Continuance Intention to Use Gamified Mobile Apps for English Speaking Skills Learning in Chinese English as Foreign Language (EFL) Higher Education

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***Abstract*—This study investigates the factors influencing Chinese EFL learners' continuance intention to use gamified mobile apps to learn English speaking skills in higher education contexts. It empirically integrated the Technology Acceptance Model (TAM), social motivation, and task-technology fit. Structural Equation Modelling (SEM) was adopted to evaluate and analyze the proposed research model. A survey questionnaire was used as a research instrument and 328 Chinese university students were chosen as respondents. The findings indicate that task-technology fit, social influence, and social recognition positively influence perceived ease of use. Additionally, task-technology fit, social influence, and social recognition positively influence perceived usefulness. Perceived usefulness and perceived ease of use both have a positive impact on attitude, and attitude positively influences continuance intention. The study provides valuable insights for mobile app designers to develop comprehensive and suitable functionalities as well as for English as Foreign Language (EFL) educators to integrate technology facilitating language learning.**

***Keywords*—English speaking proficiency, continuance intention, gamified mobile apps, English as Foreign Language (EFL), higher education**

I. Introduction

In the context of English as a Foreign Language (EFL) education in non-native English-speaking countries, the role of English is increasingly significant. As a global lingua franca, it facilitates international communication in academia and beyond, making proficiency in spoken English a critical skill for EFL learners—whose first language is not English. Nevertheless, EFL learners, like Chinese learners, frequently face significant difficulties when acquiring English speaking proficiency. A significant challenge is the lack of sufficient interaction with native speakers, which impedes their capacity to engage in meaningful practice and grasp the subtleties of spoken communication [1]. Furthermore, motivation might give rise to new obstacles. Intrinsic motivation can impact the personal interest of EFL learners with the language, and culture, which are significant elements linked to English speaking proficiency during the learning process [2]. From an external perspective, the importance attributed to English speaking proficiency in both society and academia may either motivate or demotivate learners. In contexts where English is highly esteemed, EFL learners may have a heightened feeling of pressure to enhance their English speaking proficiency. Conversely, when the benefits of improving English speaking skills are less clear, the motivation of EFL learners may decline [3]. In addition, in non-native English teaching environments, such as Chinese English speaking teaching classrooms, the traditional teaching method commonly emphasizes teachers-centred apporach., Therefore, personalized learning and student-centred learning which fulfill the current Gen Z students' interests are neglected [4]. All these current issues contribute to the challenging nature of teaching and learning English speaking skills in EFL settings.

The advancement of the Internet and mobile devices has led to paradigm shifts in the delivery of language instruction. According to Annie's 2020 State of Mobile study [5], Nearly all individuals in the Gen Z demographic (born between 1997 and 2012, when moblilephones became widespread) owned mobile phones and spent more time using mobile applications than earlier generations. The survey also indicates a consistent annual growth in the utilization of mobile applications, which has established a basis for utilizing Mobile-Assisted Language Learning (MALL). Mobile-Assisted Language Learning (MALL) enables learners to access educational information and engage in activities from different geographical places [6]. It enhances interaction and engagement by including gamified features, interactive quizzes, and combining with social media platforms [7]. Recently, there has been an ongoing discussion on the effectiveness of gamified mobile apps such as MALL tool for supporting English language learning among EFL learners and bridging the gap between students' learning and speaking proficiency [8].

Gamification is regarded as an appealing, engaging, and successful approach to learning English as a foreign language in an EFL setting. Various studies have been conducted and propose that the implementation of gamified settings has the potential to enhance the motivation and engagement of EFL learners [8–10]. Panmei and Waluyo [11] adopted a mixed research method to examine the effect of gamification on students' learning motivation in Turkey and concluded that gamified environment allow learners to make mistakes without fear of negative consequences, promoting a more favorable learning experience. Basuki's [12] research findings in Indonesia supported that the integration of gamification into the speaking assessment process results in significantly higher scores compared to traditional, non-gamified speaking evaluation methods in tertiary education. Ali [13] employed a mixed research method to investigate the impact of the gamified mobile app Duolingo

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on students' anxiety, enjoyment, and speaking performance in Egypt. The results showed that the gamified mobile app significantly reduces students' speaking anxiety and enhances their enjoyment during the learning process, thus, develop their speaking skills. In the context of Chinese higher education, gamification has been extensively employed to facilitate the acquisition of English speaking proficiency, nonetheless, predominant scholarly inquiry has concentrated on elucidating the impact of integrating gamified MALL on students' English speaking skills, their attitudes towards learning, the creation of authentic language learning environments, and the cultivation of students' overall language competence [14]. The intention of students to continue to use has a great impact on sustained learning effectiveness, motivation, and anxiety, and the feedback from students' continuing use positively influences the design of gamified learning apps [15]. However, while a considerable portion of gamified MALL implementations is initiated by teachers and peers, very limited studies investigate whether students themselves are willing to continue using gamified mobile apps to learn English speaking skills.

