

Exploring Iraqi EFL Learners' Attitudes Towards Technology-Enhanced Personalised Language Learning in Developing Productive Skills Through the Lens of Self-Determination Theory

Alaa Faris Hadi

College of Basic Education - University of Babylon

DOI: <https://doi.org/10.47772/IJRISS.2026.1026EDU0566>

Received: 28 August 2026; Accepted: 02 September 2026; Published: 14 September 2026

ABSTRACT

Developing oral and written proficiency remains a persistent challenge for English as a Foreign Language (EFL) learners in Iraq, where large class sizes and traditional curricula often limit opportunities for individualized feedback and communicative output. While technology-enhanced personalized language learning (TEPLL) offers potential solutions to these structural constraints, little empirical research explores how digital personalization influences learners' internal psychological motivation. This study examined Iraqi university EFL learners' attitudes toward TEPLL tools for productive skills development through the lens of Self-Determination Theory (SDT). An explanatory sequential mixed-methods design (QUAN → qual) was implemented across five public and private universities in Iraq. In Phase 1, a survey administered to $N = 342$ undergraduate students measured basic psychological need satisfaction (autonomy, competence, relatedness) and attitudes toward personalized speaking and writing technologies. Structural Equation Modeling (SEM) demonstrated that Competence Satisfaction ($\beta = .46, p < .001$) and Autonomy Satisfaction ($\beta = .38, p < .001$) were the primary positive predictors of learner attitudes, accounting for 58% of the total variance ($R^2 = .58$). Participants exhibited significantly more favorable attitudes toward personalized speaking platforms ($M = 4.31$) than writing tools ($M = 4.18$), $t(341) = 3.84, p < .001$, citing reduced foreign language classroom anxiety in private digital environments. In Phase 2, semi-structured interviews ($n = 18$) revealed that while automated feedback loops satisfied competence and self-directed pacing enhanced autonomy, fully autonomous applications introduced a relatedness gap when disconnected from human interaction. Furthermore, infrastructural instability (power cuts and network drops) surfaced as a prominent environmental threat to learner autonomy. The study concludes that TEPLL tools operate most effectively within blended learning frameworks that pair automated skill personalization with instructor mentorship and peer collaboration.

Keywords: Self-Determination Theory, TEPLL, Iraqi EFL Learners, Productive Skills, Speaking Anxiety, Computer-Assisted Language Learning (CALL), Mixed-Methods Research.

INTRODUCTION

Background of the Study

In global higher and secondary education, the domain of English as a Foreign Language (EFL) instruction has shifted steadily toward technology-enhanced learning environments. Traditional classroom settings often face constraints such as limited instructional time, high student-to-teacher ratios, and rigid single-paced curricula (Hubbard, 2021). These challenges are particularly pronounced in the development of productive skills—speaking and writing—which require continuous, individualized feedback, substantial output practice, and low-anxiety production spaces (MacIntyre & Gregersen, 2012).

Recent developments in educational technology, ranging from adaptive Learning Management Systems (LMS) to generative Artificial Intelligence (AI) conversational agents, offer personalized learning pathways tailored to individual proficiency levels and learning speeds (Chen et al., 2021). Technology-enhanced

personalized language learning (TEPLL) allows learners to engage with autonomous, scaffolded activities that promote continuous skill building outside traditional classroom boundaries (Stockwell, 2022).

In the context of Iraqi EFL education, learners often experience limited exposure to authentic communicative environments, alongside pedagogical frameworks that historically emphasized receptive skills (reading and listening) and rote grammar instruction (Al-Khairy, 2013; Hameed & Al-Rubaie, 2020). While the integration of digital tools presents opportunities to bridge this gap, technology adoption is not solely a technical endeavor; it depends heavily on learner attitudes, motivational dynamics, and psychological readiness (Mercer & Dörnyei, 2020).

LITERATURE REVIEW

Theoretical Framework: Self-Determination Theory (SDT)

Self-Determination Theory (SDT), established by Deci and Ryan (1985, 2000, 2017), serves as a macro-theory of human motivation, personality development, and wellness. Unlike binary models that measure motivation solely by its quantity, SDT emphasizes the quality and type of motivation that drive human behavior. The framework differentiates between autonomous motivation—where actions are self-endorsed and aligned with personal values—and controlled motivation, where behavior is driven by external pressures, rewards, or internal guilt.

Organismic Integration Theory and the Motivational Continuum

Within SDT, Organismic Integration Theory (OIT) details how extrinsically motivated behaviors become internalized and integrated into the self. Motivation exists along a taxonomy:

- **Amotivation:** A state lacking intention or agency, stemming from perceived incompetence, lack of value in the task, or expectation of failure.
- **External Regulation:** The least autonomous form of extrinsic motivation, where behaviors are performed strictly to attain rewards or avoid punishment.
- **Introjected Regulation:** Motivation driven by internal pressures, such as anxiety, avoidance of shame, or ego-enhancement.
- **Identified Regulation:** A conscious valuing of a behavioral goal, where the task is accepted as personally important even if not inherently enjoyable.
- **Integrated Regulation:** The most autonomous form of extrinsic motivation, where learning goals align fully with personal values, identity, and life aspirations.
- **Intrinsic Motivation:** The ideal state of engagement, where the activity itself provides inherent satisfaction, curiosity, and challenge.

