# Investigating Factors that Influence EFL Teachers' Adoption of Web 2.0 Technologies: Evidence from Applying the UTAUT and TPACK

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## Abstract

*The present study sought to investigate factors influencing Iranian EFL teachers' adoption of Web 2.0 technologies in light of the unified theory of acceptance and use of technology (UTAUT) and technological pedagogical content knowledge (TPACK) theoretical frameworks. A hypothesized structural model consisting of seven pertinent constructs based on UTAUT and TPACK was proposed. The study composed a cohort of 160 EFL teachers from private language institutes, who completed a questionnaire designed to collect data on acceptance of Web 2.0. Data analysis was performed to test the proposed model via structural equation modeling. Findings of the study indicated that performance expectancy (PE) and social influence (SI) had positive and direct influences on behavioral intention (BI) to use Web 2.0 technologies, while effort expectancy (EE) and TPACK did not affect BI significantly. Facilitating conditions (FC) and BI had positive and direct effects on use behavior (UB). Moreover, TPACK influenced PE and EE significantly. The current study moves our understanding of technology acceptance one step further by considering the factors influencing EFL teachers' adoption of Web 2.0 in Iran.*

***Keywords:*** *Technology acceptance; technological pedagogical content knowledge (TPACK); UTAUT; Web 2.0 technologies.*

The World Wide Web has taken a quantum leap by entering an era of hyper-connectivity and interoperability through the second stage of development of advanced internet technology known as Web 2.0. Web 2.0 technologies have become part and parcel of people's everyday lives almost all over the world. Web 2.0 specifically includes social and professional networking sites, instant messaging services, wikis, weblogs, file-sharing, podcasts, etc. Web 2.0 devices allow collaboration, knowledge sharing, and networking activities on a social platform (Davies et al., 2013). These technologies are gathering momentum in education due to learners' need to build new skills and gain educational attainment at the beginning of the 21st century (Sadaf et al., 2016; Teo et al., 2019). Moreover, the emergence of Web 2.0 technologies has offered excellent potential for integrating new applications into teaching and learning of all English language skills and components (Chapelle & Sauro, 2017; Tzotzou, 2018). Thus, Web 2.0 technological devices have provided computer-assisted language learning (CALL) with digital affordances to facilitate the task of language learning and teaching (Karsenti et al., 2020; Parmaxi & Zaphiris, 2017; Wang & Vásquez, 2012).

Even though digital devices have found a way to the lives of many people including language teachers, the research evidence suggests that there is not enough enthusiasm and interest on the part of language teachers to utilize technology for language learning and teaching purposes (Mei et al., 2018; Toffoli & Socket, 2015). The EFL teachers in Iran are no exception. Having said this, several researchers have expressed their dissatisfaction with the recent trend towards integrating digital technologies into English language instruction in Iran (Raygan & Moradkhani, 2020; Shahrokni & Sadeqjoola, 2015; Taghizadeh & Hasani Yourdshahi, 2020). The challenges of technology uptake could be attributed to lack of facilities, soaring prices of technological devices, and the inadequacy of organizational and financial support (Dashtestani & Hojatpanah, 2020). Considering the fact that applying technology for educational purposes largely hinges on one's positive thoughts about technology and their awareness of how to incorporate that technology into EFL teaching (Mei et al., 2018; Sun & Mei, 2020), it is imperative to find out what internal and external factors influence teachers' adoption of technology in language teaching (Liu et al., 2018).

During the recent years, there has been a rise in technology acceptance research into Web 2.0 technologies in various EFL settings (Hsu, 2016; Huang et al., 2019; Ma et al., 2020; Mei et al., 2018; Teo et al., 2019). Most of these studies acknowledged the positive attitudes of teachers towards technology adoption, but almost no mention was made to Iranian EFL teachers regarding their adoption of Web 2.0 technologies. Consequently, it seems important to embark on such research in under-studied contexts in order to lend a helping hand to EFL teachers to utilize Web 2.0 technologies effectively and optimally.

The current study intends to broaden the perspective of technology acceptance research especially the UTAUT model by investigating the factors that affect Iranian EFL teachers' adoption of Web 2.0 technologies and implementing the model in a new cultural context. With this end in view, this study seeks to present evidence and suggestions for major stakeholders in designing online professional development programs and Web 2.0 technology training courses in English language teaching.

## Literature Review

### The UTAUT Model

During the past 40 years, several technology adoption models have grown out of users' perceptions and their conceptualizations of technology acceptance where their beliefs in the use and uptake of various forms of technology were investigated. The growing research on user behavior towards technology use led to a number of models including the Theory of Reasoned Action (Fishbein &

Ajzen, 1975), the Theory of Planned Behavior (Ajzen, 1991), Technology Acceptance Models (Davis, 1989, 1993; Venkatesh & Davis, 2000), the Model of PC Utilization (Thompson et al., 1991), the Motivational Model (Davis et al., 1992), the Innovation Diffusion Theory (Rogers, 1995), and the Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003). The UTAUT was originally put forth in Information Systems (IS) research as a reaction to explicating users' acceptance of technological systems in organizational contexts. Technology acceptance model (TAM) has gained more popularity in studying user behavior towards technology use. TAM has been applied considerably to investigate technology acceptance in numerous educational contexts and fields of study. Yet, it could only explain no more than 40 % of the variation in the dependent variable. This drawback led to the development of UTAUT by Venkatesh et al. (2003) which managed to explain 70 % of the variation in intention to use technology and 40 % of the technology usage.