Accordingly, this study adopts an extended TAM, incorporating Task-Technology Fit (TTF), Social Influence (SI), and Self-Regulation (SR), to examine the acceptance and behavioral continuation intention of EFL learners at a Chinese university. This paper comprises six sections. The initial segment provides an overview of the study's background, while the subsequent section reviews recent research on gamification, the TAM, TTF, and SR. The third section formulates hypotheses based on the literature. Following this, the fourth section outlines the methodology, encompassing research instruments and sample details. The fifth section conducts a data analysis and presents the corresponding discussion. Lastly, the sixth section delineates the implications and limitations of the study.

II. Theoretical Background

To gain a thorough understanding of the issues, this study conducts a literature survey to examine the theoretical framework. A comprehensive analysis of pertinent literature on gamification advancement is undertaken to justify the incorporation of TAM, TTF, and SR elements in a specific domain. The subsequent section provides an overview of current research utilizing TAM, TTF, and social indicator components, explaining their operational mechanisms.

A. Gamification

Gamification involves implementing game design principles, game thinking, and game mechanics to enhance non-game contexts. It is frequently employed in non-game applications and processes to encourage individuals to adopt them and influence their usage patterns. By motivating users to engage in desirable actions, fostering mastery and independence, enabling distraction-free problem-solving, and leveraging inherent human play tendencies, gamification enhances the attractiveness of technology [16–18]. Accordingly, gamification is a growing trend across various fields such as business [19–21], organizational management, in-service training [22–24], healthcare [25, 26], social policy [27, 28], and education. The adoption of gamification in education is increasing because it is believed to provide assistance and motivation to students, resulting in improved learning processes and outcomes [29, 30].

Gamification in the realm of education may be defined as the implementation of game elements and mechanics to enhance the learning experience, also known as gamified learning [30]. Mobile applications provide a means to implement gamification. Gamified mobile apps can be used to enhance L2 learners' English vocabulary learning [31, 32]. They can also improve EFL learners' English listening and writing skills [33–35].

The elements of gamification have been identified. The characteristics can be divided into various dimensions, including performance, ecological, social, personal, and fictional [36, 37]. The most prominent ones are from the perspective of performance or measurement, feedback is provided for learners, such as badges, medals, trophies, and achievements to show praise. Skill levels are shown according to the tasks students complete for tacking. The progress bars, steps, or maps assist users in their progress. Points or scores are accumulated according to students' practice or task completion [36–38]. The social interaction is another dimension of gamification. Competition sections, such as player vs player, and leader boards provide learners with challenges in which the user competes against another user to accomplish a shared objective. Cooperation, such as building a team, encourages learners to complete a task through interaction [29, 39. 40].

In this study, gamification elements function as technological aspects within mobile apps to enhance students' acquisition of English speaking skills. Table 1 provides a summary of the widely used gamified mobile apps for English speaking skills.

Table 1. A summary of widely used gamified mobile apps for English speaking skills

Name of Mobile apps	Elements of gamification	Source
Duolingo	Levels and progression, points, rewards, streaks, leaderboards	[41–43]
Memrise	Video and audio clips, points, leaderboards, learning streaks	[44, 45]
Busuu	Feedback from native speakers, set personal goals	[44, 46, 47]
HelloTalk	Language exchange gamification, language games, corrections, and comments	[48–50]
Liulishuo (Fluently English)	Levels and progression, points, rewards, streaks, leaderboards, player competence	[51, 52]

B. Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a theoretical model designed by [53] to predict and elucidate how people act towards adopting and utilizing a technology (information system). It incorporates two basic constructs, Perceived Ease of Use (PEOU) and Perceived Usefulness (PU). It is believed the intention to adopt the information system is predicted by PU and PEOU. Meanwhile, PU can be predicted by PEOU. In addition, attitude and PU can predict the user's intention to adopt the information system [54–56].

