK, explained around 46% of the variability in Teacher Strokes. According to Cohen (1988), the impact size of the predictor set on the dependent variable, as measured by R-square, can be interpreted using the following benchmarks: $R^2 \leq .02$ (small effect); $R^2 = .13$ (medium effect); $R^2 \geq .26$ (large effect).

Table 2. ANOVA[a]

	Model	Sum of Squares	df	Mean Square	F	Sig.
	Regression	7.332	3	2.444	34.552	.000[b]
1	Residual	8.487	120	.071		
	Total	15.819	123			

a. Dependent Variable: Teacher Stroke

b. Predictors: (Constant), Teacher TPACK, Teacher Identity, Teacher Immunity

In Table 2, the F-ratio is used to evaluate the suitability of the regression model for the data. It tests whether the independent variables, including immunity, professional identity, and TPACK, predict the dependent variable, the teacher's stroke, significantly. According to the table, $F(3, 120) = 34.552$ and $P < .000$, which suggests that the regression model is well-suited for the data and that the independent variables have a significant predictive ability for the teacher's stroke.

To meet the next assumption, that is, homoscedasticity, the scatterplot of the residuals was checked. Observationally, the scatterplot did not indicate any homoscedasticity, since the residuals were not evenly scattered across the plot. Therefore, a Modified Breusch-Pagan test was run to check the assumption of homoscedasticity statistically. The results indicated that the assumption of homoscedasticity was not met. Heteroskedasticity of the data may either increase Type 1 or Type 2 error probability when making inferences regarding regression parameters (Hayes & Cai, 2007). In these cases, one potential approach to reduce the biasing effect of heteroskedasticity on test statistics and inferences is to use regression using the HC3 estimator, as displayed in the following table.

Table 3. Parameter estimates with robust standard errors

Dependent Variable: Teacher Stroke

Parameter	B	Robust Std. Error[a]	t	95% Confidence Interval	
				Lower Bound	Upper Bound
Intercept	1.678	.426	3.941	.000	.835
Identity	.313	.140	2.241	.027	.037
TPACK	.130	.047	2.789	.006	.038
Immunity	.161	.055	2.907	.004	.051

a. HC3 method

Table 3 provides information on the degree to which each individual predictor variable makes a significant contribution to the model. Looking at the Sig. column, it is revealed that the teacher identity ($p = 0.027$), immunity ($p = 0.004$), and TPACK ($P = 0.006$) as predictors of the model, could all significantly predict the teacher stroke, as the dependent variable of the study. The Beta column in the table presents the unstandardized beta coefficients (B values) for the model. The coefficients provide insights into the associations between the dependent variable (teacher stroke) and all the predictor variables (teacher identity, immunity, and TPACK). Essentially, these B values offer an understanding of the impact each predictor has on the outcome while holding the impacts of other predictors constant. It follows that for every one-unit increase in the teacher identity mean score, the teacher stroke mean score is expected to increase by .313 units, holding the remaining predictors constant (Identity B_1 =.313); for every one-unit increase in the teacher immunity mean score, the teacher stroke mean score is expected to increase by .161 units, holding the remaining predictors constant (Immunity B_2 =.161); for every one unit increase on the TPACK mean score, the teacher stroke mean score is expected to increase by .130 units, holding the remaining predictors constant (TPACK B_3 =.130).

The regression results revealed that the model accounted for 46% of the variance and served as a significant predictor of Iranian EFL participants' teacher stroke, $F(3, 120) = 34.552$, $P < .000$. In the analysis, teacher identity, immunity, and TPACK contributed significantly to the model (B_1 =.313; B_2 =.161; B_3 =.130) respectively.

5. Discussion

The present study, as its first aim, investigated the associations among Iranian EFL teachers' stroke, identity, immunity, and TPACK. The findings provided robust statistical evidence indicating significant and positive correlations among these key

variables. Specifically, teachers' stroke, conceptualized as appreciating and recognizing students' presence, was strongly correlated with identity, TPACK, and immunity, while identity, TPACK, and immunity also exhibited moderate to strong intercorrelations. These results suggest that teachers who actively acknowledge and appreciate their students tend to develop a stronger professional identity, possess higher TPACK knowledge, and demonstrate greater immunity.

