



INTERNATIONAL JOURNAL OF
EDUCATION, PSYCHOLOGY
AND COUNSELLING
(IJEPC)

<https://gaexcellence.com/ijepc>



**PERCEPTIONS AND PREFERENCES TOWARDS
TECHNOLOGY-ASSISTED (AI, VR, AND MOBILE)
ENGLISH LANGUAGE LEARNING FROM THE
PERSPECTIVE OF ESL PRE-SERVICE FLIGHT
ATTENDANTS**

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Article Info:

Article history:

Received date: 15.01.2026

Revised date: 12.02.2026

Accepted date: 26.03.2026

Published date: 31.03.2026

To cite this document:

Yu, C., & Mat Said, S. (2026). Perceptions and Preferences Towards Technology-Assisted (AI, VR, and Mobile) English Language Learning from the Perspective of ESL Pre-service Flight Attendants. *International Journal of Education, Psychology and Counselling*, 11(62), 1744-1766.

Abstract:

This study examined ESL pre-service flight attendants' perceptions of AI-, VR-, and mobile-assisted English language learning, as well as their preferred learning mode and the factors influencing that preference. A quantitative cross-sectional survey was conducted with 60 pre-service flight attendant students at a vocational college in China, and the data were analyzed using descriptive statistics. The findings showed that the participants held generally positive perceptions of all three technology-assisted learning modes, although each mode was valued for different reasons. AI-assisted English learning was viewed most positively in relation to immediate feedback, efficiency, and speaking support. VR-assisted English learning was more strongly associated with realism, immersion, and future professional communication. Mobile-assisted English learning received the highest overall evaluation and emerged as the most preferred mode because of its convenience, accessibility, and ease of regular use. The findings suggest that ESL pre-service flight attendants do not perceive these technologies as interchangeable, but rather associate them with different learning functions in vocational English learning contexts.

DOI: 10.35631/IJEPC.1162101 **Keywords:**

AI-Assisted Language Learning; VR-Assisted Language Learning; Mobile-Assisted Language Learning; ESL Learners; Learner Perceptions; Learner Preferences; Pre-Service Flight Attendants



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Introduction

Technology-assisted language learning has become a major part of contemporary English education because it extends practice beyond teacher-led classrooms and supports more flexible, continuous engagement with English. Current scholarship increasingly distinguishes among specific technological modes rather than treating digital learning as a single category (Okumuş Dağdeler, 2023). Within this broader academic tradition, the present study may also be situated in relation to Computer-Assisted Language Learning (CALL), while retaining the wider term technology-assisted language learning to better reflect its comparative focus on AI-, VR-, and mobile-assisted English learning modes. Within this broader landscape, mobile-assisted language learning remains especially prominent because of its connection to smartphone use, portability, and ubiquitous access to learning resources (Karakaya & Bozkurt, 2022). Among the most visible directions are AI-assisted, VR-assisted, and mobile-assisted English language learning. These modes offer different kinds of support: AI is commonly linked to immediate feedback, adaptive responses, and conversational practice (Du & Daniel, 2024; Lai & Lee, 2024); VR is associated with immersion, presence, and context-rich communication (Parmaxi, 2023; Hua & Wang, 2023); and mobile learning is valued for portability, convenience, learner autonomy, and sustained practice in everyday settings (Burston, 2015; Karakaya & Bozkurt, 2022; Metruk, 2024). Learners therefore may not regard these technologies as interchangeable. Their judgments are also shaped by whether the tools are perceived as useful, trustworthy, and aligned with learning goals (An et al., 2023). These distinctions are particularly relevant in professionally oriented English-learning contexts. Pre-service flight attendants need English for service interaction, listening and speaking, pronunciation, vocabulary, and context-sensitive communication in aviation-related settings rather than for general academic purposes alone (Supriadi & Purbani, 2019; Taghipour et al., 2020). Task-based needs analysis further shows that flight attendant work involves multiple authentic communicative tasks and specific occupational language demands (Keller & Gilabert, 2023). This means that a digital tool may be valued not only for accessibility or enjoyment, but for how well it appears to support profession-related communication. Despite growing research on technology-assisted language learning, three gaps remain. First, many studies examine only one technological mode at a time. Second, much of the literature focuses on general student populations. Third, there is still limited evidence on how pre-service flight attendants perceive AI-, VR-, and mobile-assisted English learning comparatively, which mode they prefer, and what factors shape those preferences. This study addresses that gap by

examining ESL pre-service flight attendants' perceptions of these three modes and their preferred learning choices.