TAM has gained significant recognition and impact in information systems; it has undergone revisions and expansions through numerous means. Extensions encompass additional factors such as subjective norms, social influence, and facilitating conditions, all of which can additionally impact the adoption and utilization of technology by users [57–60].

C. Task-Technology Fit (TTF)

The Task-Technology Fit (TTF) model is a prevalent theoretical framework proposed by Goodhue and Thompson [61]] for measuring the influence of information technology on performance, evaluating the effects of usage, and determining the compatibility between task and technology attributes. Task characteristics and technology features both have an impact on the task-technology fit, which ultimately influences the performance and utilization of users.

The Task-Technology Fit (TTF) model is commonly employed in conjunction with other technology adoption models, such as the Technology Acceptance Model (TAM), to elucidate users' adoption of Information Technology (IT) [62]. Chen [63] integrated technology-task fit and TAM to investigate the adoption of telematics. Gangwar [64] integrated task-technology fit and TAM to investigate big data analytics on business performance. Cai *et al.* [65] integrated task-technology fit and TAM to investigate the adoption of construction technology in engineering. Accordingly, in this study, the researcher integrates task-technology fit and TAM to investigate the EFL learners' continuance intention to use gamified mobile apps to learn English speaking skills.

III. Hypotheses

A. Task-Technology Fit (TTF)

The Task-Technology Fit (TTF) is defined as the extent to which the capabilities of the information system (IS) align with the tasks that the user needs to carry out. It is a significant component in determining job performance levels [66]. Prior empirical research [67–70] has indicated that users' belief of how well a certain technology aligns with their perceived ease of use and perceived usefulness, might influence their intention to adopt and utilize the technology. When there is a higher level of alignment, users perceive the instrument to be easier to use and more beneficial for the given activity. The efficiency of online learning is anticipated to be influenced by technological aspects [71]. For gamified mobile apps to be considered useful, it is necessary for EFL learners to discover a congruence between the English speaking tasks and the gamification in mobile apps being used. The gamification may include gamified learning contents, learning styles, learning targets, and various learning levels. The decision of learners to actively engage in using gamified mobile apps to do English speaking activities is likely driven by the effect of speaking task-gamification fit on their perception of the ease of use of gamified mobile apps. Therefore, the following research hypotheses are proposed:

H1: TTF has a positive effect on the perceived usefulness of using gamified mobile apps to learn English speaking skills.

H2: TTF has a positive effect on the perceived ease of using gamified mobile apps to learn English speaking skills.

B. Social Influence (SI)

Previous studies indicate that individuals often conform to social norms in the adoption of new technology. Researchers in information systems have noted that individual adoption of specific technologies is often influenced more by the opinions of others than by personal convictions [72, 73]. The unified theory of acceptance and use of technology (UTAUT) posits that social influence plays a crucial role in influencing the extent to which users adopt and utilize information technology [74]. Social influence (SI) has been incorporated into various models explicating user acceptance of information communication technology, and empirical evidence robustly supports its role as a determinant of user behavior via perceived usefulness and perceived ease of use [75–78]. The theoretical foundation for this connection is rooted in an individual's inclination to align with the beliefs of others, aiming to solidify their affiliations within a group [79].

In this study, social influence is conceptualized as the extent to which EFL learners perceive explicit approval and encouragement from others for their utilization of gamified mobile apps for learning English speaking skills. This research posits that when an individual observes peers using these gamified mobile apps and recognizes the advantages of their use, it enhances their willingness to engage with gamified English learning apps, potentially augmenting both current and future adoption of such technologies. Furthermore, social influence is hypothesized to encompass the learner's perceived utility as influenced by others, significantly shaping attitudes toward employing gamified English speaking apps. Therefore, the following research hypotheses are proposed:

H3: SI has a positive effect on the perceived usefulness of using gamified mobile apps to learn English speaking skills.

H4: SI has a positive effect on the perceived ease of use of using gamified mobile apps to learn English speaking skills.

C. Social Recognition (SR)

Recognition plays a vital role in acknowledging individuals' competencies and abilities, concurrently fostering societal engagement. Social recognition (SR) enhances the understanding of self-assurance, self-regard, self-worth, and the dynamics inherent in societal relationships [80, 81]. In the realm of technology-enhanced education, social recognition takes place as individuals interact with content delivered through technological platforms, expressing engagement through actions like commenting, liking, or sharing. In the specific domain of mobile-assisted language learning, social recognition pertains to acknowledging an individual's abilities or achievements acquired through participation in the mobile-assisted language learning process [77].