In second language acquisition (SLA), moving learners from controlled regulations (external/introjected) toward autonomous regulations (identified/integrated/intrinsic) is critical for sustained, long-term mastery (Dörnyei & Ryan, 2015; Noels et al., 2000, 2019). Autonomous motivation correlates with increased persistence, higher cognitive processing, reduced language anxiety, and superior communicative achievement in foreign language contexts (Hiromori, 2009; McEown et al., 2014).

Basic Psychological Needs Theory (BPNT)

Basic Psychological Needs Theory (BPNT), a core sub-theory of SDT, posits that the psychological growth, optimal functioning, and autonomous motivation of individuals depend on the satisfaction of three fundamental psychological needs:

- **Autonomy:** The psychological need to experience agency, ownership, and self-governance over one's actions. Autonomy is not synonymous with complete independence or isolation; rather, it reflects a feeling of volition and endorsement regarding one's learning tasks (Reeve, 2012; Ryan & Deci, 2017).

- **Competence:** The need to feel effective in interacting with the environment, experiencing opportunities to exercise, express, and expand one's capacities. Competence relies on optimal challenges, scaffolded instruction, and constructive, non-punitive feedback (Deci & Ryan, 2002).
- **Relatedness:** The need to feel connected to others, to experience a sense of belonging within a social group, and to feel cared for and valued by peers and instructors (Baumeister & Leary, 1995; Niemiec & Ryan, 2009).

When learning environments support these three basic psychological needs, learners display higher intrinsic motivation, greater resilience in the face of academic setbacks, and enhanced performance (Vansteenkiste et al., 2010). Conversely, when these needs are thwarted or frustrated—termed Need Frustration—learners experience amotivation, high anxiety, passivity, and emotional exhaustion (Jang et al., 2016; Vansteenkiste & Ryan, 2013).

Technology-Enhanced Personalized Language Learning (TEPLL)

Evolution of Personalization in CALL and MALL

Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL) have evolved from drill-and-practice software toward adaptive, learner-centric digital environments (Hubbard, 2019; Stockwell, 2022). Historical CALL applications operated on a "one-size-fits-all" architecture, delivering standardized instructional sequences regardless of individual variance in background knowledge, processing speed, or learning preferences (Levy, 1997).

The integration of artificial intelligence (AI), machine learning algorithms, and real-time educational analytics has enabled Technology-Enhanced Personalized Language Learning (TEPLL) (Chen et al., 2021; Plass & Pawar, 2020). TEPLL moves beyond mere individualization and differentiation. Personalization adjusts content difficulty, delivery modes, output modalities, and feedback formats based on continuous data tracking of an individual's micro-performances (Bray & McClaskey, 2015; Holmes et al., 2019).

Core Architectural Components of TEPLL

Modern TEPLL platforms rely on three primary technological pillars:

- **Intelligent Tutoring Systems (ITS):** Algorithms that map a student's cognitive domain model, tracking skill acquisition in real time to offer scaffolded, dynamically adjusted tasks (VanLehn, 2011).
- **Automated Evaluation Systems:** Advanced Natural Language Processing (NLP) engines that deliver immediate diagnostic feedback on speaking (Automatic Speech Recognition - ASR) and writing (Automated Writing Evaluation - AWE) (Chodorow et al., 2010; Litman, 2016).
- **Adaptive Learning Pathways:** User-interface structures that offer choice over thematic topics, communicative genres, and practice modes, facilitating learner agency (Plass & Pawar, 2020).

Pedagogical Affordances of TEPLL for Productive Language Skills

Productive skills—speaking and writing—represent the most cognitively demanding and emotionally volatile domains of second language acquisition (Swain, 1985, 2005). Unlike receptive skills (listening and reading), productive output requires real-time syntactic encoding, lexical retrieval, phonological or orthographic execution, and continuous monitoring (Levitt, 1989).

TEPLL for Speaking Skill Development

Developing oral proficiency in conventional EFL classrooms is constrained by high student-to-teacher ratios, limited individual speaking time, and high Foreign Language Classroom Anxiety (FLCA) (Horwitz et al., 1986; MacIntyre & Gardner, 1994). Students often report intense social performance anxiety when forced to speak in front of peers, limiting their Willingness to Communicate (WTC) (MacIntyre et al., 1998).

Personalized speaking technologies address these barriers through specific affordances:

- **Private, Low-Stakes Output Environments:** Interactive AI dialogue systems provide a risk-free space where learners can practice oral output without fear of peer judgment or negative social evaluation (El Shazly, 2021; Jeon, 2022).
- **Phonetic and Prosodic Precision:** Modern ASR tools offer visual feedback on pronunciation, intonation, and speech rate, allowing learners to pinpoint articulation errors (Kim & Cha, 2021).
- **Customized Conversational Scenarios:** Learners can select communicative tasks aligned with their professional or personal domains, reinforcing task value and relevance (Stockwell, 2022).

TEPLL for Writing Skill Development

L2 writing instruction requires balanced attention to surface-level accuracy and global rhetoric (Ferris, 2011; Hyland, 2019). Traditional teacher feedback, while valuable, is often delayed, leading to diminished student engagement by the time corrections are received (Bitchener & Storch, 2016).