The UTAUT presents four major exogenous variables consisting of Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), and Facilitating Conditions (FCs), and two other endogenous variables namely Behavioral Intention (BI) and Use Behavior (UB). This framework postulates that PE, EE, and SI influence a user's technology acceptance and behavioral intention, which in turn influences adoption, while FCs are considered as direct determinants of actual use. There are four intermediary variables acting upon the main constructs including gender, age, experience, and voluntariness of use.

Since its introduction, UTAUT has been applied and tested empirically as a valid explanation for a system user's acceptance and use of technology in a wide variety of educational contexts including China (Ma et al., 2020), the Philipines (Kim & Lee, 2020), Saudi Arabia (Alasmari & Zhang, 2019), Canada, (Birch & Irvine, 2009), Nigeria and Scotland (Echeng & Usoro, 2014), USA (Lawson-Body et al., 2020), South Africa (Graham et al., 2020), and Turkey (Harmandaoğlu Baz et al., 2019). The rationale behind utilizing such a model is its strength in analyzing individuals' technology acceptance (Lakhal et al., 2013; Oye et al., 2014). Although the UTAUT is complicated (Bagozzi, 2007), it is comprehensive enough to account for the details in a study. As such, the UTAUT can provide an appropriate way to figure out how a given teacher's PE, EE, SI, and FC could affect their intentions to make use of Web 2.0 technologies.

**The TPACK Model**

Although research into technology acceptance has progressed greatly since its inception, a meta-analysis of the research in this area by Scherer et al. (2019) has revealed that technology acceptance models have failed to determine the types of knowledge teachers require in order to incorporate technology into teaching and learning processes successfully. These types of professional knowledge are materialized in Technological Pedagogical Content Knowledge (TPACK) model. Therefore, it was suggested that educationally-related factors be included to better explain and conceptualize teaching with technology in technology acceptance research (Teo & Zhou, 2017). Thus, TPACK as an educational factor was incorporated into the UTAUT.

Mishra and Koehler (2006) extended Shulman's (1986; 1987) pedagogy-content dual knowledge by adding the technology aspect into the model referred to as technological, pedagogical, and content knowledge, briefly known as TPACK. The intersections of these knowledge forms give rise to second-level knowledge structures, identified as technological pedagogical knowledge, pedagogical content knowledge, technological content knowledge, and technological pedagogical content knowledge (Koehler et al., 2014).

TPACK refers to knowledge of making use of technology for constructive implementation of teaching methodology in course contents of different types. TPACK lies at the center of the model

and incorporates different competences into one whole associated with teachers' effective technology integration for pedagogical applications (Koh et al., 2013).

In spite of being highly acclaimed by CALL scholars (e.g., Herring et al., 2016; Torsani, 2016), there is a paucity of empirical investigations into the contribution of TPACK as a teacher-related factor in promoting EFL teachers' Web 2.0 use. As yet most of TPACK studies have mainly concentrated on measuring the construct validation and reliability of components of the model, examining the interrelationships of the model's constructs, assessing the intervention outcomes, understanding the perceptions and self-efficacies of teachers and students, and evaluating it among pre-service and in-service teachers (Archambault, 2016; Chai et al., 2016). Therefore, with regard to the general aim of TPACK and UTAUT in optimizing technology utilization, the technological pedagogical content knowledge as the end result of the TPACK framework was included in the proposed conceptual model in order to further technology acceptance research by collecting empirical evidence for the adoption of Web 2.0 in the EFL context of Iran.

***Research Question and Hypotheses.*** The main concern of the present research was to test a structural model (see Figure 1) in order to investigate factors affecting the use of digital devices among Iranian EFL teachers by applying UTAUT and TPACK models. Drawing on previous research, seven factors including PE, EE, SI, FC, and TPACK were selected as exogenous variables, and BI and UB as the endogenous variables. Therefore, the current research sought to address the following research question and test the corresponding hypotheses.

RQ. What factors influence EFL teachers' adoption of Web 2.0 technologies?

**Performance Expectancy (PE).** Performance expectancy is defined as "the degree to which an individual believes that using the system will help him/her to attain gains in job performance" (Venkatesh et al., 2003, p. 447). Previous studies into acceptance of different technology types have supported the potential usefulness of the technologies for instructional purposes (Abdekhoda et al., 2016; Durak, 2018; Lawrence, 2016; Wong et al., 2013). In their study on Chinese EFL teachers' intention to use ICT, Ma et al. (2020) analyzed data from 585 in-service teachers at various higher education institutes. The results indicated that PE had a statistically significant effect ($\beta = 0.38$, p < .001) on behavioral intention to use ICT resources. Thus, the following hypothesis was addressed:

H1: Performance expectancy will have a direct and positive effect on EFL teachers' behavioral intention of Web 2.0 use.

**Effort Expectancy (EE).** Effort expectancy is associated with the ease with which an individual will be able to use the system (Venkatesh et al., 2003). Prior research has shown that the role of EE in technology acceptance research is significant (Kim & Lee, 2020; Tan, 2013; Thomas et al., 2013). Venkatesh et al. (2016) stated that there was often a statistically significant and positive association between EE and behavioral intention. In a meta-analysis of 162 studies, Dwivedi et al. (2019) demonstrated that all the UTAUT constructs including effort expectancy had positive influences on behavioral intention. Therefore, the hypothesis below was put forth:

H2: Effort expectancy will have a direct and positive effect on EFL teachers' behavioral intention of Web 2.0 use.

**Social Influence (SI).** Social influence refers to "the degree to which an individual perceives that important others believe he/she should use the new system" (Venkatesh et al., 2003, p. 451). The effect of SI, involving peer teachers, close friends, and family members on behavioral intention has been documented in previous technology adoption research (Kim & Lee, 2020; Ma et al., 2020; Shen et al., 2019). In fact, the findings have shown that SI is a determining factor of behavioral

intention (Mei et al., 2018; Teo et al., 2019). Current research, thus, hypothesizes that social contacts will affect English teachers' intention to use Web 2.0 technologies.