As an important predictor of user's behavior, empirical studies support that social recognition has a significant influence on perceived usefulness and perceived ease of use [81–84]. Accordingly, the hypotheses are proposed as follows:

H5: SR has a positive influence on the perceived

usefulness of using gamified mobile apps to learn English speaking skills.

H6: SR has a positive influence on the perceived ease of use of using gamified mobile apps to learn English speaking skills.

D. Perceived Ease of Use (PEOU)

Perceived ease of use (PEOU) refers to the extent to which a technology is considered effortless to use, it is proposed by Davis [43], which is one of the important predictions in TAM. Existing research indicates that perceived ease of use positively influences perceived usefulness in various types of technologies, including civil service [85], payment technology [86, 87], and e-learning system [88–90] as technologies that are effortless to use tend to be more beneficial and advantageous. Besides, many studies suggest that perceived ease of use is predicted to influence users' attitude to adopt a technological system [91–93]. Yet, there is also research indicating that PEOU has an insignificant impact on user's attitudes, for ease of a product should be a basic necessary attribute [94].

In this study, the perceived ease of use refers to the extent of effortless use of gamified mobile apps to learn English speaking skills. Accordingly, the hypotheses are as follows:

H7: PEOU has a positive effect on PU towards the continuing use of gamified mobile apps to learn English speaking skills.

H8: PEOU has a positive effect on attitudes towards the continuing use of gamified mobile apps to learn English speaking skills.

E. Perceived Usefulness (PU)

Perceived usefulness (PU) is another predictor of TAM. It is conceptualized as the degree to which an individual believes that utilizing a specific system will enhance their performance [53]. This concept is grounded in the definition of "useful", which pertains to the capacity to be employed beneficially. The construct of perceived usefulness has consistently been demonstrated to exert an influence on attitude in previous studies [83, 95–97].

In this study, perceived usefulness refers to the degree to which an EFL learner believes that using gamified mobile apps will enhance their English speaking performance. Therefore, the hypnosis is proposed:

H9: PU has a positive effect on attitudes towards the continuing use of gamified mobile apps to learn English speaking skills.

F. Attitude (ATT)

Attitude refers to a predisposition to react to an event in either a favorable or unfavorable manner [98]. Prior research on e-learning acceptance has identified attitude as a critical factor influencing the continuance intention towards the utilization of e-learning [95, 99, 100]. In this study, attitude refers to EFL learner's positive or negative perception of using gamified mobile apps to learn English speaking skills. Thus, the hypothesis is proposed:

H10: Attitude has a positive effect on the continuance use of gamified mobile apps to learn English speaking skills.

Accordingly, the research model in the study is illustrated in Fig. 1.

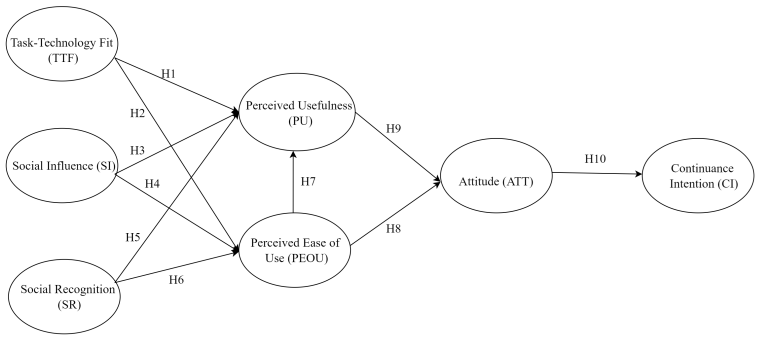

Fig. 1. Proposed research model.

IV. Methodology

This study employs a quantitative research method to test the proposed research model. The factors influencing EFL learners' continuance intention on using gamified mobile apps to learn English speaking skills are investigated.

A. Research Instruments

A questionnaire was used to investigate the factors influencing EFL learners' continuance intention towards using gamified mobile apps to learn English speaking skills in this study. The items in the questionnaire were written in both English and Chinese. To ensure content validity, three Teaching English as a Second Language (TESL) experts were invited to check the appropriateness and clarity of the language use [101].