Literature Review

Technology-Assisted Language Learning in ESL Contexts

Technology-assisted language learning has become an important part of contemporary English language education, particularly because it expands learning opportunities beyond teacher-led classroom instruction. Recent review work shows that digital language learning research has moved away from treating technology as a single broad category and has increasingly focused on how different technological modes support different kinds of learner experience and language outcomes (Okumuş Dağdeler, 2023). In current ESL and EFL contexts, digital tools are often valued not only for content delivery but also for their capacity to increase access, practice frequency, and learner autonomy. This is especially relevant in language learning, where repeated exposure, flexible participation, and out-of-class engagement can strongly influence development over time (Burston, 2015; Karakaya & Bozkurt, 2022).

At the same time, technology-assisted language learning is no longer dominated by a single mode. AI-assisted tools, virtual reality environments, and mobile-assisted learning now represent three visible yet distinct directions in the field. They differ not only in technical design but also in the kinds of language learning experiences they tend to promote, such as automated feedback, immersive simulation, or portable self-study (Du & Daniel, 2024; Parmaxi, 2023; Metruk, 2024). This distinction matters because learners may not respond to all digital tools in the same way. Their perceptions and preferences are likely to depend on whether a particular technology is seen as useful, manageable, relevant, or suitable for their own learning goals. For that reason, recent technology-related language learning research increasingly pays attention not only to achievement outcomes, but also to acceptance, experience, and perceived value from the learner perspective (An et al., 2023; Vieriu et al., 2025).

AI-Assisted Language Learning

AI-assisted language learning has expanded rapidly in recent years, especially with the emergence of chatbots, generative AI tools, and conversational systems that allow learners to interact with English in more immediate and personalized ways. Recent review studies indicate that AI is no longer a marginal topic in language education research, but a fast-growing area with particular relevance to English learning and speaking practice (Du & Daniel, 2024; Lai & Lee, 2024). One reason for this growth is that AI tools can provide immediate responses and repeated practice opportunities without the time constraints of classroom interaction. Review evidence suggests that AI-powered chatbots can support speaking-related outcomes such as confidence, engagement, and reduced anxiety, while also increasing opportunities for low-pressure interaction in English (Du & Daniel, 2024).

Recent synthesis research also suggests that AI-supported language learning may influence not only performance but also emotional and motivational dimensions of learning. Wu's meta-analysis reported that AI-assisted language learning outcomes are shaped by contextual and social-emotional moderators, which implies that learner response to AI depends partly on how

the tool is experienced, not only on what it technically does (Wu, 2024). Learner perception studies further show that acceptance of AI is not determined by convenience alone. An et al. (2023) found that students' perceptions of AI-assisted language learning are shaped by technological, motivational, and social factors, suggesting that learners evaluate AI through a broader lens of trust, usefulness, and learning fit. At the same time, recent work has also identified learner concerns. Research on students' perceptions of generative AI in language-related tasks shows that some learners value AI support but also worry about dependence, reduced original effort, or possible weakening of genuine skill development (Nelson et al., 2025; Chen, 2025).

This tension is important for the present study. Learners may prefer AI because it is efficient, responsive, and easy to access, but they may also question whether it supports the kind of practical communicative ability they want to build. As a result, AI should not be assumed to be automatically preferred simply because it is currently prominent or technologically advanced (An et al., 2023; Du & Daniel, 2024).