The findings align with prior research emphasizing the interconnected nature of teacher stroke, professional identity, technological pedagogical expertise, and psychological resilience. The strong correlation between teachers' stroke and immunity corroborates with that of Mercer and Gregersen (2020) who emphasize that teachers' emotional engagement with students significantly contributes to their ability to handle professional challenges effectively. The observed relationship between teachers' stroke and TPACK also aligns with prior research suggesting that when teachers appreciate their students' value and progress, they are more likely to explore and integrate innovative teaching methodologies (Khorsand & Modarresi, 2023; McCroskey, 1998). This appreciation fosters a sense of purpose, motivating them to refine their pedagogical and technological competencies to enhance student engagement.

Similarly, the correlation between teachers' professional identity and TPACK supports findings from Derakhshan et al. (2021), which suggest that teachers who have a well-established professional identity are more confident in integrating technology into their instruction. Teachers with a strong sense of identity perceive technological advancements as tools to enhance student learning rather than as barriers, making them more willing to incorporate innovative educational technologies. Moreover, the association between teachers' professional identity and psychological immunity is in line with Hiver and Dörnyei's (2017) research, which posits that teachers with a strong professional self-concept are better equipped to manage stress and remain resilient in the face of professional adversity. Given the emotional demands of teaching, particularly in the Iranian EFL context, a well-established identity acts as a protective factor that fosters teachers' psychological endurance.

As its second aim, the current research revealed that the teacher identity, teacher immunity, and teacher TPACK as predictors, could all significantly predict the teacher stroke, as the dependent variable of the study. The concept of teacher stroke as explored in association with the teacher identity has not been investigated in the previous literature, according to the researcher's best knowledge. Nonetheless, the relationship between the teacher's identity and the teacher's stroke can be elucidated by the theoretical framework of Transactional Analysis (TA) in the context of interpersonal relationships in education (Berne, 1988). In this respect, TA may be characterized as "a theory of personality and a structured psychotherapy for personal transformation and progress" (Stewart & Joines, 1987, p. 3). According to the theory, a "stroke" is any action a person does to demonstrate that they are aware of the people around them (Shirai, 2006). In conclusion, the behaviors of giving and getting strokes may satiate a person's insatiable emotional need for acknowledgment and praise from others (Berne, 1988). Accordingly, It could be argued that the stroking behaviors of EFL teachers can contribute to the acknowledgment and recognition of their identity. That is why the teacher's identity as a concept in which the teacher's stroking behavior could be embedded can predict the teacher's stroking behavior.

The predictive relationship between EFL teacher TPACK and their stroke is also an unexplored research line as the review of the past literature indicated. The predictive relationship, however, could be accounted for through the teacher credibility theory (McCroskey & Teven, 1999). The degree to which a teacher is seen as trustworthy, dependable, or credible when applied to the educational setting, is referred to as teacher credibility (McCroskey, 1998). According to McCroskey and Teven (1999), the three components of teacher credibility, namely goodwill, competence, and trustworthiness respectively refer to instructors' concern for students' best interests, expertise in their field, and honesty. Accordingly, it could be argued that for an EFL teacher to have successful stroking behaviors, the teacher needs to have good knowledge of the subject matter, including TPACK, to serve best in an educational context. The teacher's TPACK can function as a tool in her hands to fulfill students' educational needs and consequently gain greater credibility in the educational context. This credibility can pave the way for the teacher to provide more stroke that in a reciprocal relationship can result in more credibility. Therefore, a teacher's TPACK can act as a predictor of the stroking behaviors an EFL teacher practices in instructional settings.

The past literature on the association between the instructor's immunity and the instructor's stroke is in its infancy yielding no previous study in this regard. However, the novel predictive association between the two concepts found in the current study can be consistent with the statement that "teacher immunity affects almost everything that teachers do in their careers" (Hiver, 2015, p. 226). Moreover, the predictive/associative relationship between EFL teachers' immunity and their stroke can be explained by the mediating role that the teacher's stroke can play with other variables that are correlated with the teacher's immunity. For example, teacher stoke as a mediating variable can explain the relationship between EFL instructors' engagement and their immunity. In this respect, Noughabi et al.'s (2020) findings demonstrated that "various aspects of teacher engagement (i.e., cognitive engagement, emotional engagement, social engagement with learners, and social engagement with colleagues) could affect EFL teachers' immunity" (p. 7). It might be argued that through stroking behaviors, teachers strengthen their engagements with both colleagues and learners, thereby creating a pathway toward developing immunity. However, this mediating role explained for the teacher's stroke needs to be supported by further empirical studies.