The questionnaire contains two parts. The first part collects respondents' demographic information, including grade, gender, and length of using gamified mobile apps. The second part investigates the influencing factors through the questionnaire. The questionnaire items were adapted from previous studies, including 7 constructs, and 30 items. Task-technology Fit (5 items) was adapted from [64, 102]. Social Influence (5 items) was adapted from [79, 84, 103]. Social Recognition (4 items) was adapted from [77, 82, 84]. Perceived Ease of Use (4 items) was adapted from [79, 104]. Perceived Usefulness (4 items) was adapted from [79, 103, 104]. Attitude (5 items) was adapted from [84, 103, 104]. Continuance Intention (3 items) was adapted from [71, 84]. The questionnaire was constructed using the Likert 7-point scale, ranging from 'strongly disagree (1)' to 'strongly agree (7)' [105].

B. Sample and Data Collection

This study aims to investigate factors influencing the EFL learners' continuance intention to use gamified mobile apps to learn English speaking skills in Chinese higher education. A total of 380 questionnaires were distributed via a famous Chinese survey website "The Questionnaire Star", and the 360 were collected back. After checking, 328 valid questionnaires were accepted. The questionnaires with incomplete answers, or who have no experience (the respondents who chose "less than 1 month" in the questionnaire "The time EFL learners spend on learning English speaking skills through gamified mobile apps" column) in using gamified mobile apps to learn English speaking skills were removed in the report. The AMOS 24 was adopted to analyze data through a Structural Equation Model (SEM), for it may assess the interaction between factors by examining the relationships among various variables and processing several sorts of variables such as continuous, binary, and categorical data.

V. Result and Discussion

A. Data Analysis and Findings

1) Demographic information

Table 2 illustrates the participation of students across all academic levels in the study. Out of the total respondents, 147 male students, constituting 44.82%, and 181 female students, representing 55.18%, completed the questionnaire. The data further reveals that 46.04% of students have utilized gamified mobile applications for enhancing English speaking skills for a duration of less than six months, 31.4% for 6-12 months, and 22.56% for over a year.

Table 2. Demographic information

Items	Categories	N	Percent (%)	Cumulative Percent (%)
Grade	Freshman	64	19.51	19.51
	Sophomore	105	32.01	51.52
	Junior	96	29.27	80.79
	Senior	63	19.21	100.00
Gender	Male	147	44.82	44.82
	Female	181	55.18	100.00
The time EFL learners spend on learning English speaking skills through gamified mobile apps	1–6 Months	151	46.04	46.04
	6–12 Months	103	31.40	77.44
	Over a year	74	22.56	100.00
Total		328	100.0	100.0

2) Reliability and validity

Cronbach's α was employed to assess the internal reliability of the questionnaire, specifically examining the internal consistency among its items. A Cronbach's α value exceeding 0.6 indicates satisfactory internal reliability and demonstrates good internal consistency when exceeding 0.7 [106]. Table 3 reveals that Cronbach's α coefficients for all dimensions exceed 0.6. Specifically, the seven dimensions designed in this study exhibit Cronbach's α values of 0.892, 0.893, 0.877, 0.878, 0.876, 0.892, and 0.854, all surpassing 0.7. This affirms the commendable internal consistency within each dimension of the questionnaire, substantiating the ideal reliability of the survey results.

The Average Variance Extracted (AVE) value and Composite Reliability (CR) value of each dimension can be obtained by calculating the standardized Factor loadings of each question item. If the AVE value for each dimension exceeds 0.5, and the CR value surpasses 0.7, it indicates that the convergent validity of each dimension meets the established standards [107, 108]. Table 3 demonstrates AVE values for the seven dimensions as 0.639, 0.638, 0.663, 0.663, 0.662, 0.641, and 0.691, respectively, with corresponding CR values of 0.898, 0.897, 0.886, 0.886, 0.885, 0.898, and 0.869—all surpassing the prescribed thresholds. Simultaneously, each item's load coefficient with its corresponding factor surpasses 0.6, signifying a robust relationship between the item and the factor. This outcome suggests that the convergent validity within the dimension aligns with established standards.

