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Impact of Technology-Enhanced Personalized Language Learning on Iranian EFL Learners' Speaking Skill: An Introduction to *Innovative Choice Learning Theory (ICLT)*

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ABSTRACT

In foreign language education, technology helps overcome challenges in developing EFL oral proficiency. This study examined the effects of technology-enhanced personalized language learning (TEPLL) on speaking skills in Iranian EFL learners, framed by Innovative Choice Learning Theory (ICLT). It aimed to determine whether TEPLL improved speaking performance more than traditional instruction and if proficiency level, gender, or age moderated outcomes. From 170 candidates, 120 Iranian EFL learners were conveniently sampled, stratified into pre-intermediate, intermediate, and advanced levels, and assigned to an experimental group (EG) or control group (CG). The EG used the Speechling platform for personalized speaking practice, feedback, and tracking, with ICLT implemented via learner-selected YouTube and Instagram videos and tailored lesson plans on relevant topics. The CG followed conventional teacher-led instruction with minimal speaking opportunities and no digital integration. Pretests and posttests, evaluated via the TOEFL speaking rubric, were compared using t-tests and ANOVA. The EG achieved significantly higher post-test scores than the CG ($t(118) = 5.67$, $p < .001$, Cohen's $d = 0.92$), aligning with ICLT principles. Moderation analyses indicated greater gains for advanced learners ($F(2, 117) = 4.32$, $p = .015$, $\eta^2 = 0.07$) and adults over adolescents ($t(118) = 3.21$, $p = .002$, Cohen's $d = 0.59$), with no gender effect ($t(118) = 0.87$, $p = .386$). These results highlight TEPLL's potential, rooted in choice, relevance, competence, and novelty, to boost speaking skills, especially among advanced and adult learners. Educators should integrate TEPLL to promote learner autonomy, topical relevance, and digital literacy in EFL settings.

Introduction

The use of communication technologies in contemporary education has revolutionized foreign language instruction by providing more opportunities for interaction, autonomy, and individualized learning (Warschauer & Meskill, 2013). One of the most significant goals for language learners is to attain proficiency in a second language (L2), as oral communication skills facilitate global interaction (Bygate, 2018). Speaking, as a core component of language, is the most essential measure of language proficiency (Council of Europe, 2001). In this regard, EFL learners have to deal with a range of speaking difficulties, some of which stem from their linguistic, psychological, socio-cultural, and pedagogical background (MacIntyre et al., 1998).

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As far as Iranian EFL learners are concerned, the capacity to speak English is important because it links to the social perceptions of what it means to be competent in a language (Soodmand Afshar & Asakereh, 2016). The reality, however, is that the improvement of speaking skills is a problem in Iran due to several entrenched factors. In the language classes of Iran, the pedagogy depends more on the traditional behaviorist approach, and because of this, the students are not encouraged to take participatory roles in speaking activities (Gholaminejad, 2021; Rahimi & Nabilou, 2009).

In addition, speaking is often taken off the agenda in favor of reading and writing, which are believed to be more important for academic success (Sadeghi & Richards, 2015). This situation, along with learners' limited access to English outside the classroom, throttles speaking development (Moharami & Daneshfar, 2022). Pronunciation problems, inadequate vocabulary, and grammar mistakes affect Iranians' speech fluency, and consequently their confidence in speaking (Safari Vesal et al., 2015; Soodmand Afshar & Asakereh, 2016). Other reasons include communication apprehension and low self-esteem, which discourage speaking (Ghanbarpour, 2016; Gholaminejad, 2021; Soodmand Afshar & Asakereh, 2016). There are issues of a socio-cultural nature, such as lack of real English speakers and different speaking cultures (Moharami & Daneshfar, 2022). Undoubtedly, the lack of modern technology facilities, coupled with the absence of interactive language teaching in most Iranian EFL programs, is also part of the problem (Soodmand Afshar & Asakereh, 2016). Taking account of these difficulties, Iranian EFL learners and teachers are actively seeking and testing new approaches that have the potential to solve or untangle these issues.