H3: Social influence will have a direct and positive effect on EFL teachers' behavioral intention of Web 2.0 use.

**Facilitating Conditions (FCs).** Facilitating conditions are defined as "the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system (Venkatesh et al., 2003, p. 453). These conditions comprise availability of both hardware and software support systems such as technical infrastructure, technology training courses, technical and logistical support, and educational policy on technology use (Teo et al., 2019). In a study concentrating on 305 Filipino secondary school teachers' adoption of ICT-based teaching, Kim and Lee (2020) indicated that FCs had positive influences on the use behavior of ICT-based instruction. This research assumes that facilitating conditions could be a contributory factor in EFL teachers' willingness to use Web 2.0 devices.

H4: Facilitating conditions will have a direct and positive effect on EFL teachers' use behavior of Web 2.0 technologies.

**Behavioral Intention (BI)**. Behavioral intention refers to an individual's intention to accept and use a particular system in the future (Venkatesh et al., 2003). Therefore, BI is presumed to play a significant role in influencing a user's decision to make actual use of technology. Several recent studies have reported the positive and direct effect of BI on the actual usage of technology (Graham et al., 2020; Kim & Lee, 2020; Ma et al., 2020). Taking these findings into account and consistent with the original UTAUT framework, it is assumed that behavioral intention of EFL teachers has a significant influence on using digital devices. Therefore, the hypothesis below was formulated:

H5: Behavioral intention will have a direct and positive effect on EFL teachers' use behavior of Web 2.0 technologies.

**Technological Pedagogical Content Knowledge (TPACK).** TPACK represents knowledge of adopting and operating technology in order to improve teaching practice in various course contents (Mishra & Koehler, 2006). TPACK involves the interrelationships that occur between various domains of knowledge and determines the important aspects of teacher knowledge, which are required when teachers integrate technology into their teaching practice. There has been little research focusing on the contributing role of TPACK in technology adoption. However, in an attempt to study factors influencing 296 Korean pre-service teachers' intention of using technology, Joo et al. (2018) focused on analyzing structural relationships between TPACK and technology acceptance determinants. It was indicated that TPACK influenced both perceived usefulness and perceived ease of use (similar to PE and EE respectively) positively and directly. In two other recent investigations, Mei et al. (2018) and Teo et al. (2019) pointed out that TPACK was a determining factor in Chinese pre-service teachers' intention to utilize Web 2.0 devices in their future teaching. In one of the latest developments, Prasojo et al. (2020) found that TPACK had a positive effect on intention to use Web 2.0 in Indonesian technical schools. With respect to current research results, the hypotheses below were addressed:

H6: Technological pedagogical content knowledge will have a direct and positive effect on EFL teachers' effort expectancy.

H7: Technological pedagogical content knowledge will have a direct and positive effect on EFL teachers' performance expectancy.

H8: Technological pedagogical content knowledge will have a direct and positive effect on EFL teachers' behavioral intention.
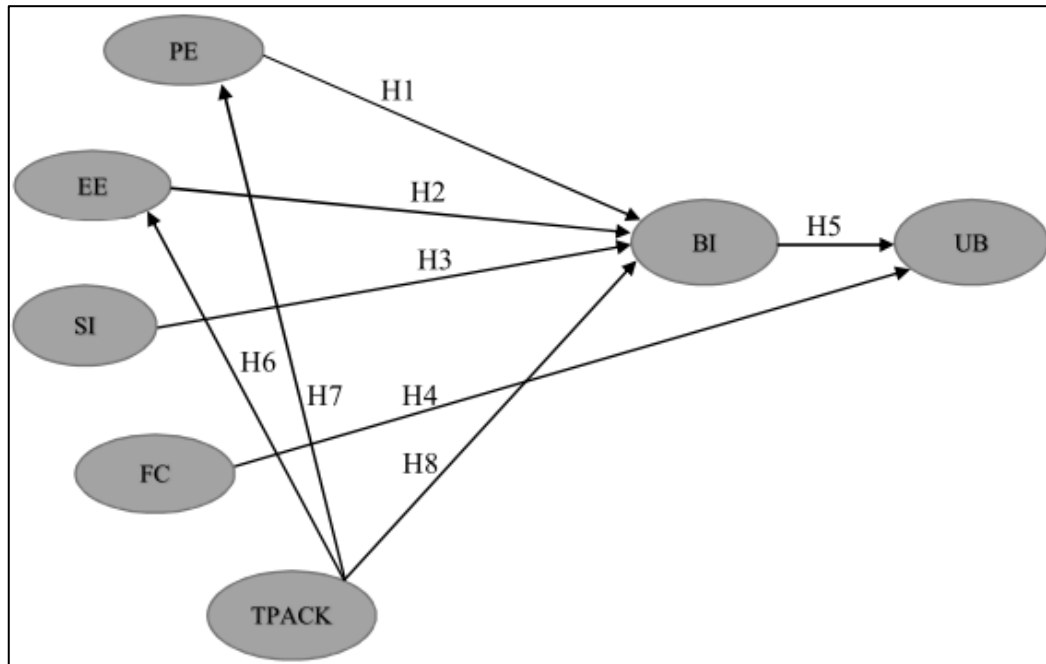


**Figure 1. Proposed Research Model.**


## Methodology

### Research Design

The present research employed a quantitative, non-experimental survey design (Creswell, 2012). As Creswell (2012) argued, in survey design procedure, researchers are able to compile numerical data by making use of questionnaires or interviews and doing statistical analyses in order to examine research questions and hypotheses.