Table 3. Cronbach α, AVE, CR, and factor loading

Constructs	Cronbach α	AVE	CR	FL Range
TTF	0.892	0.639	0.898	0.730–0.970
SI	0.893	0.638	0.897	0.744–0.951
SR	0.877	0.663	0.886	0.759–0.951
PEOU	0.878	0.663	0.886	0.754–0.960
PU	0.876	0.662	0.885	0.749–0.982
ATT	0.892	0.641	0.898	0.735–0.957
CI	0.854	0.691	0.869	0.740–0.967

Upon achieving convergent validity standards, discriminant validity is subsequently examined. The criterion for discriminant validity evaluation posits that the square root of AVE on the diagonal should exceed Pearson correlation coefficient values between dimensions. Table 4 illustrates that the square root of AVE for each dimension surpasses the correlation coefficient values between that dimension and others, affirming that discriminant validity within each dimension aligns with established standards.

Table 4. Fornell-Larcker criterion: Correlation matrix of constructs and the square root of AVE (in bold)

	TTF	SI	SR	PEOU	PU	ATT	CI
TTF	**0.800**						
SI	0.229	**0.799**					
SR	0.304	0.318	**0.814**				
PEOU	0.240	0.277	0.289	**0.815**			
PU	0.294	0.294	0.270	0.246	**0.814**		
ATT	0.171	0.263	0.258	0.240	0.300	**0.800**	
CI	0.280	0.270	0.289	0.219	0.235	0.207	**0.832**

3) Goodness-of-fit measurements

Six model fit indices were utilized to assess the model's goodness-of-fit, as displayed in Table 5. The Goodness-of-Fit (GFI) rating obtained a value of 0.88, exceeding the threshold of 0.80 set by Hair *et al*. [109]. The AGFI, reported as 0.859, is above the suggested criterion of 0.80 set by MacCallum and Hong [100]. The root-mean-square error of approximation (RMSEA) was 0.043, lower than the suggested value of 0.08 by Hu and Bentler [111]. The Normed Fit Index (NFI) was reported as 0.902 and the Normed Comparative Fit Index (CFI) as 0.961, both exceeding the specified threshold of 0.90 [111]. The χ^2/df value was found to be 1.605, which is below the specified threshold of 3.0 [112].

Table 5. Model fit

Fit Indices	Recommended value	Structural model	Result
GFI	>0.8	0.88	Accepted
AGFI	>0.8	0.859	Accepted
RMSEA	<0.08	0.043	Accepted
NFI	>0.8	0.902	Accepted
CFI	>0.8	0.961	Accepted
CMIN/df	<3.0	1.605	Accepted

4) Path analysis

SEM serves as a precise statistical approach facilitating the evaluation and validation of multiple hypotheses within a specified model. It enables the independent analysis of each hypothesis. The present study formulated 10 hypotheses, as depicted in Fig. 2.

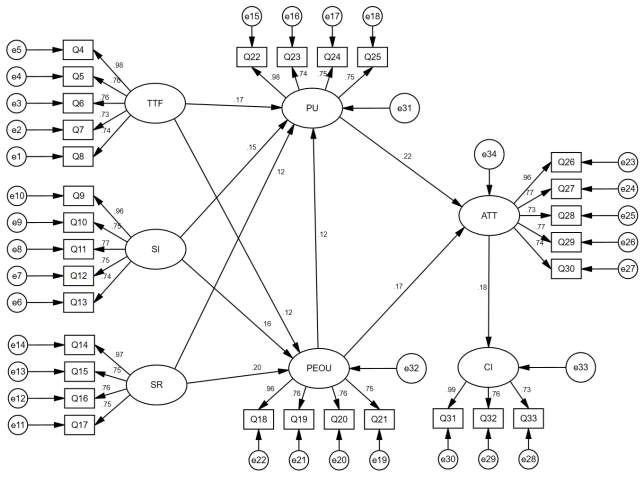

Fig. 2. The path analysis of the model.

It can be seen that in Table 6 in the path "TTF→PEOU", the standard path coefficient is 0.122 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "SI→PEOU", the standard path coefficient is 0.162 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "SR→PEOU", the standard path coefficient is 0.198 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "TTF→PU", the standard path coefficient is 0.175 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "SI→PU", the standard path coefficient is 0.152 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "SR→PU", the standard path coefficient is 0.121 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "PEOU→PU", the standard path coefficient is 0.123 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "PU→ATT", the standard path coefficient is 0.225 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "PEOU→ATT", the standard path coefficient is 0.17 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

In the path "ATT→CI", the standard path coefficient is 0.175 and reaches the significance level ($P < 0.05$), indicating that this path has a significant positive effect.