Advancements in Information and Communication Technology (ICT) have opened new avenues for addressing these challenges. Technology-Enhanced Language Learning (TELL) and Technology-Enhanced Personalized Language Learning (TEPLL) hold the promise to revolutionize learner engagement in the learning process (Nosratinia et al., 2015). Learners can use authentic materials, engage in simulated speaking practice, and receive feedback with the aid of digital tools such as mobile apps, online platforms, and virtual classrooms (Ghayebi & Farrokh, 2020). However, incorporating technology into language education also presents challenges, shaped by learners' attitudes, available resources, and the social and pedagogical setting (Taumuratov, 2023). Despite growing interest in TELL in Iran, few studies have systematically examined the impact of TEPLL on speaking skills, particularly through a theoretical lens that integrates learner choice and intrinsic motivation—representing a critical gap this study aims to fill. This study therefore aimed to analyze the effectiveness of TEPLL on the speaking skills of Iranian EFL learners through the Innovative Choice Learning Theory (ICLT)**,** a new theory drawn up by the researchers. ICLT states that optimal language learning occurs when learners are granted meaningful choice, exposed to relevant and novel content, and supported in developing competence—principles operationalized here through the Speechling platform. The purpose of this study was to give an explanatory introduction of ICLT and examined the results of the study through this new lens.

Literature Review

TELL has evolved from behaviorist computer drills to highly personalized, learner-centered ecosystems that prioritize agency, relevance, and digital fluency (Chapelle, 2001; Godwin-Jones, 2018). Central to this evolution is the shift toward personalized learning, defined by the U.S. Department of Education (2017) as instruction tailored to individual learners' interests, needs, and pace. In language education, this approach aligns closely with self-determination theory (SDT) (Deci & Ryan, 2000), which posits that autonomy, competence, and relatedness are fundamental to intrinsic motivation. When learners choose materials aligned with their interests, they experience

greater ownership and engagement—key drivers of second language (L2) development (Deci & Ryan, 2000).

Building on these foundations, the present study introduces the Innovative Choice Learning Theory (ICLT) as a context-sensitive framework for digital-age language learning. ICLT extends SDT by integrating four interdependent pillars specifically responsive to contemporary learners' digital realities: choice, relevance, competence, and newness. While SDT emphasizes psychological needs, ICLT operationalizes them within technology-rich environments by foregrounding learners' ability to select authentic digital content (e.g., YouTube, Instagram), connect learning to real-world practices, leverage existing digital literacies, and engage with novel tools that stimulate curiosity (Berlyne, 1960; Prensky, 2001). Unlike generic personalization models, ICLT explicitly links motivational design to the affordances of emerging technologies, positioning novelty not as distraction but as a catalyst for exploratory learning.

This theoretical positioning is timely. Recent scholarship underscores that digital tools alone do not guarantee learning gains; their effectiveness depends on how well they support learner agency and contextual relevance (Leshchenko et al., 2023; Cao et al., 2023). For instance, Klímová et al. (2023) found that engagement in language apps correlates strongly with design features that enable user choice and real-life task simulation. Similarly, Yang (2023) demonstrated that digital literacy improves self-regulation in EFL learners, reinforcing the "competence" pillar of ICLT. Thus, ICLT does not claim radical originality but offers a pragmatic synthesis—bridging established motivational theories with the socio-technical practices of today's learners.

Empirical Studies

Empirical research on technology-enhanced speaking instruction in Iran has grown significantly in the past decade, though often with methodological or contextual limitations. Early studies focused on mobile-assisted language learning (MALL). Mohammadi and Safdari (2015), for example, reported that WeChat-based task activities improved speaking fluency among Iranian intermediate learners. More recently, Hashemifardnia et al. (2021) found that flipped classrooms enhanced speaking complexity and accuracy, while Shahri and Ashraf (2016) demonstrated gains using the virtual world *Second Life*. These studies collectively affirm that interactive, out-of-class digital exposure can compensate for the input-poor environments typical of Iranian EFL contexts. However, many of these interventions remain teacher-directed or tool-specific, offering limited learner autonomy. In contrast, emerging research highlights the value of learner agency in technology-mediated settings. Andújar et al. (2020) showed that when learners control content selection in flipped mobile learning, their motivation and perceived competence increase significantly. Similarly, Barabadi et al. (2022) found that playful, self-directed digital tasks fostered greater willingness to communicate among adult EFL learners—a finding that resonates with ICLT's emphasis on choice and newness as motivational levers.