### Participants

The participants of the study comprised one-hundred and sixty EFL teachers who were selected through a non-probability, convenience sampling procedure (Best & Kahn, 2006). They were working as either full-time or part-time teachers in private language institutes in Isfahan. The sample contained both male and female English language teachers in different age ranges having teaching experience of various ability levels and age groups (see Table 1).

**Table 1. Demographic Characteristics of EFL Teachers.**

| Item | Category | Frequency | Percentage |
|---|---|---|---|
| **Gender** | Male | 49 | 30.6 |
| | Female | 111 | 69.4 |
| **Major** | English | 154 | 96.3 |
| | Non-English | 6 | 3.7 |
| **Age Range** | 20-25 | 31 | 19.4 |
| | 26-30 | 30 | 18.8 |
| | 31-35 | 54 | 33.8 |
| | 36-40 | 26 | 16.3 |
| | 40-50 | 19 | 11.9 |
| **Years of Teaching Experience** | 1-5 | 63 | 39.4 |
| | 6-10 | 52 | 32.5 |
| | 11-15 | 25 | 15.6 |
| | 16-20 | 7 | 4.4 |
| | 20-25 | 13 | 8.1 |

The participants' responses to Web 2.0 familiarity items indicated that EFL teachers had a high familiarity with social and professional networking sites and applications, video sharing sites, online learning and searching tools, and wikis. Medium familiarity was reported for pod/vodcasts, online office suites, file-sharing services, blogs, and discussion/message boards. Last but not least, low familiarity was found for the interactive whiteboard, social bookmarking sites, and learning management systems.

**Table 2. Degree of EFL Teachers' Familiarity with Web 2.0.**

| Web 2.0 Technologies | Mean | SD |
|---|---|---|
| Blog (e.g., Edublog, WordPress) | 3.33 | 1.30 |
| Discussion Board/Message Board/Microblogging (e.g., EnglishForum.com, Twitter) | 3.28 | 1.23 |
| File Sharing (e.g., Samsung Cloud, iCloud, Google Drive) | 3.46 | 1.37 |
| Interactive Whiteboard (IWB) (e.g., SMARTboard) | 2.91 | 1.40 |
| Learning Management Systems (LMSs) (e.g., Moodle, Google for Education) | 2.54 | 1.33 |
| Online Learning/Searching Tools (e.g., Dictionary.com, Google Assistant) | 4.68 | .70 |
| Online Office Suite (e.g., Google Docs, Google Slides) | 3.43 | 1.27 |
| Pod/Vodcast (e.g., podcastsinenglish.com, Radiolab, TED-Ed) | 3.91 | 1.14 |
| Social Bookmarking (e.g., Google Bookmarks, Delicious) | 2.80 | 1.39 |
| Social/Professional Networking (e.g., Telegram, WhatsApp, LinkedIn, ResearchGate) | 4.37 | .85 |
| Video Sharing (e.g., Instagram, YouTube, TeacherTube) | 4.25 | .94 |
| Wiki (e.g., Wikipedia) | 4.31 | 1.10 |

## Instrument

The research survey consisted of three separate sections. Section one gathered data on respondents' demographic characteristics including gender, major, age range, and years of teaching experience. Section two collected background information on participants' degree of familiarity with the actual use of Web 2.0 technologies based on the current devices which are popular and known in Iran. A range of 5-point linear scale was utilized from *unfamiliar* to *very familiar* to collect the data (see Table 2). Section three queried EFL teachers' responses to the questionnaire items surveying the degree of their agreement with seven constituent factors derived from previous research into UTAUT and TPACK frameworks. As the instrument was supposed to be used in a new context, three experts with educational technology research experience were called on to go over the questionnaire items and comment on their overall quality and relevance for content validity. Given their feedback, some minor modifications were made in the content of the questionnaire to reflect

the idea of Web 2.0 technologies by replacing *technology* and *system* in the original items with *Web 2.0* terms. Each statement of the questionnaire was set on a five-point Likert-type scale including *strongly disagree, disagree, neutral, agree, and strongly agree*. The reviewing process led to a 26-item questionnaire including four PE items, four EE items with one item reverse-coded, four SI items, four FC items, three BI items (Venkatesh et al., 2003), three UB items (Sadaf et al., 2012), and four TPACK items (Baser et al., 2016). A small-scale pilot study was done to estimate internal consistency reliability (alpha coefficient) and to check for the appropriateness of the questionnaire items.

**Data Collection and Analysis Procedure**

Data were gathered during a four-week time period in the fall of 2019 using an available sample of 160 EFL teachers from different language institutes. A coordinator visited the institutes to obtain the consent of the respondents' voluntary participation. The teachers were informed of purpose of the study, filling instructions, privacy measures, and confidentiality. Then the questionnaires' links created via Google Forms were sent to the teachers' email addresses and social media accounts in order to accelerate response return and save costs. To prevent the participants from duplicating responses "Limit to One Response" feature on Google Forms was added. Finally, the EFL teachers filled in the questionnaire soft copies and returned the responses online.

Data analysis was performed by entering the numerical data into SPSS v. 22.0 and loading the file onto Amos v. 24.0. The initial sample comprised 173 EFL teachers, 13 of whom were discarded due to inconsistent responses and unreliable data provision. Regarding the research purpose and the utilized scale, various types of statistical analysis were used, which included descriptive statistics, one-sample t-test, and Pearson correlation, confirmatory factor analysis (CFA), and structural equation modeling (SEM) technique.