Table 6. Path analysis results

Hypothesis	Path	STD Coeff.	UNSTD Coeffi.	P	Result
H1	TTF→PU	0.175	0.312	0.002	Supported
H2	TTF→PEOU	0.122	0.126	0.032	Supported
H3	SI→PU	0.152	0.274	0.007	Supported
H4	SI→PEOU	0.162	0.168	0.005	Supported
H5	SR→PU	0.121	0.213	0.033	Supported
H6	SR→PEOU	0.198	0.201	***	Supported
H7	PEOU→PU	0.123	0.213	0.036	Supported
H8	PEOU→ATT	0.17	0.294	0.003	Supported
H9	PU→ATT	0.225	0.224	***	Supported
H10	ATT→CI	0.175	0.101	0.003	Supported

***: $p<0.001$

B. Discussion

This study aims to explore the factors that impact EFL learners' intention to continue using gamified mobile applications for improving their English speaking abilities. Accordingly, the study combines the Technology Acceptance Model (TAM), Social Motivation, and Task Technology Fit (TTF) to achieve its purpose.

Substantiating Hypotheses 1 and 2 aligns with previous research findings [67–70], which suggest that TTF positively influences EFL learners' PEOU and PU. When gamification learning materials correspond with speaking assignments, EFL (English as a Foreign Language) learners find mobile apps more advantageous and user-friendly for enhancing their speaking skills. Consequently, it is imperative to classify the complexity of gamified content in English speaking learning apps and formulate diverse learning objectives tailored to various learner groups.

Validating Hypotheses 3 and 4 supports the findings of prior research [75–78] indicating that SI positively influences EFL learners' PU and PEOU. Observing peers' enthusiasm for gamified English speaking learning apps can impact an individual's willingness to use these mobile applications, potentially enhancing the adoption of gamified English learning technologies. Additionally, SI plays a crucial role in cultivating favorable attitudes towards the utilization of gamified English speaking apps, facilitated by gamification features such as team building, community-based learning,

and achievement medals.

Confirming Hypotheses 5 and 6 aligns with prior research [81–84] indicating that SR has a beneficial effect on the EFL learner's PEOU and PU. When utilizing gamified mobile apps to learn spoken English, EFL learners engage in challenging activities, collaborate to gain points, and receive structured incentives and peer support in the form of "likes". This virtual element enhances learners' sense of identity, serves as a motivational tool to encourage continued learning, and promotes the belief that utilizing gamified applications is beneficial and user-friendly for learning English speaking skills.

The significant results of Hypotheses 7, 8, and 9 align with numerous empirical research [83, 91–93, 95–97] on TAM, supporting the positive impact of PEOU on PU, the positive impact of PEOU on continuance intention, and the influence of PU on continuance intention. Learners in this study perceive that gamified mobile applications are beneficial and user-friendly for learning English speaking skills, which will increase their motivation to keep using them. Confirming hypothesis 10 also aligns with prior research [95, 99, 100] indicating that people who have a positive attitude towards gamified apps are more inclined to continue using them for further learning of English speaking skills.

VI. Conclusion

This study delineates the characteristics of gamification in language-learning mobile apps and explores the determinants impacting EFL learners' continuance intention to persist in using gamified mobile apps for enhancing English speaking skills. The results offer guidance to mobile app designers, emphasizing the importance of aligning gamified content with the learning style, objectives, and difficulty level of English-speaking learners. Diverse and engaging gamification content, encompassing learning materials and incentives, is recommended to foster sustained engagement among EFL learners. Additionally, the study provides insights for EFL educators, creating an encouraging and positive environment can help students keep a sustained learning behavior with integrating gamified mobile apps as educational tools.

However, this study is conducted at a Chinese university, with survey respondents comprising Chinese university students. Accordingly, the research findings may exhibit variability contingent on distinct research sites, settings, respondent demographics, and respondents' personal backgrounds. Furthermore, it is crucial to note that this study focuses on investigating EFL learners' continuance intention to use gamified mobile apps for English speaking skills, rather than evaluating the educational effects of these apps. A subsequent study could employ an experimental design to systematically compare and assess the learning outcomes associated with the utilization of gamified mobile applications for English speaking skills. Moreover, due to the limitation of the quantitative research method, it is possible that though the answers in the questionnaire cannot reflect the respondents' real perspective, the respondents may choose the answers close to his/her real thoughts, yet the subsequent qualitative study may be conducted to explore the participants' real using experience.

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

K.D., M.M., and A.M. jointly conducted the research, analyzed the data, and wrote the paper. All authors had approved the final version.

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