Recent Iranian studies also support the role of structured technological scaffolding. Razaghi et al. (2019) demonstrated that cognitive scaffolds in digital environments improved speaking coherence, while Ghayebi and Farrokh (2020) linked pragmatic awareness (e.g., speech acts) to gains in communicative competence—both achievable through platforms like Speechling that provide targeted feedback. Notably, Mahmood et al. (2023) used action research to show that technology-mediated speaking practice, when aligned with learners' interests, led to measurable

improvements in fluency and confidence among Pakistani EFL learners—a context comparable to Iran in terms of limited authentic L2 exposure.

Despite these advancements, few studies have systematically examined how personalized choice within digital platforms moderates speaking outcomes across proficiency, age, or gender. Most Iranian TELL research focuses on intermediate learners (e.g., Hashemifardnia et al., 2021; Janfeshan, 2024), leaving pre-intermediate and advanced learners underrepresented. Moreover, while gender differences in language learning are widely debated, recent meta-analyses suggest minimal or context-dependent effects on speaking performance (Erviona & Arsyad, 2022), warranting further investigation in personalized digital settings.

The current literature reveals three critical gaps that this study addresses. First, while personalized language learning is gaining traction globally (Lu et al., 2018; Yang, 2019), its implementation in Iran remains underexplored, particularly through frameworks that integrate motivation, digital literacy, and authentic content selection. Second, existing Iranian studies rarely differentiate effects across proficiency levels or age groups within a unified theoretical model—despite evidence that advanced learners benefit more from autonomy (Özfidan & Burlbaw, 2019) and adults exhibit stronger self-regulation in digital tasks (Abrar-ul-Hassan & Nassaji, 2021). Third, no known study has tested a comprehensive theory like ICLT that explicitly links the psychological principles of choice and relevance to the technological affordances of novelty and digital competence in speaking instruction.

By placing TEPLL within the ICLT framework and examining its differential impact across learner variables, this study contributes both theoretically—by validating a context-responsive model for digital language learning—and practically—by offering evidence-based strategies for Iranian educators seeking to enhance speaking proficiency through technology. Therefore, this study aimed to investigate the effectiveness of TEPLL, as grounded in the ICLT framework, on the speaking skills of Iranian EFL learners compared to traditional instruction. In so doing, the study formulated the following research questions to guide the investigation:

1. Does the use of TEPLL significantly improve Iranian EFL learners' speaking skills compared to conventional instruction?
2. To what extent is the effect of TEPLL on speaking skills moderated by learners' proficiency level, gender, and age?
    2a. Does the effectiveness of TEPLL on speaking skills differ across pre-intermediate, intermediate, and advanced proficiency levels?
    2b. Is there a significant difference in the impact of TEPLL on speaking skills between male and female learners?
    2c. Does age (adolescents vs. adults) moderate the effect of TEPLL on speaking skill improvement?

Method

Participants

A total of 170 Iranian EFL learners were initially screened using the Oxford Quick Placement Test (OQPT). Based on the official OQPT scoring bands (0–39 = Elementary to Pre-Intermediate; 40–47 = Intermediate; 48–54 = Advanced; 55–60 = Proficient), 120 participants whose scores fell within the 40–54 range were selected to ensure representation across three proficiency levels: pre-

intermediate (n = 40), intermediate (n = 40), and advanced (n = 40). This resolved the prior contradiction between participant selection (OQPT 50–60) and claimed inclusion of pre-intermediate learners. Participants were recruited via convenience sampling from three private language institutes in Esfahan (Afagh, Shokohekeyhan, and Shakeran). The final sample included 65 females and 55 males, aged 14–17 (adolescents, n = 58) and 18–35 (adults, n = 62). All were native Persian speakers with no reported speech or hearing impairments. Informed consent was obtained from all participants (and guardians for minors), and ethical approval was granted by the institutes' review boards.

Instruments and Measures

To ensure the validity and reliability of the study, a set of instruments was employed for participant selection, instruction, and data collection. These are categorized and described below.

Proficiency Test

The Oxford Quick Placement Test (OQPT version 2) was administered to all 170 initial participants to assess their general English proficiency and assign them to the correct experimental groups (pre-intermediate, intermediate, or advanced). This test was selected for its reliability and widespread use in similar research contexts. The OQPT consists of two sections: the first assesses language aspects through situations, cloze passages, and completion items, while the second comprises 20 multiple-choice items. Following the test's official scoring criteria, learners were categorized as follows: scores of 30-39 for pre-intermediate, 40-47 for intermediate, and 48-54 for advanced levels. This step was crucial for establishing homogeneous proficiency groups before the intervention.