Virtual Reality-Assisted Language Learning

VR-assisted language learning is often discussed in relation to immersion, presence, and contextualized communication. Unlike many conventional digital tools, VR allows learners to engage with language inside simulated environments where interaction is tied to space, action, and role-based participation. For this reason, VR has frequently been presented as a promising tool for communicative and scenario-based language learning (Parmaxi, 2023).

Systematic and follow-up review studies consistently suggest that VR can increase engagement and create more vivid communicative experiences than traditional screen-based learning. Hua and Wang (2023) found that recent VR language learning studies placed strong emphasis on speaking, interaction, and learner experience, while also showing that motivational benefits were among the most frequently reported outcomes. However, the literature also shows that immersion alone does not guarantee strong language gains. Review evidence indicates that the value of VR depends heavily on task design, pedagogical integration, and the extent to which the virtual environment is tied to meaningful communication goals rather than mere novelty (Parmaxi, 2023; Esteves et al., 2023).

Recent work on immersive VR English learning applications has also focused on design recommendations, which suggests that researchers increasingly recognize that VR effectiveness depends on how the environment is structured for interaction, not simply on the presence of virtual space itself (Esteves et al., 2023). This makes VR especially relevant to learners who need contextualized communication practice. Because VR can simulate service scenarios and situational interaction, it may be particularly attractive to learners preparing for professions in which communication occurs in dynamic, role-bound environments. In such cases, learners may perceive VR as useful less because it is entertaining and more because it appears to resemble real-world communication tasks (Hua & Wang, 2023). At the same time, practical constraints remain an important part of the VR literature. Cost, equipment availability, technical barriers, and ease of regular use are recurring concerns, which means that learners may admire VR's realism while still preferring a more accessible tool for routine study (Parmaxi, 2023).

Mobile-Assisted Language Learning

Mobile-assisted language learning remains one of the most established branches of technology-assisted language learning. Although it is less novel than AI or VR, it continues to be important because it enables flexible, portable, and often low-barrier engagement with language learning tasks (Burston, 2015).

Recent bibliometric and review research confirms that MALL is still a highly active field. Karakaya and Bozkurt (2022) identified themes such as learner empowerment, ubiquitous access, and educational flexibility as central patterns in contemporary MALL research. Their findings suggest that mobile learning is valued not only because it is convenient, but because it supports sustained learning across settings and times of day. MALL is also important because it helps bridge formal and informal learning. Learners can revisit content, practice in short intervals, and integrate English learning into daily routines without needing specialized hardware or fixed study environments. This makes mobile learning especially relevant for learners who need ongoing practice but may not always have the time or conditions for extended study sessions (Karakaya & Bozkurt, 2022). Recent reviews suggest that MALL research now goes beyond general access issues and increasingly addresses specific language skills. For example, Metruk (2024) showed that mobile-assisted pronunciation instruction has become a meaningful area of research, particularly because mobile tools allow repeated and individualized pronunciation practice. Other recent studies similarly indicate that mobile learning can support oral and listening-related development. Empirical work on mobile applications has reported gains in areas such as listening comprehension and pronunciation practice, suggesting that MALL can contribute not only to passive review but also to performance-oriented language learning (Khalil, 2022; Tuong, 2024).

Even so, MALL does not offer the same type of interactivity as AI chatbots or the same degree of immersion as VR. Its value is often grounded more in manageability and continuity than in simulation or intelligent feedback. For that reason, learners may prefer mobile learning not because it is the most advanced mode, but because it is the easiest to sustain over time (Burston, 2015; Metruk, 2024).