First, the current state of research variables was examined using a one-sample t-test to determine the mean score. Second, CFA was run to test the measurement model comprising seven latent constructs and verify the construct validity of the instrument. Third, inter-correlations between constructs were presented based on descriptive statistics values including mean, standard deviation (SD), and Cronbach's alpha coefficients. The hypothesized model in Fig. 1 was then specified in Amos. Afterward various model fit indices were taken into account and path coefficients of the hypothesized relationships were examined for the purpose of testing the research hypotheses. The proposed research model would have satisfactory fit indices if the analysis yielded the following values including Chi-Square/df ratio ($\chi 2/df$) < 5 depending on the sample size (Hooper et al., 2008), root-mean square error of approximation (RMSEA) equal to or < 0.05 (Byrne, 2010), comparative fit index (CFI) > 0.95, root-mean squared residual (SRMR) equal to or < 0.05 (Schumacker & Lomax, 2016), and Tucker-Lewis index (TLI) > 0.90 (Arbuckle, 2017).

## Results

**Descriptive Statistics**

Table 3 illustrates that all research variables of the current study are placed above the hypothesized mean value (M = 3) significantly (p < 0.05). The analysis shows that PE enjoys the highest mean value (M = 4.07; t = 22.52; p < 0.05) and SI has the lowest mean value (M = 3.40; t = 7.32; p < 0.05).

**Table 3. Results of One-sample T-test for Research Variables.**

| Variables | t | df | Mean | Sig. (2-tailed) | 95% Confidence Interval of the Difference | |
|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| | | | | | Lower | Upper |
| PE | 22.52 | 159 | 4.07 | .001 | .982 | 1.171 |
| EE | 18.54 | 159 | 3.96 | .001 | .861 | 1.066 |
| SI | 7.32 | 159 | 3.40 | .001 | .292 | .507 |
| FC | 12.75 | 159 | 3.70 | .001 | .593 | .810 |
| BI | 15.52 | 159 | 3.96 | .001 | .840 | 1.084 |
| UB | 12.10 | 159 | 3.73 | .001 | .617 | .857 |
| TPACK | 16.20 | 159 | 3.85 | .001 | .747 | .955 |

Note: The header row "Test Value = 3" spans the table.

## Confirmatory Factor Analysis

On the basis of seven latent constructs of the research model (PE, EE, SI, FC, BI, UB, TPACK) and the 26-item questionnaire that measured each associated factor, a measurement model was determined in Amos. First-order confirmatory CFA was employed to measure the construct validity of the questionnaire items (Schumacker & Lomax, 2016). Accordingly, the measurement model was examined based on the items of each construct then good fit indices were provided.

**Table 4. CFA Fit Indices of the Measurement Model.**

| No | Fit Index Model | $\chi^2$ | df | $\chi^2$/df | TLI | CFI | RMR | RMSEA |
|:---:|:---|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| 1 | PE | 4.99 | 2 | 2.49 | 0.96 | 0.98 | 0.001 | 0.071 |
| 2 | EE | 0.785 | 2 | 0.78 | 1.00 | 1.00 | 0.001 | 0.001 |
| 3 | SI | 1.20 | 1 | 1.20 | 0.99 | 0.99 | 0.010 | 0.036 |
| 4 | FC | 0.46 | 2 | 0.23 | 1.00 | 1.00 | 0.006 | 0.001 |
| 5 | BI | -- | -- | -- | -- | -- | -- | -- |
| 6 | UB | -- | -- | -- | -- | -- | -- | -- |
| 7 | TPACK | 1.40 | 1 | 1.40 | 0.99 | 0.99 | 0.006 | 0.050 |
| Good Fit | | -- | -- | < 5 | > 0.9 | > 0.9 | < 0.05 | < 0.08 |

Note. RMSEA= root-mean-square error of approximation; CFI= comparative fit index; TLI= Tucker-Lewis index; RMR= root mean squared residual

Table 4 reflects good fit indices of the measurement model factors through running first-order CFA (see $\chi^2$/df, TLI, CFI, RMR, & RMSEA values). Thus, factor models were confirmed and the selected items for measuring the latent constructs enjoyed required validity. Since BI and UB contained three items, the confirmatory factor models became saturated, with the result that model fit indices not being provided. According to Kline (2011), if the factor loading value of an item for a construct is greater than .50 then the item can reflect the latent construct optimally. Factor loadings of almost all the items for research constructs demonstrated that the selected items enjoyed values greater than .50 and as the critical ratios (CRs) of the items were greater than 1.96, they were statistically significant at .05 level. Therefore, it can be asserted that the selected items correctly explained the latent constructs resulting in confirming the construct validity of the model.

## Correlation Analysis

Having confirmed the measurement model, Pearson correlation was run to establish the existence of inter-correlations between the constructs of the research model. Table 5 provides mean values, SDs, Cronbach's alpha coefficients, and correlations between the constructs. Zero-order correlations between variables indicated that there was the highest correlation between BI and UB

(r = 0.79, p < 0.01) and the lowest correlation existed between SI and EE (r = 0.17, p < 0.05). According to the results of correlation coefficients, the reliability of the instrument was ensured.