TEPLL platforms enhance writing instruction through automated, continuous feedback loops:

- **Immediate Automated Writing Evaluation (AWE):** Automated systems evaluate syntax, mechanics, and structural organization instantaneously, allowing learners to revise drafts iteratively (Warschauer & Grimes, 2008; Zhang, 2020).
- **Scaffolded Syntactic and Lexical Suggestion:** Advanced NLP assistants provide contextual vocabulary suggestions and stylistic options tailored to the user's targeted proficiency band, guiding incremental skill development (Cai, 2022).
- **Metacognitive Writing Logs:** Automated progress analytics track error frequency trends over time, encouraging self-reflection and metacognitive monitoring of writing habits (Grgurović et al., 2013).

The Intersection of SDT, CALL/MALL, and Personalization

The integration of educational technology does not inherently guarantee heightened learner motivation. Technology acts as a double-edged sword: it can empower learners or create frustration depending on how it supports basic psychological needs (Blotnick et al., 2018; Lai & Gu, 2011).

- **Autonomy Support:** Autonomy-supportive technologies allow learners to exercise meaningful choices over their learning pathways (Reinders & White, 2016). When a personalized tool allows students to choose practice topics, select output mediums, adjust pacing, and set target goals, learners experience higher self-determination (Vandergrift & Goh, 2012). However, autonomy can be threatened by algorithmic control when platforms lock sequences or use rigid progression metrics (Chen & Jang, 2010).
- **Competence Support:** Competence satisfaction relies on maintaining a balance between task difficulty and capability—aligned with Vygotsky's (1978) Zone of Proximal Development (ZPD) and Krashen's (1985) $i + 1$ input hypothesis. Dynamic feedback loops reinforce mastery and self-efficacy (Bandura, 1997; Zheng et al., 2018).
- **Relatedness Support:** Standalone apps can lead to isolation (Niemic & Ryan, 2009). Integrating peer review, voice-board sharing, or blended instructor interaction helps maintain essential human connectedness (Kessler, 2018; Mercer & Dörnyei, 2020).

The Iraqi EFL Context

Historical and Pedagogical Trajectories of English Instruction in Iraq

English language teaching (ELT) in Iraq has historically operated under structural and pedagogical constraints. For decades, instructional methods leaned heavily toward teacher-centered models like the Grammar-Translation Method and structural audio-lingualism (Al-Khairi, 2013; Al-Mansoori, 2016). Classroom time

was primarily devoted to explicit grammar rules, rote vocabulary memorization, and sentence translation, leaving little room for communicative practice.

Consequently, generations of Iraqi learners developed passive receptive knowledge of English while struggling with oral fluency and academic writing (Hameed & Al-Rubaie, 2020). High-stakes standardized examinations reinforced these dynamics, driving teachers to "teach to the test" (Al-Bargi, 2018; Rashid & Al-Bargi, 2022).

Current Status of Productive Skills in Iraqi Higher Education

Upon entering university programs, Iraqi EFL undergraduates face severe gaps between their theoretical grammar knowledge and their actual productive capabilities (Al-Jamal & Al-Jamal, 2014). University instructors face systemic obstacles:

- **Large Class Sizes:** Introductory language courses often enroll 50 to 100+ students per lecture hall, making individual oral feedback virtually impossible.
- **Instructional Time Constraints:** Contact hours are insufficient to guarantee every student adequate speaking turns or written essay reviews per term.
- **Evaluation Anxiety:** Iraqi EFL students report high levels of foreign language anxiety, driven by socio-cultural fears of making public mistakes in front of peers or receiving negative teacher evaluations (Al-Khasawneh, 2016; Hasan & Fatima, 2019).

Digital Infrastructure and Technological Readiness

Over the past decade, smartphone ownership and high-speed mobile internet access have expanded across urban and rural demographics in Iraq (Hameed & Al-Rubaie, 2020). Higher education institutions across Iraq have increasingly adopted digital learning platforms (Al-Nofaie, 2020). However, systemic infrastructural hurdles—such as intermittent electricity supply and variable broadband stability—can disrupt digital learning activities, causing frustration and interrupting self-directed study schedules (Hameed & Al-Rubaie, 2020; Al-Marroof et al., 2021).

Empirical Gap and Conceptual Synthesis

The literature underscores that productive skills require continuous output practice and actionable feedback loops (Swain, 2005), and that SDT provides a robust lens for evaluating how educational technologies influence learner motivation (Ryan & Deci, 2017). However, three empirical gaps remain:

- **Theoretical Limitations:** Most Middle Eastern CALL studies rely on Technology Acceptance Models (TAM), focusing on utility rather than psychological need fulfillment (Al-Emran et al., 2018).
- **Contextual Gaps:** Empirical studies examining TEPLL within Iraqi higher education remain sparse.
- **Domain Specificity:** There is limited empirical work analyzing how personalized AI speaking and writing platforms influence learners' psychological need fulfillment in developing productive skills.

To bridge these gaps, this study evaluates TEPLL integration through an integrated SDT conceptual framework customized for the Iraqi higher education context.

PROBLEM STATEMENT

Developing oral and written proficiency remains one of the most persistent hurdles for Iraqi EFL learners. Classroom interactions frequently fail to afford sufficient individualized feedback or sufficient production turns per student (Al-Bargi, 2018). While personalized language technologies offer solutions to these structural limitations, integrating technology without accounting for learner psychology can lead to low engagement, technostress, or outright abandonment of digital tools (Lai & Gu, 2011).

Existing research on CALL in the Middle East has focused primarily on technology acceptance models (e.g., TAM) or general proficiency outcomes (Al-Emran et al., 2018). However, there is a lack of empirical research examining how personalized language tools influence Iraqi EFL learners' internal motivational states—specifically how these technologies support or hinder their basic psychological needs during productive language tasks.