English Learning Needs of Pre-Service Flight Attendants

Pre-service flight attendants are a meaningful group for this study because their English learning needs are occupationally specific rather than purely general or academic. Existing needs-analysis work suggests that learners preparing for cabin crew roles require English for service interaction, task-based communication, listening under pressure, and context-sensitive spoken response (Supriadi & Purbani, 2019; Taghipour et al., 2020). Research in this area consistently shows that communicative competence is central. Taghipour et al. (2020) reported that pre-service cabin crew learners and teachers identified vocabulary, pronunciation, listening, and speaking as major priorities, which indicates that profession-related English preparation must go beyond general grammar-based instruction. Curriculum-oriented work has reached a similar conclusion. Kaya (2021) argued that vocational English design for cabin services students should be grounded in actual learner needs, which reinforces the value of studying technology preferences through a professional-communication lens rather than through general learner attitudes alone. Task-based research also supports the importance of authentic communicative demands in this field. Keller and Gilabert (2023) showed that flight attendant work involves multiple task types and destination-specific communication demands,

which suggests that learners preparing for this profession may pay particular attention to whether a learning tool feels transferable to real interaction. Related aviation English research further highlights the importance of speaking and listening in realistic service contexts. Arslan (2021) emphasized authenticity in aviation language testing for flight attendants, underlining the need to align language tasks with target workplace communication. This matters for the present study because learners may judge AI, VR, and MALL partly in terms of how closely each one seems to support real communicative demands (Arslan, 2021).

Taken together, these studies suggest that pre-service flight attendants may not choose a digital learning mode simply because it is easy or fashionable. Instead, they may evaluate it according to whether it supports correction, scenario realism, repeated practice, or profession-related communication needs. This makes them a particularly suitable group for a preference-based comparison across AI, VR, and mobile-assisted English learning (Keller & Gilabert, 2023; Taghipour et al., 2020).

Research Gap

The literature clearly shows that AI, VR, and MALL each have recognized strengths in English language learning. AI is frequently associated with responsiveness, feedback, and personalization; VR with immersion and contextualized interaction; and MALL with portability, continuity, and low-barrier access (Du & Daniel, 2024; Parmaxi, 2023; Karakaya & Bozkurt, 2022).

However, most existing studies examine these modes separately rather than comparing them within the same learner population. This means that there is still limited evidence on how learners weigh these technologies against one another when making actual preference judgments (Lai & Lee, 2024; Hua & Wang, 2023). A second limitation is that much of the literature focuses on general student populations in school or university settings. Comparatively less attention has been given to learners in clearly occupational or pre-professional English-learning contexts, where technology may be evaluated in more functional and profession-oriented ways (Kaya, 2021; Keller & Gilabert, 2023). A third gap is that, although previous needs-analysis studies have established that pre-service flight attendants have distinctive communication needs, there is still little research on how this group perceives different technology-assisted English learning modes, which mode they prefer, and what factors shape that preference. The present study addresses that gap by comparing perceptions and preferences across AI-, VR-, and mobile-assisted English language learning within a single pre-service flight attendant population (Supriadi & Purbani, 2019; Taghipour et al., 2020).

Method

Research Design

This study employed a quantitative cross-sectional survey design to examine ESL pre-service flight attendants' perceptions of AI-, VR-, and mobile-assisted English language learning, as well as their preferred learning mode and the factors shaping that preference. A questionnaire-based approach was selected because it allowed the collection of structured and comparable responses from a defined learner group across the three technology-assisted English learning modes within a single investigation. Data were collected at one point in time rather than across multiple stages, making the design appropriate for identifying general patterns in learners'

perceptions, preferences, and influencing factors rather than changes over time. Data were collected through a structured online questionnaire developed for this study. The instrument included items on participants' demographic background, their perceptions of AI-, VR-, and mobile-assisted English language learning, their preferred learning mode, and the factors influencing that preference. The questionnaire contained seven sections: demographic information; perception items for AI-assisted, VR-assisted, and mobile-assisted English language learning; a preferred learning mode section; a section on reasons shaping preference; and two brief open-ended questions for supplementary comments. Most perception items used a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), while the two open-ended items were retained only to provide brief explanatory support and were not treated as a separate qualitative dataset. To support content validity, the questionnaire was reviewed by three specialists in TESL, applied linguistics, ESP, and technology-assisted language learning, and minor revisions were made to improve clarity and reduce overlap. A pilot test was then conducted with 10 students from a similar vocational English-learning background. Following the pilot, further minor revisions were made, and the internal consistency results showed acceptable reliability across the main perception sections: AI-assisted English language learning ($\alpha = .81$), VR-assisted English language learning ($\alpha = .84$), and mobile-assisted English language learning ($\alpha = .79$), with an overall reliability of $\alpha = .86$.