**Table 5. Constructs Inter-correlations and Descriptive Statistics Matrix.**

| No | Variables | Mean | SD | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|----|-----------|------|-----|-----|-----|-----|-----|-----|-----|-----|
| 1 | PE | 4.07 | 0.60 | (0.85) | | | | | | |
| 2 | EE | 3.96 | 0.65 | 0.43** | (0.87) | | | | | |
| 3 | SI | 3.40 | 0.69 | 0.43** | 0.17* | (0.84) | | | | |
| 4 | FC | 3.70 | 0.69 | 0.47** | 0.61** | 0.33** | (0.84) | | | |
| 5 | TPACK | 3.85 | 0.66 | 0.47** | 0.56** | 0.32** | 0.57** | (0.85) | | |
| 6 | BI | 3.96 | 0.78 | 0.51** | 0.35** | 0.43** | 0.50** | 0.41** | (0.89) | |
| 7 | UB | 3.73 | 0.77 | 0.52** | 0.48** | 0.37** | 0.59** | 0.52** | 0.79** | (0.85) |

Note. Cronbach's alphas are displayed in parentheses along the diagonal
N = 160      *P < 0.05      **P < 0.01

## Structural Path Analyses

As presented in Table 6, hypothesis testing results of the path coefficients of the structural model indicated that six of the eight hypotheses were supported. It can be observed that the direct and positive impacts of PE and SI on EFL teachers' BI were significant. In contrast, the direct and positive impacts of EE and TPACK on EFL teachers' BI were insignificant. Moreover, examining the direct and positive effects of other variables showed that FC and BI affected EFL teachers' UB. Likewise, TPACK had positive and direct effects on EE and PE.

**Table 6. Results of Path Coefficients of the Hypothesized Relationships.**

| Hypothesis | Path | Path coefficient | Bootstrap confidence interval | | P | Result |
|------------|------|------------------|--------|--------|-------|--------|
| | | | Lower | Upper | | |
| H1 | PE → BI | 0.31 | 0.12 | 0.46 | 0.002 | Supported |
| H2 | EE → BI | 0.11 | − 0.08 | 0.28 | 0.247 | Unsupported |
| H3 | SI → BI | 0.24 | 0.09 | 0.39 | 0.001 | Supported |
| H4 | FC → UB | 0.41 | 0.24 | 0.55 | 0.001 | Supported |
| H5 | BI → UB | 0.38 | 0.22 | 0.53 | 0.001 | Supported |
| H6 | TPACK → EE | 0.57 | 0.44 | 0.68 | 0.001 | Supported |
| H7 | TPACK → PE | 0.47 | 0.31 | 0.60 | 0.001 | Supported |
| H8 | TPACK → BI | 0.13 | − 0.05 | 0.31 | 0.183 | Unsupported |

As depicted in Fig. 2, path coefficients of the interrelationships of the conceptual model with 20000 bootstrap replications are provided. The trimmed model is presented after removing the insignificant direct effects of the path coefficients. From the results, it is evident that EFL teachers' behavioral intention to utilize Web 2.0 devices was influenced by PE and EE. TPACK had positive and direct effects on PE and EE. FC influenced UB of EFL teachers. BI was also directly related to UB. Nevertheless, there were no direct paths of EE and TPACK to BI as it is presented with dashed lines indicating non-significant relationships.
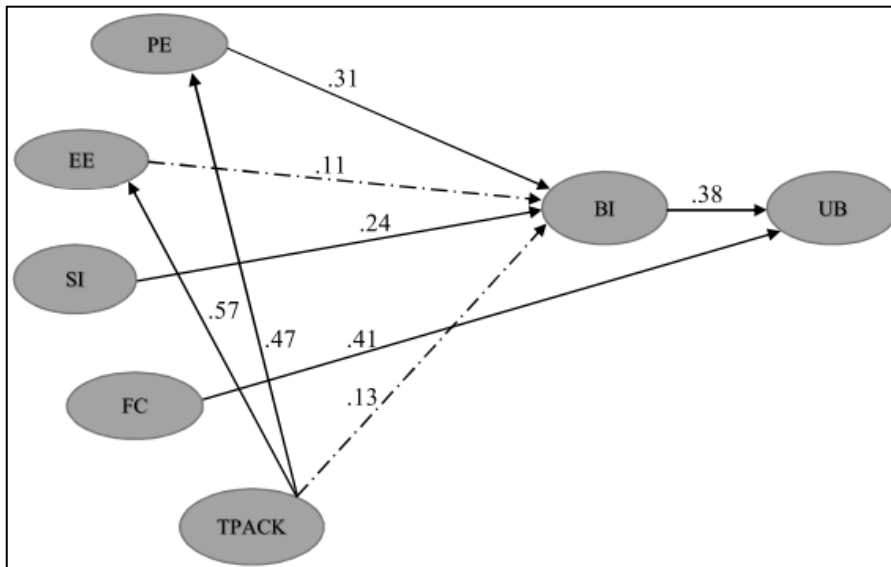
**Figure 2. Path Coefficients of the Hypothesized Relationships of the Research Model.**

Table 7 shows that a satisfactory goodness of fit level (see $\chi 2 = 4.44$; $\chi 2/df = 1.11$; TLI = 0.99; CFI = 0.99; RMR = 0.010; RMSEA = 0.027) was achieved. Therefore, it is now possible to state that the proposed model portrayed good fit to the sample data.

**Table 7. Fit Indices of the Proposed Model.**

| Fit Index<br>Model | $\chi 2$ | df | $\chi 2/df$ | TLI | CFI | RMR | RMSEA |
|---|---|---|---|---|---|---|---|
| Proposed Model | 4.44 | 4 | 1.11 | 0.99 | 0.99 | 0.010 | 0.027 |
| Good Fit | -- | -- | < 5 | > 0.9 | > 0.9 | < 0.05 | < 0.08 |

## Discussion

The current study revolved around testing a structural model to investigate factors that influence Iranian EFL teachers' adoption of Web 2.0 technologies by applying the UTAUT and TPACK frameworks. It was found out that PE and SI influenced BI directly and positively, but EE and TPACK did not influence BI directly. Meanwhile, FC and BI affected UB directly, and direct and positive relationships were perceived between TPACK and PE and EE. Finally, BI had a positive and direct impact on UB. Overall, of eight hypotheses, six were supported by the data. Most of the findings of the study are in keeping with the studies done to investigate the causal relationships among factors of the UTAUT model even though some contrary results were also observed. It can be seen that the effect of TPACK on PE and EE, among all the factors, are the strongest whereas the effects of EE and TPACK on BI are the weakest among all the other effects.