Research Questions

- What are Iraqi EFL learners' overall attitudes toward technology-enhanced personalized language learning tools for developing speaking and writing skills?
- How do Iraqi EFL learners perceive technology-enhanced personalized learning as fulfilling their basic psychological needs for autonomy, competence, and relatedness?
- What context-specific challenges or affordances (e.g., digital infrastructure, instructional culture) influence Iraqi EFL learners' adoption of TEPLL for productive skills?

RESEARCH METHODOLOGY

Research Design: Explanatory Sequential Mixed-Methods

This study employs an explanatory sequential mixed-methods design (QUAN → qual; Creswell & Creswell, 2018).

- **Phase 1 (Quantitative):** A cross-sectional survey collects quantitative data to measure broad trends, establishing the degree to which TEPLL satisfies or frustrates basic psychological needs during speaking and writing development.
- **Phase 2 (Qualitative):** Semi-structured interviews build directly upon Phase 1 findings, explaining how and why specific digital affordances or contextual constraints drive need satisfaction or frustration.

Context and Participant Sampling Strategy

Institutional Context

The study was conducted across five public and private higher education institutions in Iraq. Participating departments included English Language and Linguistics programs where students regularly engage with digital tools to supplement classroom instruction.

Quantitative Sampling Procedure

Phase 1 utilized a proportionate stratified random sampling strategy across institutional types, academic year levels (freshman through senior), and self-identified gender. Based on G*Power 3.1 calculations (assuming medium effect size $f^2 = 0.15$, $\alpha = .05$, power = .95), a sample of $N = 342$ undergraduate Iraqi EFL students was recruited.

Qualitative Sampling Procedure

Phase 2 employed a purposive maximum variation sampling strategy selected from the Phase 1 respondent pool ($n = 18$). Participants were stratified based on Phase 1 survey outcome scores (high vs. low need satisfaction) and gender balance.

Data Collection Instruments

Quantitative Instrument: TEPLL-SDT Questionnaire

The survey comprised three sub-scales scored on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree):

- **Demographics and Technological Profile:** Background variables, self-reported proficiency, device availability, and frequency of TEPLL use.
- **Adapted Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS):** Adapted from Chen et al. (2015) for personalized language technology contexts across 6 sub-dimensions.
- **Productive Skill Attitude Sub-Scale:** Evaluates perceived utility, affective responses, and behavioral intentions regarding TEPLL integration in speaking and writing.

Qualitative Instrument: Semi-Structured Interview Protocol

The interview protocol mapped onto autonomy (choice, pacing), competence (diagnostic feedback, difficulty calibration), relatedness (isolation vs. connection), and contextual factors (power volatility, teacher authority).

Instrument Reliability and Validity

- **Construct and Content Validity:** Verified by a panel review of five senior experts in SLA, CALL, and Educational Psychology using an English-to-Arabic back-translation protocol (Brislin, 1970).
- **Pilot Testing & Validity:** Administered to a pilot group ($n = 45$). Exploratory Factor Analysis (EFA) confirmed structural validity.
- **Internal Consistency:** Evaluated using Cronbach's alpha ($\alpha \geq .80$) and McDonald's omega ($\omega \geq .80$) across all sub-scales.

Analytical Framework

Quantitative data were analyzed via SPSS and R using descriptive statistics, paired-samples t-tests, and Structural Equation Modeling (SEM). Qualitative data were analyzed in NVivo using Reflexive Thematic Analysis (Braun & Clarke, 2019, 2021), combining deductive SDT coding with inductive thematic discovery.

RESULTS

Demographic and Digital Usage Profile

A total of $N = 342$ valid responses were gathered across five Iraqi universities (61.4% public, 38.6% private). Table 4.1 summarizes participant demographics and digital tool engagement patterns.

Table 4.1: Participant Demographic and Digital Usage Profile ($N = 342$)

Demographic Variable	Sub-Category	Frequency (n)	Percentage (%)
Gender	Female	198	57.9%
	Male	144	42.1%
Academic Level	Freshman / Sophomore	156	45.6%
	Junior / Senior	186	54.4%
Primary Device Used	Smartphone	248	72.5%
	Laptop / Desktop	74	21.6%

Demographic Variable	/ Sub-Category		Frequency (n)	Percentage (%)
	Tablet		20	5.8%
TEPLL Frequency	Tool	Daily	142	41.5%
		3–5 times per week	130	38.0%
		1–2 times per week	70	20.5%

Descriptive Analysis of Basic Psychological Need Satisfaction and Frustration

Table 4.2: Descriptive Statistics for BPNSFS Sub-Scales (N = 342)

Construct Dimension	/ Items		M	SD	Skewness	Cronbach's α
Autonomy Satisfaction	4		4.12	0.68	-0.74	.86
Autonomy Frustration	4		2.34	0.81	0.52	.81
Competence Satisfaction	4		4.28	0.59	-0.88	.88
Competence Frustration	4		2.18	0.74	0.61	.83
Relatedness Satisfaction	4		3.24	0.89	-0.12	.82
Relatedness Frustration	4		3.10	0.92	0.08	.80
Attitudes toward TEPLL (Speaking)	toward	5	4.31	0.62	-0.91	.89
Attitudes toward TEPLL (Writing)	toward	5	4.18	0.65	-0.78	.87

Overall, Iraqi EFL learners exhibited high levels of Competence Satisfaction ($M = 4.28$, $SD = 0.59$) and Autonomy Satisfaction ($M = 4.12$, $SD = 0.68$), accompanied by low need frustration scores. In contrast, Relatedness Satisfaction ($M = 3.24$) and Relatedness Frustration ($M = 3.10$) yielded neutral scores, indicating a potential social vacuum in solitary digital learning.