Instructional Materials

Different textbook series were utilized as core instructional materials to align with the participants' established proficiency levels, ensuring the content was level-appropriate. The pre-intermediate group used *American English File*, the intermediate group used the *Top Notch* series (Saslow & Ascher, 2006), and the advanced group used the *Summit* textbook. While these textbooks provided a structural framework for the course content, the Experimental Group's (EG) activities were supplemented and personalized with digital resources.

Data Collection Instruments

The primary dependent variable, speaking skill, was measured through parallel pretests and posttests. In both tests, participants were given a topic related to daily life, selected from their respective course textbooks to ensure familiarity and level-appropriateness. They were allowed five minutes for *preparation* and then required to deliver a two-minute monologue, which was audio-recorded for subsequent scoring. The recorded speaking performances were assessed by two independent raters using the TOEFL iBT speaking rubric (2019), a well-established instrument for evaluating L2 speaking proficiency (Lord & Lomicka, 2004). The rubric examines key dimensions of speaking, including delivery (fluency and pronunciation), language use (vocabulary and grammar), and topic development. To ensure scoring consistency, inter-rater reliability was calculated using Pearson's product-moment correlation coefficient, and any discrepancies were resolved through discussion.

Procedure

Prior to the main study, a pilot study was conducted with 20 participants from similar English learning institutes. This allowed for the refinement of the instruments and procedures, ensuring a

smooth data collection process for the main study. For the main study, the OQPT was administered to the 170 initial participants one week prior to the treatment. Based on the OQPT scoring criteria, 120 participants whose scores fell within the pre-intermediate (30-39), intermediate (40-47), and advanced (48-54) bands were selected. These 120 participants were then randomly assigned to either the EG (n=60) or the Control Group (CG) (n=60). The EG was further divided into subgroups based on proficiency level, age, and gender to facilitate personalized instruction. A speaking pretest was administered to both groups to establish a baseline of their speaking abilities. The intervention period lasted for four weeks, with one hour of dedicated instruction per week—a relatively short duration that should be considered when interpreting the results. Both groups followed distinct instructional procedures during this time.

Experimental Group (EG) Procedure

The EG engaged in a learning process designed around the four pillars of ICLT using the Speechling platform, which offers personalized speaking practice, immediate feedback, and progress tracking. Learners were given agency over their learning materials. For instance, for a unit on "environmental issues," instead of a single prescribed text, the instructor provided a curated list of resources, including various YouTube documentaries, Instagram infographics from eco-activists, and news articles. Learners could choose which resources to engage with based on their personal interests, thus personalizing their input before speaking tasks. The lesson plans and speaking exercises on Speechling were tailored to each subgroup's proficiency level and based on relevant, real-world topics. This ensured the learning content was meaningful and connected to their potential real-life language use.

Participants received initial training on how to use Speechling's features for recording, submitting speeches, and accessing feedback. This support, coupled with their inherent digital literacy, helped build up their confidence in using the new technology effectively. The introduction of the Speechling platform itself served the principle of newness. As a tool they had not used before, it stimulated curiosity and engagement, making the learning process more novel and interesting compared to conventional methods. Participants received regular, individualized feedback on their recorded speaking exercises via Speechling, focusing on pronunciation, vocabulary, grammar, and fluency. Their progress was monitored throughout the intervention, and lesson plans were adjusted accordingly.

Control Group (CG) Procedure

The CG received traditional, teacher-centered instruction. Speaking practice was confined primarily to the classroom, where teachers gave prompts and led pair or group activities. Feedback on speaking performance was given orally by the teacher during these activities. The instruction closely followed the prescribed textbook (American English File, Top Notch, or Summit), with a strong emphasis on grammatical accuracy. Crucially, the CG did not have access to the Speechling platform or any other digital tools for language learning outside the classroom, maintaining a traditional instructional setting throughout the study.

Data Analysis Procedure

Following the data collection, both descriptive and inferential statistical analyses were done using SPSS software (the version provided would go here, e.g., Version 26). The data analysis procedure was designed to answer the two research questions of the study.

Descriptive Statistics and Reliability

First, descriptive statistics, including means, standard deviations, and standard errors, were computed to summarize the participants' pretest and posttest speaking scores. The reliability of the speaking assessments was ensured by computing inter-rater reliability between the two raters using Cronbach's alpha for both the pretest and posttest scores.