Based on the research results, BI was under the direct and positive influence of PE, which is in agreement with the findings of Tan (2013), Abdekhoda et al. (2016), Salloum and Shaalan (2018), Durak (2019), and Kim and Lee (2020). This finding supports the literature that PE is a key factor in explaining teachers' educational technology adoption directly or indirectly (Scherer et al., 2019). This finding could be indicative of the fact that if users of a particular technology find it useful, they are more likely to accept that technology and integrate it into their instruction. Administrators are advised to brief teachers on the pedagogical benefits and affordances of digital technologies and pay due attention to Web 2.0-integrated training and instruction for teachers in order to raise

their intentions to use technology in their future career. This finding was corroborated by Sun and Mei (2020) and Teo et al. (2019). Ma et al. (2020) also found that PPA (PE) played a key role in intention to use ICT in EFL teaching. Moreover, in their mixed-methods study, Sadaf et al. (2016) attributed pre-service teachers' intent of integrating Web 2.0 technologies to perceived usefulness (PU) (akin to PE) as a strong predictor. Echeng and Usoro (2014) discussed that there must definitely be a relationship between adoption of Web 2.0 and usefulness in the case of Web 2.0 technologies. In the same vein, Kim and Lee (2020) emphasized that the relationship between PE and BI was the most significant, which may suggest that participants link benefits of ICT to applying useful technologies in order to make pedagogical gains.

The current study showed that EE did not influence behavioral intention to use Web 2.0 technologies, meaning that EFL teachers' intentions were not under the influence of their attitude to effort needed for Web 2.0 use. The result is in line with Graham et al. (2020), who indicated that teachers will not necessarily use ICT only if it is easy to use and learn, rather they have to feel it is useful for their instruction performance. Similar findings were reported by Ma et al. (2020) and Teo et al. (2019). Ease of use may not necessarily lead to intentions to use Web 2.0 due to contextual factors and the restrictions on using few of them in spite of the fact that teachers are willing to use such devices. Moreover, it is possible that the accessibility and expansion of ICT made teachers become familiar with technology resources, so they were more inclined to think of the effectiveness of technology compared with the effortlessness of using ICT (Hsu, 2016; Teo et al., 2018). On the other hand, the finding is contrary to Kim and Lee (2020), Salloum and Shaalan (2018), and Durak's (2019) studies, implying that the easier it is to use technology, the more willing the teachers are to utilize it.

In this study, SI influenced BI positively and directly. A similar result was reported in Graham et al.'s (2020) study indicating that the ICT use was believed to be a deciding factor by the people who were important for the participants. This finding was supported in other research studies (Durak, 2019; Echeng & Usoro, 2014; Kim & Lee, 2020; Ma et al., 2020; Mei et al., 2018; Salloum & Shaalan, 2018). As students, colleagues, close friends, and teachers constitute a unified community of practice, they could affect each other by sharing their professional experience and learning. This makes it possible for the members of community of practice to adopt and adapt one another's learning and teaching strategies with technology. Additionally, the finding may be indicative of Iranian EFL teachers' cultural background, which encourages sociality and spirit of camaraderie.

Congruent with previous research (Kim & Lee, 2020; Ma et al., 2020; Salloum & Shaalan, 2018), FC positively affected use behavior towards using Web 2.0 technologies, meaning that EFL teachers should be provided with technical support and various hardware and software facilities in order to implement Web 2.0 technologies. The direct and positive influence of FCs on teachers' actual use behavior indicated that the presence of technical infrastructure and education facilities at schools and their continuous support can result in adopting Web 2.0-based teaching at large. This view is consistent with UNESCO's (2018) report, which suggests that the Asia-Pacific region is to improve the conditions of learning environments. The report noted that the disparity in ICT infrastructure of schools and the percentage of the Internet users differs considerably between and within the sub-regions, which is also the case in Iran.

BI had a positive and direct impact on UB. Similar results were found in Graham et al. (2020) who demonstrated that teachers' intentions to use ICT does predict the actual usage of ICT for instruction. Ma et al. (2020) and Kim and Lee (2020) also came up with such a finding. This significant impact may imply that as teachers believe more in intending to use digital technologies in EFL instruction, the chance of actually using Web 2.0 will arise. Behavioral intention to use has

been explored as a determining factor in actual use of technologies in prior research (Venkatesh et al., 2016) and is in congruence with the present research findings. Thus, it is anticipated that as teachers' behavioral intention to use Web 2.0 rises, their actual use will be also affected.

The lack of significant and positive effect of TPACK on BI is inconsistent with previous research evidence (Mei et al., 2018; Prasojo et al., 2020; Teo et al., 2019). On the contrary, this finding was supported by Joo et al. (2018). It implies that EFL teachers seem to lack sufficient knowledge of Web 2.0 technology, pedagogy, and content to be integrated into their instruction of English, which leads to a lesser chance of using Web 2.0 in the future. It can indicate that EFL teachers are not either prepared enough in integrating Web 2.0 technologies or competent in using digital technologies. Successful integration of Web 2.0 technology into EFL teaching necessitates that teachers possess sufficient knowledge of Web 2.0 technology, pedagogy, and content.