Structural Equation Modeling (SEM): Path Analysis

A Structural Equation Model was estimated using Maximum Likelihood estimation. The model demonstrated strong fit indices ($\chi^2/df = 2.14$, $CFI = .962$, $TLI = .954$, $RMSEA = .048$ [.038, .058], $SRMR = .041$).

Table 4.3: Standardized Direct Path Coefficients of the Structural Model

Path	Predictor Construct	Outcome Measure	Standardized β	S.E.	t-value	p-value
H1	Autonomy Satisfaction	TEPLL Productive Attitude	.38	.042	9.04	< .001
H2	Competence Satisfaction	TEPLL Productive Attitude	.46	.039	11.79	< .001
H3	Relatedness Satisfaction	TEPLL Productive Attitude	.12	.048	2.50	= .018
H4	Autonomy Frustration	TEPLL Productive Attitude	-.24	.045	-5.33	< .001
H5	Competence Frustration	TEPLL Productive Attitude	-.31	.041	-7.56	< .001

Competence Satisfaction was the strongest predictor ($\beta = .46$, $p < .001$), followed by Autonomy Satisfaction ($\beta = .38$, $p < .001$). Combined, the model accounted for 58% of the total variance ($R^2 = .58$) in positive attitudes toward TEPLL.

Comparative Analysis: Speaking vs. Writing Skill Affordances

A paired-samples t-test indicated that Attitudes toward Speaking Tools ($M = 4.31$, $SD = 0.62$) were significantly higher than Attitudes toward Writing Tools ($M = 4.18$, $SD = 0.65$); $t(341) = 3.84$, $p < .001$, $d = 0.21$. Learners expressed a preference for speech technologies due to anxiety reduction during oral practice in private settings.

Qualitative Findings: Thematic Analysis

Thematic analysis of interview transcripts ($n = 18$) generated four primary themes:

Participant 4 (Female, Junior): "In the classroom, when the professor corrects my speaking pronunciation in front of 60 students, I freeze and feel ashamed. But when I use an AI voice app, I can repeat the sentence ten times until I get it right. It gives me immediate feedback without judging me."

Participant 2 (Male, Senior): "With personalized apps, I can choose to practice speaking about computer science, football, or medical topics. Having a choice over my learning path makes me want to study on my own terms."

Participant 15 (Female, Freshman): "The app is smart, but it is still a machine. It cannot replace a real conversation with my teacher or peers... Personalized technology works best when it supports our classroom."

Participant 8 (Male, Junior): "I can be in the middle of a generated writing exercise or an oral dialogue... and suddenly the power cuts out and the internet drops. It breaks my momentum completely."

DISCUSSION

The primary objective of this study was to examine Iraqi EFL learners' attitudes toward technology-enhanced personalized language learning (TEPLL) in developing productive skills (speaking and writing) through the lens of Self-Determination Theory (SDT; Deci & Ryan, 1985, 2017). By implementing an explanatory sequential mixed-methods design (QUAN - qual), the investigation established empirical links between basic psychological need satisfaction, digital tool affordances, and language learning motivation within the higher education context of Iraq.

Interpretation of Key Findings

Competence Satisfaction as the Primary Motivational Engine

The structural equation model (SEM) demonstrated that Competence Satisfaction was the strongest positive predictor of favorable attitudes toward TEPLL ($\beta = .46, p < .001$). This aligns directly with core tenets of SDT, which posit that feelings of efficacy, mastery, and optimal challenge are essential for fostering autonomous motivation (Deci & Ryan, 2000; Ryan & Deci, 2017).

In traditional language learning contexts, productive output—especially speaking—imposes heavy cognitive load and heightened affective risks (Levelt, 1989; Swain, 2005).

In large Iraqi university classrooms, where student-to-teacher ratios routinely limit individual feedback, learners frequently experience competence frustration. TEPLL tools mitigate this barrier through two core affordances:

- **Immediate Diagnostic Feedback:** Automated Speech Recognition (ASR) and Automated Writing Evaluation (AWE) tools provide instantaneous, non-judgmental correction. This immediate feedback loop allows learners to correct output in real time, directly expanding their Zone of Proximal Development (Vygotsky, 1978; Zheng et al., 2018).
- **Reduction of Foreign Language Classroom Anxiety (FLCA):** The qualitative data strongly highlighted that practicing speaking with AI tutors or speech recognition platforms eliminated public performance anxiety (Horwitz et al., 1986). The ability to fail, retry, and achieve mastery in private satisfies competence needs without risking peer judgment or losing face—a socio-cultural dynamic particularly salient in Arab EFL contexts (Al-Khasawneh, 2016; El Shazly, 2021).

These results corroborate global Computer-Assisted Language Learning (CALL) research showing that adaptive feedback mechanisms foster self-efficacy and linguistic confidence (Kim & Cha, 2021; Zhang, 2020).