Research Samples

The study was conducted at a vocational college in China involving students enrolled in a flight attendant program. The specific institution is not identified in order to preserve institutional anonymity. The target population consisted of pre-service flight attendant students preparing for internship placement and future entry into airline-related service contexts. Purposive sampling was employed to recruit participants who met the study criteria. To be included, participants had to be enrolled in a pre-service flight attendant or air service program, be ESL learners studying English as part of their professional preparation, and be in the final stage of study prior to internship placement. A total of 65 questionnaires were distributed online, 62 were returned, and 60 valid responses were retained for analysis after excluding two incomplete responses with substantial missing data. The participants were mainly between 21 and 23 years old and were in the final year of their vocational training. Most described themselves as having an intermediate level of English, and the gender distribution reflected the profile of the training program, with approximately one male participant for every three female participants.

Research Analysis

The questionnaire was administered online in December 2025 through a WeChat-based questionnaire form distributed through student communication channels associated with the program. Participants completed the questionnaire independently over a period of approximately two weeks. Participation was voluntary, informed consent was obtained prior to completion, and no personally identifying information was collected. All returned questionnaires were screened for completeness, and only valid responses were retained for the final dataset. The quantitative data were analyzed using descriptive statistics. Frequencies and percentages were used to summarize participants' demographic characteristics, prior exposure to AI-, VR-, and mobile-assisted English learning, preferred learning modes, and the reasons shaping those preferences. Means and standard deviations were calculated for the Likert-scale perception items in order to examine participants' views of the three learning modes across dimensions such as usefulness, interactivity, realism, flexibility, convenience, and professional

relevance. For presentation purposes, the results were organized into comparative tables showing the mean scores for AI-, VR-, and mobile-assisted English language learning across key dimensions. In addition, the responses to the two open-ended questions were reviewed and grouped into recurring categories such as convenience, immediate feedback, realism, flexibility, motivation, and support for future professional communication. These responses were used only as supplementary explanatory comments to enrich the interpretation of the quantitative findings and were not treated as a separate qualitative strand of analysis. Ethical considerations were observed throughout the study. All responses were treated confidentially and were used solely for research purposes. Because the study focused on learners' perceptions and preferences and did not involve sensitive personal or medical data, the level of risk to participants was minimal.

Results

Participant Profile

A total of 60 valid questionnaires were included in the final analysis. All participants were pre-service flight attendant students enrolled in a cabin crew-related program at a vocational college in China. They were in the final stage of their training and were preparing for internship placement. In terms of age, the participants were mainly between 21 and 23 years old. Most participants rated their English proficiency as intermediate. The gender distribution reflected the profile of the program, with female students outnumbering male students by approximately three to one. Table 1 presents the demographic profile of the participants and outlines the overall characteristics of the surveyed pre-service flight attendant students.

Table 1: Demographic Profile of Participants

Variable	Category	Frequency (n)	Percentage (%)
Age	21-23 years old	60	100.0
Gender	Male	15	25.0
Gender	Female	45	75.0
Training stage	Final-year students	60	100.0
English proficiency	Intermediate	42	70.0
English proficiency	Elementary	10	16.7
English proficiency	Upper-intermediate	8	13.3

Prior Exposure to AI-, VR-, and Mobile-Assisted English Learning

The results showed that participants had differing levels of prior exposure to the three technology-assisted learning modes. Mobile-assisted English learning was the most familiar mode, with nearly all participants reporting prior experience. AI-assisted English learning was also relatively common, although slightly less familiar than mobile learning. By contrast, VR-assisted English learning was the least experienced mode among the participants. This pattern suggests that accessibility and prior exposure may have played an important role in shaping participants' evaluations of the three learning modes. Since mobile devices are already integrated into students' daily learning routines, mobile-assisted English learning may have been perceived as more practical and familiar. In contrast, the lower level of experience with VR may have influenced how participants viewed its usefulness and accessibility for regular English learning. Participants reported different levels of prior exposure to AI-, VR-, and mobile-assisted English learning, as summarized in Table 2.