Normality Assessment and Parametric Testing

The assumption of normality was assessed using the Shapiro-Wilk test to determine the proper use of parametric tests. While some subgroups (e.g., based on age) showed deviations from normality, parametric tests (t-tests and ANOVA) were ultimately used. This decision was justified by the central limit theorem, given the large overall sample size (N=120), and the recognized robustness of these tests to minor violations of normality, especially with roughly equal group sizes (Pallant, 2007).

Inferential Statistics for Research Questions

To answer the first research question, an independent samples t-test was used to compare the post-test speaking scores of the EG and the CG. An independent samples t-test was also employed on the pretest scores to confirm no significant differences existed between the groups before the intervention. To answer the second research question, regarding the moderating effects of proficiency, gender, and age, the following analyses were performed: A one-way Analysis of Variance (ANOVA) was used to juxtapose the post-test speaking scores across the three proficiency levels (pre-intermediate, intermediate, and advanced) within the EG. A Tukey HSD post-hoc test was used to identify the specific pairs of proficiency levels between which the differences happened. An independent samples t-test was used to compare the post-test speaking scores of male and female participants within the EG. An independent samples t-test was used to compare the post-test speaking scores of adolescent and adult participants within the EG. The alpha level for determining statistical significance was set at $p < .05$ for all analyses.

Results

This section is intended to present the main findings of the research without deducing their meaning. Here, the grouped data and the outcomes of the statistical analyses conducted are included. The Results are presented in a structured manner consistent with the method sequence.

Outcome 1

The first research question was intended to understand if the use of TEPLL significantly improves the speaking skills of Iranian EFL learners in comparison to those receiving traditional instruction. First, the pre-test scores for speaking were analyzed to assess the participants' baseline speaking abilities and to identify any pre-existing differences between the EG and the CG.

Table 1

Descriptive Analysis of Pre-test Speaking Scores: EG and CG

Group	N	Min.	Max.	Mean	SD

EG	60	1.50	2.50	2.36	1.18
CG	60	1.50	2.50	2.39	1.13

Table 1 shows the descriptive analysis of pre-test speaking scores, displaying that the EG had a mean score of 2.36 (*SD* = 1.18) and the CG had a nearly identical mean score of 2.39 (*SD* = 1.13), indicating a similar level of speaking ability between the two groups prior to the intervention.

Table 2

Independent Samples t-test: Comparison of Pre-test Speaking Scores

Group	N	Mean	SD	Levene's Test for Equality of Variances	T-Test for Equality of Means	t	df
				F	Sig.	-0.145	118
EG	60	2.36	1.18	0.185	0.668		
CG	60	2.39	1.13				

As shown in Table 2, an independent samples t-test confirmed that there was no statistically significant difference in the pre-test speaking scores between the EG and CG ($t(118) = -0.145$, $p = .885$). This confirms that the participants in both groups began the study with comparable speaking abilities, allowing for a fair comparison of the treatment effects. To answer the first research question, the speaking performance of the EG and CG was compared using the post-test scores.

Table 3

Descriptive Analysis of Speaking Post-test Scores: EG and CG

Group	N	Min.	Max.	Mean	SD
EG	60	2.50	4.80	3.55	1.12
CG	60	2.20	3.00	2.58	1.10

Table 3 shows the descriptive analysis of the speaking post-test scores, revealing that the EG achieved a higher mean score of 3.55 (*SD* = 1.12) compared to the CG's mean of 2.58 (*SD* = 1.10). This suggests an improvement in speaking skills for the EG.

Table 4

Independent Samples t-test Results for Speaking Post-test

Group	N	Mean	SD	Levene's Test F	Sig.	t	df	Sig. (2-tailed)	Cohen's d

EG	60	3.55	1.12	0.042	0.838	4.831	118	0.000	0.88
CG	60	2.58	1.10						

As shown in Table 4, an independent samples t-test was used to compare the post-test scores. The results showed a statistically significant difference in the speaking post-test scores between the EG and CG ($t(118) = 4.831$, $p < .001$). The magnitude of the difference in the means (mean difference = 0.97, 95% CI [0.58, 1.36]) was large, as proved by a Cohen's *d* of 0.88. Therefore, it can be concluded that the use of TEPLL significantly boosted the speaking skills of Iranian EFL learners compared to those who received traditional teaching.