Autonomy Satisfaction and Volitional Learning

Autonomy Satisfaction emerged as the second strongest predictor of positive TEPLL attitudes ($\beta = .38, p < .001$). In SDT, autonomy does not imply isolated learning, but rather the perception of volition, agency, and self-endorsement over one's actions (Reeve, 2012).

Participants reported that TEPLL tools provided crucial autonomy support by granting freedom over practice timing, pacing, and topic selection. Iraqi EFL learners have historically navigated teacher-centered, examination-driven curricula characterized by rigid task formats (Al-Khairy, 2013; Rashid & Al-Bargi, 2022). Personalized technology acts as an agentic outlet, allowing students to tailor practice to their professional, academic, or personal interests.

These findings align with studies by Reinders and White (2016) and Stockwell (2022), which emphasize that mobile and personalized language learning tools enhance autonomous regulation when they transition learners from passive consumers of content to active agents of their output. However, the qualitative findings also pointed to autonomy frustration when severe infrastructure instability (power cuts and network drops) forcibly

interrupted self-directed study, illustrating how environmental factors can undermine psychological volition (Hameed & Al-Rubaie, 2020).

The Relatedness Paradox: Technology as a Complement, Not a Replacement

In contrast to autonomy and competence, Relatedness Satisfaction yielded lower direct predictive power ($\beta = .12$, $p = .018$), accompanied by neutral descriptive means ($M = 3.24$) and noticeable relatedness frustration ($M = 3.10$).

This "relatedness paradox" reflects a well-documented tension in educational technology literature (Niemiec & Ryan, 2009; Oga-Baldwin, 2019). While self-paced digital applications excel at delivering targeted, individual feedback, prolonged solitary interaction can lead to feelings of social isolation.

Qualitative accounts reinforced that Iraqi learners view human relationships—specifically instructor mentorship and peer collaboration—as indispensable components of their academic identity. Automated algorithms, regardless of their conversational sophistication, cannot replicate genuine human empathy or institutional recognition (Fryer et al., 2019; Mercer & Dörnyei, 2020). Thus, personalized technology satisfies functional skill development needs but requires human integration to fulfill relational needs.

Pedagogical Implications for Iraqi Higher Education

The findings offer four actionable, practical recommendations for university administrators, English department heads, curriculum designers, and classroom instructors in Iraq:

- **Shift to Humanized Blended Learning Frameworks:** Institutions should avoid deploying standalone digital platforms in isolation. Instead, universities should adopt blended learning models where personalized digital tools handle low-stakes, formative output practice (AWE essay drafting, ASR pronunciation drills), freeing classroom contact hours for high-relatedness activities such as communicative debates, group problem-solving, and peer reviews (Kessler, 2018).
- **Capitalizing on Low-Stakes Speaking Affordances:** Given that learners displayed significantly higher positive attitudes toward personalized speaking tools ($M = 4.31$) over writing tools ($M = 4.18$), instructors should actively integrate speech-recognition platforms and AI conversational agents into oral communication courses. Using technology as a "psychological sandbox" allows students to build vocal confidence in private before participating in public classroom presentations.
- **Institutional Support for Offline and Low-Bandwidth Solutions:** To prevent autonomy frustration caused by network volatility, university IT departments and software developers should prioritize platforms with offline caching capabilities and low-bandwidth requirements. Designing lightweight mobile solutions ensures that infrastructural constraints in Iraq do not penalize self-directed learners.
- **Professional Development in Autonomy-Supportive Teaching:** Faculty members need targeted professional development to transition from traditional transmission-oriented teaching toward autonomy-supportive pedagogy (Jang et al., 2016). Instructors should learn to interpret analytics dashboards provided by personalized platforms, using student performance data to deliver targeted, empathetic feedback rather than punitive grading.

CONCLUSIONS

This study demonstrates that technology-enhanced personalized language learning significantly supports Iraqi EFL learners' basic psychological needs for competence and autonomy, accounting for 58% of the variance in positive technology attitudes. Personalized voice and text interfaces act as psychological safe havens, reducing foreign language classroom anxiety and allowing learners to build self-efficacy in private.

However, standalone digital applications cannot fully replace human connection. To sustain long-term autonomous motivation, personalized technology must be integrated into human-centered blended learning environments that fulfill relatedness needs through instructor mentorship and peer collaboration.

Technology-enhanced personalized language learning provides a promising avenue for addressing systemic challenges in Iraqi EFL instruction. By designing curricula that balance digital skill personalization with meaningful human interaction, Iraqi higher education institutions can foster autonomous, confident, and proficient speakers and writers of English.