It was also found that TPACK influenced PE and EE significantly, which is in line with Hsu's (2016) and Joo et al.'s (2018) findings. They indicated that PU and PEU (the same as PE and EE) were predicted by TPACK. This is to suggest that designers of Web 2.0 training courses should consider affordances of digital devices in terms of ease of implementation and easy-to-use user interface. Moreover, pedagogical aspects of digital devices and the content they cover should also be taken into account with respect to their usefulness. Some contradictory results were also reported in this regard. While the findings of this study was supported partially by Teo et al. (2019) in terms of the effect of TPACK on EE, Mei et al. (2018) reported opposite findings in their study.

## Conclusion

This research set out to explore the effects of factors in adopting Web 2.0 technologies among EFL teachers based on a structural model. It is believed that teachers' adoption of pedagogical use of Web 2.0 is a complicated and tricky phenomenon. However, in order to improve the level of Web 2.0 use in learning and teaching, it is of utmost importance to investigate factors that may influence teachers' decisions on taking appropriate measures to enhance levels of using Web 2.0 resources in the educational fields. By concentrating on EFL practitioners and taking advantage of previous research on technology acceptance, this study uncovered several crucial factors in EFL teachers' acceptance and application of Web 2.0 devices. Findings of the study provide support for investigations into technology acceptance in foreign language teaching, illustrating a growing need for including knowledge-oriented factors in the teaching process. As such, the findings of the study could inform major players' decisions (administrators, teacher educators, and policy makers) on how to make arrangements to better educate prospective EFL teachers in Iran by directing them to make appropriate pedagogical uses of Web 2.0.

The findings of this research project suggest that the perspective of CALL in Iran is experiencing some kind of change. In spite of reporting positive results in the recent Web 2.0 research, the use of Web 2.0 technologies by Iranian EFL teachers is somehow running low thanks to administrative policies, teachers' technology integration factors, and lack of infrastructure. These internal and external factors along with the users' behavior towards the uptake of Web 2.0 technologies have been influencing EFL teachers' beliefs in their engagement with Web 2.0 practices. Thus, a new approach should be adopted to the problem in order to pinpoint factors affecting Web 2.0 acceptance and integration by Iranian EFL teachers and to investigate the intricate interplays between these factors.

The scope of this study was limited in terms of the sample size, lack of access to other EFL teaching practitioners from public educational contexts, sampling procedure, and the use of quantitative measures. A key strength of this study was the use of structural modeling technique to analyze the pathways between the model constructs.

Further research is imperative to validate the kinds of conclusions that can be drawn from this study. Of special interest would be the research that could be carried out on pre-service and in-service teachers of English in Iran and other parts of the world where English is taught as a foreign or second language. Teacher education and teacher professional development programs on Web 2.0 can be devised in which the effect of TPACK is investigated in pre-post experiments. Further research needs to be done to test the proposed model, which stresses the significance of accounting for educational factors and technology features teaming up in new cultural contexts. Last but not least, confirmatory research is another option to replicate this study in different contexts, across various subject areas, and levels of education to explore teachers' perceptions even further.

The findings of the study have a number of implications including attaching more importance to improving effort expectancy of Web 2.0 devices, increasing EFL teachers' technological pedagogical content knowledge of Web 2.0 by presenting targeted training programs, and considering the UTAUT for examining ICT adoption factors involved in teachers' intentions and use behavior.

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# Appendix

## List of Factors and Attendant Items

### Performance Expectancy (PE)

1. I find Web 2.0 technologies useful in my language teaching practice.
2. Using Web 2.0 technologies enables me to accomplish language teaching goals more quickly.
3. Using Web 2.0 technologies increases my performance in language teaching practice.
4. If I use Web 2.0 technologies for teaching English, I will increase my employment opportunities.

### Effort Expectancy (EE)

5. My interaction with Web 2.0 technologies for teaching English is clear and understandable.
6. It is easy for me to become skillful at using Web 2.0 technologies.
7. I find Web 2.0 technologies difficult to use.
8. Learning to use Web 2.0 technologies is easy for me.

### Social Influence (SI)

9. People who are important to me think that I should use Web 2.0 technologies.
10. People who influence my teaching behavior think that I should use Web 2.0 technologies.
11. My colleagues and peer teachers think that I should use Web 2.0 technologies.
12. The administrators of my institute have been helpful in using Web 2.0 technologies.

### Facilitating Conditions (FC)

13. I have the resources necessary to use Web 2.0 technologies.
14. I have the knowledge necessary to use Web 2.0 technologies.
15. I think that using Web 2.0 technologies fits well with the way I like to teach.
16. If I have problems using Web 2.0 technologies, I could solve them very quickly.

### Behavioral Intention (BI)

17. I intend to use Web 2.0 technologies in my future language teaching career.
18. I predict I would use Web 2.0 technologies in the future.
19. I plan to use Web 2.0 technologies in the future.

### Use Behavior (UB)

20. I use Web 2.0 resources in presenting language teaching materials in my classroom.
21. I use Web 2.0 technologies frequently and plan to keep using them when teaching English.

22. I could communicate to others the consequences of using Web 2.0 technologies in my classroom.

**Technological Pedagogical Content Knowledge (TPACK)**

23. I can use Web 2.0 collaboration devices (e.g. Wiki, Skype, 3D virtual environments, etc.) to support students' language learning.

24. I can support students as they use Web 2.0 technologies to support their development of language skills in an independent manner.

25. I can use Web 2.0 devices (Instagram, podcasts, etc.) to develop students' language skills.

26. I can support my professional development by using Web 2.0 devices and resources to continuously improve the language teaching process.