6. Conclusion

Instructors, including EFL teachers, have been recognized as significant stakeholders within the educational system, with the ability to influence students' academic advancements and the overall effectiveness of educational systems. The conclusion that instructors' behavioral, psychological, and instructional traits need proper consideration and investigation is the result of their significant influence on a range of student-related academic choices (Burroughs et al., 2019; Derakhshan et al., 2020). As a result,

the present study was an attempt to shed more light on the behavioral, psychological, and instructional qualities of EFL instructors. The current study in its approach to the four main variables of the research was novel in Iran.

The findings of the present study provide strong empirical support for the significant relationships among Iranian EFL teachers' stroke, identity, immunity, and TPACK. The study highlights that teachers who actively recognize and appreciate their students' presence tend to develop a more robust professional identity, possess higher technological pedagogical content knowledge, and demonstrate greater psychological resilience. Moreover, teacher identity, immunity, and TPACK were found to significantly predict teacher stroke, underscoring the interconnected nature of these variables. These results contribute to the growing body of research on teacher psychology and professional development, offering new insights into how teacher acknowledgment of students can enhance instructional effectiveness and teacher well-being.

7. Implications

Considering the results found in the present research, this kind of study has important implications for the practice of pre- and in-service EFL instructors, instructor trainers, and administrators in charge of instructor employment initiatives, among other stakeholders in EFL settings. It is obvious that teachers are important to education and that both internal and external variables affect their performance. Hence, students' motivation, learning, achievements, and the educational system efficacy in general, all depend on several teacher's attributes, including but not limited to the teacher's stroke, teacher's immunity, teacher's TPACK, and teacher's Identity, which are shaped by behavioral, psychological, and instructional factors (Derakhshan et al., 2021). EFL instructors must be trained and mentally equipped to handle challenges since teaching is a difficult and stressful profession that puts strain on them. By learning about the demands of teaching languages and the fact that this line of work is well known for its emotional strains, adversities, and stress, in addition to the content, pedagogical, and technological knowledge challenges that EFL teachers may face, teachers can benefit from this line of research. Similar to this, EFL instructors may build an affluent environment for their educational settings where EFL teachers can have professional growth and EFL learners can experience excellent education by learning how to cope with these challenges and demands via developing necessary techniques.

Another implication of the study is to recommend teacher educators provide content and pedagogical knowledge in their teacher education programs with pre-service and in-service teachers regarding the concepts of the teacher's stroke, teacher's identity, teacher's immunity, teacher's TPACK as they are correlated with one another, according to the results obtained in the current study. They can learn the concepts, negotiate different aspects of the concepts, and develop their basic knowledge for their future careers in teacher education programs. The presentation of such concepts and how important they could be in teacher education programs can prepare the teachers to enact their professional knowledge in their instructional settings, paving the way to have more successful English language in EFL contexts.

The findings of this research can also be advantageous for individuals responsible for hiring qualified EFL instructors for educational programs. Only EFL teachers who exhibit a professional identity with stable immunity and those who possess a sufficient understanding of various facets of teacher competence, such as knowledge of stroke and TPACK, among other content, language, psychology, sociology, instructional communication, and cultural knowledge, are allowed to pass the gate in this regard.

8. Limitations and suggestions for further research

Despite its valuable contributions, this study has certain limitations that should be acknowledged. First, the study focused exclusively on Iranian EFL teachers, which may limit the generalizability of the findings to different cultural or educational contexts. Future research could extend this investigation to diverse linguistic and geographical settings to validate the results further. Second, the study employed a quantitative design, which, while effective in establishing statistical relationships, does not capture the in-depth qualitative experiences of teachers regarding stroke, identity, and immunity. Future research could employ qualitative methodologies, such as interviews or classroom observations, to gain deeper insights into these dynamics. Additionally, the study relied on self-reported data, which may introduce response bias. Future studies could use a mixed-methods approach to triangulate findings and enhance validity. Finally, experimental studies examining the effects of targeted teacher training interventions on increasing teacher stroke and its subsequent impact on student engagement and achievement would offer practical applications for teacher education and professional development programs.

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