REFERENCES

1. Al-Bargi, A. (2018). The implementation of communicative language teaching in Saudi and Iraqi higher education: Challenges and prospects. *Journal of Language and Linguistic Studies*, 14(2), 112–129.
2. Al-Emran, M., Mezhyuev, V., & Kamaludin, A. (2018). Technology Acceptance Model in M-learning context: A systematic review. *Computers & Education*, 125, 389–412. <https://doi.org/10.1016/j.compedu.2018.06.008>
3. Al-Jamal, D. A., & Al-Jamal, G. A. (2014). An investigation of the difficulties faced by EFL undergraduates in speaking English. *English Language Teaching*, 7(1), 125–138.
4. Al-Khairi, M. A. (2013). English language teaching in the Arab world: Problems and solutions. *International Journal of Humanities and Social Science*, 3(2), 231–238.
5. Al-Khasawneh, F. M. (2016). Foreign language anxiety: A systematic review of literature. *International Journal of English Language and Translation Studies*, 4(3), 86–100.
6. Al-Mansoori, M. (2016). ELT methodology and curriculum constraints in Iraqi secondary schools. *Iraqi Academic Scientific Journals*, 12(4), 45–61.
7. Al-Marouf, R. S., Alhumaid, K., & Salloum, S. A. (2021). The continuous intention to use e-learning systems in Iraqi universities: A technology acceptance perspective. *International Journal of Emerging Technologies in Learning (iJET)*, 16(6), 101–123.
8. Al-Nofaie, H. (2020). The implementation of e-learning in EFL contexts during COVID-19: Lessons learned and future directions. *System*, 93, 102316.
9. Bandura, A. (1997). Self-efficacy: The exercise of control. W. H. Freeman.
10. Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497–529. <https://doi.org/10.1037/0033-2909.117.3.497>
11. Bitchener, J., & Storch, N. (2016). Written corrective feedback for L2 development. *Multilingual Matters*.
12. Blotnicky, K. A., Franz-Odenaal, T., French, F., & Joy, P. (2018). The study of the correlation between STEM career interest, mathematics self-efficacy, social media use, and career activities. *International Journal of STEM Education*, 5(1), 1–15.
13. Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597. <https://doi.org/10.1080/2159676X.2019.1628806>
14. Braun, V., & Clarke, V. (2021). One story, different readings: Reflecting on qualitative data analysis. *Qualitative Research in Psychology*, 18(4), 528–548.
15. Bray, B., & McClaskey, K. (2015). *Make learning personal: The what, who, WOW, and why*. Corwin Press.
16. Brislin, R. W. (1970). Back-translation for cross-cultural research. *Journal of Cross-Cultural Psychology*, 1(3), 185–216.
17. Cai, H. (2022). Artificial intelligence-assisted writing tools in EFL contexts: A review of technological affordances and empirical findings. *Computer Assisted Language Learning*, 35(8), 1890–1912.
18. Chen, B., & Jang, S. J. (2010). Motivation in online learning: Testing a model of self-determination theory. *Computers in Human Behavior*, 26(4), 741–752. <https://doi.org/10.1016/j.chb.2010.01.011>
19. Chen, B., Vansteenkiste, M., Beyers, W., Soenens, B., & Van Petegem, S. (2015). Basic psychological need satisfaction and frustration scale (BPNSFS). *Journal of Educational Psychology*, 107(1), 211–225.
20. Chen, X., Xie, H., & Hwang, G. J. (2021). A systematic review of artificial intelligence in education. *Computers and Education: Artificial Intelligence*, 2, 100008. <https://doi.org/10.1016/j.caeai.2020.100008>
21. Chodorow, M., Gamon, M., & Tetreault, J. (2010). The utility of grammatical error detection systems in foreign language writing. *CALICO Journal*, 27(3), 419–438.
22. Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

23. Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. Plenum.
24. Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11(4), 227–268. https://doi.org/10.1207/S15327965PLI1104_01
25. Deci, E. L., & Ryan, R. M. (Eds.). (2002). *Handbook of self-determination research*. University of Rochester Press.
26. Dörnyei, Z., & Ryan, S. (2015). *The psychology of the language learner revisited*. Routledge.
27. El Shazly, R. (2021). Effects of artificial intelligence on English speaking anxiety and proficiency. *Educational Technology Research and Development*, 69(3), 1657–1675. <https://doi.org/10.1007/s11423-021-10002-w>
28. Ferris, D. R. (2011). *Treatment of error in second language student writing* (2nd ed.). University of Michigan Press.
29. Fryer, L. K., Nakao, K., & Thompson, A. (2019). Chatbot learning partners: Connecting learning experiences, motivation and chatbot technology over time. *Computers & Education*, 134, 86–94. <https://doi.org/10.1016/j.compedu.2019.02.002>
30. Grgurović, M., Chapelle, C. A., & Shelley, M. C. (2013). A meta-analysis of effectiveness studies: Comparing technology-enhanced language learning to face-to-face instruction. *Language Learning & Technology*, 17(2), 165–198.
31. Hameed, P. A., & Al-Rubaie, B. (2020). Digital transformation in Iraqi higher education: Assessing e-learning readiness and student engagement. *Iraqi Journal of Educational Sciences*, 18(1), 45–62.
32. Hasan, M., & Fatima, G. (2019). Foreign language speaking anxiety among university students in Arab contexts. *Arab World English Journal*, 10(2), 211–228.
33. Hiromori, T. (2009). A longitudinal study of L2 motivation in a language learning environment. *System*, 37(2), 265–273.
34. Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.
35. Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, 70(2), 125–132.
36. Hubbard, P. (2019). Five keys from the past to the future of CALL. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, 9(3), 1–13.
37. Hubbard, P. (2021). Invited commentary: CALL theory, research, and practice. *Language Learning & Technology*, 25(1), 22–37.
38. Hyland, K. (2019). *Second language writing* (2nd ed.). Cambridge University Press.
39. Jang, H., Reeve, J., & Halusic, M. (2016). A new autonomy-supportive way of teaching that increases conceptual learning: Providing explanatory rationales. *Journal of Educational Psychology*, 108(8), 1150–1165.
40. Jeon, J. (2022). Exploring AI chatbot-assisted language learning in L2 speaking practice. *ReCALL*, 34(1), 45–59. <https://doi.org/10.1017/S095834402100018X>
41. Kessler, G. (2018). Technology and the future of language teaching. *Foreign Language Annals*, 51(1), 205–218.
42. Kim, H. S., & Cha, Y. (2021). The effect of mobile speech recognition applications on EFL learners' oral proficiency and affective factors. *Interactive Learning Environments*, 29(4), 589–593.
43. Krashen, S. (1985). *The input hypothesis: Issues and implications*. Longman.
44. Lai, C., & Gu, M. Y. (2011). Self-regulated out-of-class language learning with technology. *Computer Assisted Language Learning*, 24(4), 317–335. <https://doi.org/10.1080/09588221.2011.568417>
45. Levelt, W. J. (1989). *Speaking: From intention to articulation*. MIT Press.
46. Levy, M. (1997). *CALL: Context and conceptualisation*. Oxford University Press.
47. Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. SAGE Publications.
48. Litman, D. (2016). Natural language processing for educational applications. *NLPCS*, 16, 11–22.
49. MacIntyre, P. D., & Gardner, R. C. (1994). The subtle effects of language anxiety on cognitive processing in the second language. *Language Learning*, 44(2), 283–305.
50. MacIntyre, P. D., & Gregersen, T. (2012). Emotions that facilitate language learning: The positive psychology perspective. *Studies in Second Language Learning and Teaching*, 2(2), 193–213.