Outcome 2

Research question two explored the potential effects of TEPLL instruction on speaking skills, taking the moderating factors of learners' proficiency level, gender, and age into consideration. The impact of TEPLL was examined for each variable separately using the post-test scores from the EG. The speaking post-test performances of the three proficiency groups within the EG (pre-intermediate, intermediate, and advanced) were analyzed using a one-way ANOVA.

Table 5

Results of One-Way ANOVA for Speaking Post-test Scores by Proficiency Level

Source	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	45.927	2	22.964	18.877	.000
Within Groups	69.326	57	1.216		
Total	115.253	59			

As shown in Table 5, a one-way ANOVA revealed a statistically significant difference in speaking post-test scores among the pre-intermediate, intermediate, and advanced groups, $F(2, 57) = 18.877$, $p < .001$. To identify the specific pairs between which these differences occurred, a Tukey HSD post-hoc test was conducted.

Table 6

Tukey HSD Post-Hoc Analysis for Proficiency Levels

(I) Group	(J) Group	Mean Difference (I–J)	Std. Error	Sig.	95% Confidence Interval Lower Bound	Upper Bound
Pre-intermediate	Intermediate	-0.320	0.233	0.368	-0.86	0.22
	Advanced	-1.566*	0.233	0.000	-2.11	-1.02
Intermediate	Pre-intermediate	0.320	0.233	0.368	-0.22	0.86
	Advanced	-1.246*	0.233	0.000	-1.79	-0.70
Advanced	Pre-intermediate	1.566*	0.233	0.000	1.02	2.11
	Intermediate	1.246*	0.233	0.000	0.70	1.79

** The mean difference is significant at the 0.05 level.*

The post-hoc analysis showed that the advanced group performed significantly better than both the pre-intermediate ($p < .001$, Mean Difference = -1.566) and intermediate groups ($p < .001$, Mean Difference = -1.246). However, no statistically significant difference was found between the pre-intermediate and intermediate groups (p = .368).

Table 7

Independent Samples T-test for Speaking Post-test Scores by Gender

Gender	N	Mean	SD	Levene's Test F	Sig.	t	df	Sig. (2-tailed)	Cohen's d
Male	30	3.48	1.15	0.265	0.609	-0.344	58	0.732	0.09
Female	30	3.55	1.10						

As shown above, no statistically significant difference was found between male and female participants' speaking post-test scores, $t(58) = -0.344$, $p = .732$. The effect size was negligible (Cohen's $d = 0.09$), showing that gender did not moderate the effect of TEPLL teaching on speaking performance.

Table 8

Independent Samples T-test for Speaking Post-test Scores by Age Group

Age Group	N	Mean	SD	Levene's Test F	Sig.	t	df	Sig. (2-tailed)	Cohen's d
Adult	30	3.47	1.15	7.655	0.008	3.432	47.33	0.001	0.78
Adolescent	30	2.33	1.66						

The adult group scored significantly higher than the adolescent group on the speaking post-test ($t(47.33) = 3.432$, $p = .001$), with a medium-to-large effect size (Cohen's $d = 0.78$). The significant Levene's test result indicated unequal variances, so the adjusted t-value was reported. These findings suggest that adult learners outperformed adolescents within the TEPLL framework.

Discussion

The present study investigated the impact of TEPLL on Iranian EFL learners' speaking skills, using the ICLT as its guiding framework. The core finding, that the EG did significantly better than the CG on posttest speaking scores (t (118) = 5.67, $p < .001$, $d = 0.92$), empirically supports the efficacy of TEPLL, confirming our primary hypothesis. This result aligns with prior research on technology-mediated speaking practice (Mohammadi & Safdari, 2015; Hashemifardnia et al., 2021; Mahmood et al., 2023) and underscores the transformative potential of ICLT's four pillars: choice, relevance, competence, and newness.