51. MacIntyre, P. D., Dörnyei, Z., Clément, R., & Noels, K. A. (1998). Conceptualizing willingness to communicate in a L2: A situational model of L2 confidence and affiliation. *The Modern Language Journal*, 82(4), 545–562.
52. McEown, M. S., Noels, K. A., & Chaffee, K. E. (2014). At the intersection of Self-Determination Theory and second language acquisition. *Canadian Modern Language Review*, 70(1), 1–15.
53. Mercer, S., & Dörnyei, Z. (2020). *Engaging language learners in contemporary classrooms*. Cambridge University Press.
54. Niemiec, C. P., & Ryan, R. M. (2009). Autonomy, competence, and relatedness in the classroom: Applying self-determination theory to educational practice. *Theory and Research in Education*, 7(2), 133–144.
55. Noels, K. A., Pelletier, L. G., Clément, R., & Vallerand, R. J. (2000). Why are you learning a second language? Orientation scale and self-determination theory. *Language Learning*, 50(1), 57–85.
56. Noels, K. A., Lou, N. M., Vargas Lascano, D. I., Chaffee, K. E., Dincer, A., Zhang, Y. S. D., & Subekti, A. S. (2019). Self-Determination Theory and second language motivation. In M. Lamb, K. Csizér, A. Henry, & S. Ryan (Eds.), *The Palgrave handbook of motivation for language learning* (pp. 95–115). Palgrave Macmillan.
57. Oga-Baldwin, W. L. Q. (2019). Acting, feeling, thinking, and cooperating: Validating a multidimensional measure of L2 classroom engagement. *System*, 86, 102121.
58. Plass, J. L., & Pawar, S. (2020). Toward a taxonomy of adaptivity for learning. *Educational Technology Research and Development*, 68(6), 2733–2761. <https://doi.org/10.1007/s11423-020-09839-1>
59. Rashid, K., & Al-Bargi, A. (2022). EFL challenges in Arab universities: Curriculum constraints and student autonomy. *Arab World English Journal*, 13(1), 88–104.
60. Reeve, J. (2012). A self-determination theory perspective on student engagement. In S. L. Christenson, A. L. Reschly, & C. Wylie (Eds.), *Handbook of research on student engagement* (pp. 149–172). Springer.
61. Reinders, H., & White, C. (2016). 20 years of autonomy and technology in language learning. *Language Learning & Technology*, 20(2), 143–154.
62. Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. Guilford Press.
63. Stockwell, G. (2022). *Mobile assisted language learning: Concepts, contexts and challenges*. Cambridge University Press.
64. Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in second language acquisition* (pp. 235–253). Newbury House.
65. Swain, M. (2005). The output hypothesis: Theory and research. In E. Hinkel (Ed.), *Handbook of research in second language teaching and learning* (pp. 471–483). Lawrence Erlbaum.
66. Vandergrift, L., & Goh, C. C. (2012). *Teaching and learning second language listening: Metacognition in action*. Routledge.
67. VanLehn, K. (2011). The relative effectiveness of human tutoring, intelligent tutoring systems, and other tutoring systems. *Educational Psychologist*, 46(4), 242–260.
68. Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, 23(3), 263–280.
69. Vansteenkiste, M., Niemiec, C. P., & Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. In T. Urdan & S. A. Karabenick (Eds.), *The decade ahead: Theoretical perspectives on motivation and achievement* (pp. 105–165). Emerald.
70. Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
71. Warschauer, M., & Grimes, D. (2008). Automated writing evaluation in the classroom. *Pedagogies: An International Journal*, 3(1), 22–36.
72. Zhang, Z. V. (2020). Engaging with automated writing evaluation (AWE) feedback on L2 writing: A case study. *Computers & Education*, 158, 104000. <https://doi.org/10.1016/j.compedu.2020.104000>
73. Zheng, C., Liang, J. C., Li, M., & Tsai, C. C. (2018). The relationship between EFL learners' self-efficacy and their perceptions of mobile-assisted language learning. *System*, 76, 207–217.