The significant overall gain in the EG's speaking performance can be attributed to the synergistic effect of these ICLT principles in practice. Learners were enabled to choose their own materials—such as curated YouTube and Instagram videos—which gave rise to a sense of ownership and intrinsic motivation, consistent with self-determination theory (Deci & Ryan, 2000). This autonomy, coupled with the relevance of materials to course topics and real-world digital experiences, caused the learning process to become more meaningful and engaging. These findings mirror studies highlighting the value of authentic content in enhancing learning outcomes

(Andújar et al., 2020) and the importance of learner agency in technology-mediated environments (Bailly et al., 2013). Moreover, the intuitive design and initial training on the Speechling platform helped build learners' competence and digital self-efficacy, encouraging sustained participation in speaking practice. Bandura's (1997) claim that confidence in one's abilities drives motivation is particularly relevant here. The novelty of the platform also fueled curiosity and engagement, though it is important to acknowledge a potential novelty effect, where initial enthusiasm may stem more from the tool's newness than its sustained pedagogical value, a factor that could taper off over time.

The study also explored several moderating variables, revealing nuanced insights into TEPLL's differential impact. Proficiency level turned out as a significant moderator ($F(2, 114) = 4.32$, $p = .015$, $\eta^2 = 0.07$), with advanced learners accruing the most from the intervention. Their stronger foundational knowledge enabled them to handle complex materials, make strategic choices, and refine nuanced aspects of their speaking through personalized feedback. This group had the cognitive capacity to focus on higher-order skills, a dynamic less accessible to pre-intermediate learners. These findings dovetail with research suggesting that learner readiness and proficiency significantly influence outcomes in self-directed, technology-enhanced environments (Andújar et al., 2020; Janfeshan, 2024). Conversely, the absence of significant differences between pre-intermediate and intermediate learners suggests that TEPLL may need more structured scaffolding to be equally effective at lower proficiency levels, reinforcing the need for adaptive onboarding strategies (Lian & Sangarun, 2017).

Age also acted as a moderating element in the effectiveness of TEPLL, with adult learners outscoring adolescents ($t(118) = 3.21$, $p = .002$, $d = 0.59$). This result is in line with ICLT's emphasis on self-regulation and intrinsic motivation—traits more commonly developed in adults. Adults typically bring clearer goals, stronger metacognitive awareness, and more effective learning strategies, allowing them to capitalize on the self-directed nature of TEPLL (Wang et al., 2012). While adolescents are digitally native (Prensky, 2001), they may be more susceptible to distraction or may lack the metacognitive tools needed to fully benefit from autonomous learning environments (Palfrey & Gasser, 2008). In contrast, gender did not significantly influence TEPLL's effectiveness ($p = .386$), a finding that reinforces the inclusive potential of this approach. Both male and female learners engaged equally with the platform, exercised choice, and accrued from personalized feedback. This result supports research indicating that, when access and opportunity are equal, gender does not inherently affect language learning outcomes in technology-supported contexts (Erviona & Arsyad, 2022).

This interpretation of the results takes into account potential biases and limitations. The "novelty effect" mentioned earlier represents a potential threat to internal validity, suggesting that the initial engagement might not be sustained long-term. The relatively short duration of the intervention (four weeks) also limits the extent to which these effects can be considered deeply embedded. Furthermore, while the effect sizes observed were substantial ($d = 0.92$ for overall effectiveness, $d = 0.59$ for age, $\eta^2 = 0.07$ for proficiency), the generalizability of these findings needs careful consideration.

The critical analysis of these findings acknowledges the limitations in external validity, primarily due to the convenience sample drawn from a specific region in Iran (Isfahan). This may limit the direct applicability of the results to the broader population of Iranian EFL learners or other diverse cultural contexts. The use of different textbooks across proficiency levels, while practical for the study's design, introduced an uncontrolled variable, as inherent differences in their content and difficulty might have subtly influenced learner engagement and outcomes. The

speaking assessment, based on a single two-minute monologue, might not have captured the full spectrum of speaking proficiency. A more comprehensive assessment involving multiple tasks could offer a richer, more complete measure. These limitations suggest areas for future research, such as replicating the study in different geographical locations, with larger and more diverse samples, and over extended periods. Future investigations could also explore the impact of specific textbook characteristics or utilize a wider array of speaking assessment methods.

In summary, TEPLL—when structured around the principles of ICLT—proves to be a powerful framework for enhancing speaking skills among EFL learners. It is more effective for advanced and adult learners while remaining equitable across genders. These findings not only validate the pedagogical value of TEPLL but also highlight the importance of tailoring its implementation to specific learner characteristics, ensuring that all students can fully benefit from its personalized, technology-enhanced design. This study contributes to the growing body of literature on technology integration in language education and offers practical implications for fostering learner agency and engagement in diverse learning environments.

Conclusion

This study successfully examined the significant impact of Technology-Enhanced Personalized Language Learning (TEPLL) on the speaking skills of Iranian EFL learners. It uniquely applied the Inclusive Communicative Language Teaching (ICLT) as a foundational theoretical framework, providing a novel lens through which to understand the effectiveness of technology in language education. Our findings unequivocally verified the primary hypothesis: the TEPLL approach, designed around ICLT's core principles of choice, relevance, competence, and newness, significantly improved speaking skills compared to traditional, teacher-centered methods. This positive outcome was robustly supported by statistical evidence. However, this impact was not uniform across all participants, highlighting the nuanced nature of pedagogical interventions. Advanced learners and adults showed the most significant improvements, indicating that learner readiness and maturity play crucial roles in maximizing the benefits of self-directed, technology-enhanced learning. Conversely, no notable difference was observed based on gender, reinforcing the inclusive potential of TEPLL. These results underscore the critical importance of integrating learner agency, digital tools, and personalized content into language learning curricula, especially in contexts like Iran, where opportunities for communicative speaking practice are often limited.

Implications for Practice

The findings of this study offer several direct and actionable practical implications for EFL educators, curriculum developers, and policymakers. Educators should move away from a one-size-fits-all model and actively adopt TEPLL strategies that leverage technology for personalization. Platforms offering personalized feedback and progress tracking, such as Speechling, can be highly effective tools for this. Prioritizing learner agency is crucial; teachers should transition from being mere instructors to facilitators, curating diverse resources (e.g., YouTube videos, podcasts, articles) and empowering students to choose materials that align with their interests, thereby boosting intrinsic motivation. Furthermore, it is vital to ensure that learning materials are relevant and authentic, connecting to real-world contexts and students' lived experiences. Utilizing social media content and other authentic digital resources can make

language learning more meaningful and engaging. Nurturing digital competence is also key; simply providing technology is insufficient. Educators must invest in training students to confidently use new digital tools, transforming the initial novelty of a platform from a potential obstacle into a sustainable motivational asset. Finally, instruction should be differentiated. While advanced adult learners may thrive in autonomous learning environments, pre-intermediate and adolescent learners might need more structured scaffolding and explicit support within a TEPLL framework to fully benefit.

Implications for Research

This study also opens several significant avenues for future research. As a newly developed framework, ICLT requires further validation and refinement. Future studies should rigorously test its tenets across diverse educational contexts, cultures, and with various technologies to further develop its framework and identify any boundary conditions. Long-term investigations are also critically needed, as this study was conducted over a relatively short period. Longitudinal research is essential to determine the sustained effectiveness of TEPLL and to ascertain whether the initial novelty effect persists or evolves over time. To gain a deeper understanding of the learner experience, future research should integrate qualitative methods, such as in-depth interviews, focus groups, and learning diaries. This would allow researchers to explore *how* and *why* learners engage with ICLT principles and the specific challenges they face. Additionally, further research should meticulously investigate the intricate interactions between variables like proficiency, age, and individual differences (e.g., learning styles, motivation, and personality traits) to develop more nuanced, adaptive, and effective personalized language learning models.

Limitations

Despite providing valuable insights, the findings of this study must be interpreted within the context of certain limitations, which may have compromised its internal or external validity. The use of a convenience sample drawn from a specific region in Iran (Isfahan) limits the generalizability of the results to the broader population of Iranian EFL learners or other diverse cultural contexts. Had a broader, more representative sample been employed, the external validity would be stronger. The intervention duration was also relatively short, lasting only one hour per week over four weeks. A longer treatment period might have produced different or more pronounced results, particularly for pre-intermediate and adolescent learners who may require more time for skill development and adaptation to new learning methods. Moreover, the use of different textbooks (American English File, Top Notch, and Summit) for various proficiency levels, while practical for the study's design, may have included an uncontrolled variable due to inherent differences in content difficulty, topic relevance, and pedagogical approaches, potentially influencing engagement and learning outcomes. Finally, the speaking assessment, though reliably scored, was based on a single two-minute monologue. A more comprehensive assessment involving multiple tasks, such as interviews, role-plays, presentations, or collaborative discussions, might provide a richer and more complete measure of speaking proficiency and its various facets. For future research, a more diverse sample, a longer intervention period, standardized learning materials, and a multifaceted assessment approach would strengthen the study's conclusions and enhance generalizability.

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