Table 2: Participants' Prior Exposure To AI-, VR-, And Mobile-Assisted English Learning

Learning Mode	Yes (n)	Yes (%)	No (n)	No (%)
AI-assisted English learning	41	68.3	19	31.7
VR-assisted English learning	18	30.0	42	70.0
Mobile-assisted English learning	56	93.3	4	6.7

Perceptions of AI-Assisted English Language Learning

The results indicated that participants generally held positive perceptions of AI-assisted English language learning. The overall mean score for the AI section was 4.06, indicating a high level of agreement. Among the AI-related items, the highest mean scores were found for the statements that AI-assisted tools could provide useful and immediate feedback ($M = 4.32$, $SD = 0.63$), that AI-assisted English learning was convenient for daily study ($M = 4.27$, $SD = 0.68$), and that AI-assisted tools could help learners practice English more efficiently ($M = 4.18$, $SD = 0.71$). Items related to speaking support and interactivity also received relatively high mean scores, suggesting that participants did not view AI only as a general support tool but also as useful for practical English learning. The item on confidence support received a slightly lower mean score ($M = 3.82$, $SD = 0.81$), indicating that although participants generally valued AI, they were somewhat less certain about its role in increasing their confidence when practicing English. The item on willingness to use AI regularly also remained high ($M = 4.05$, $SD = 0.77$), showing that participants were generally open to continued use of AI-assisted English learning. Participants generally expressed positive perceptions of AI-assisted English language learning across the measured items, as indicated in Table 3.

Table 3: Perceptions of AI-Assisted English Language Learning

Item Code	Item Summary	Mean	SD	Interpretation
B1	Practice English more efficiently	4.18	0.71	High
B2	Provides immediate feedback	4.32	0.63	Very high
B3	Convenient for daily study	4.27	0.68	Very high
B4	Supports speaking practice	4.09	0.72	High
B5	Makes learning interactive	4.03	0.76	High
B6	Increases confidence	3.82	0.81	High
B7	Relevant to future communication needs	4.01	0.74	High
B8	Easy to use	4.11	0.69	High
B9	Willing to use regularly	4.05	0.77	High
B10	Valuable support tool	4.07	0.70	High
	Overall AI mean	4.06	0.72	High

Perceptions of VR-Assisted English Language Learning

Participants also showed positive perceptions of VR-assisted English language learning, with an overall mean score of 4.02. The highest-rated items in this section were related to realism, immersion, and profession-related communication. In particular, the items stating that VR created a more realistic learning environment ($M = 4.31$, $SD = 0.65$), that it made English learning more immersive than traditional methods ($M = 4.24$, $SD = 0.69$), and that it was useful for future workplace communication ($M = 4.20$, $SD = 0.67$) received the strongest agreement. These results suggest that participants associated VR most strongly with contextualized and profession-oriented communication practice. Items relating to engagement and motivation were also rated highly, which indicates that VR was viewed as an appealing and stimulating mode of English learning. However, the item on personal interest in using VR received a slightly lower score than the realism-related items ($M = 3.78$, $SD = 0.88$), which may reflect more limited prior exposure or uncertainty about regular access to VR-based learning environments. Table 4 indicates that participants also reported positive perceptions of VR-assisted English language learning, particularly in relation to realism and immersion.

Table 4: Perceptions of VR-Assisted English Language Learning

Item Code	Item Summary	Mean	SD	Interpretation
C1	Creates a realistic learning environment	4.31	0.65	Very high
C2	Supports situational or role-based practice	4.15	0.72	High

C3	Makes learning engaging	4.10	0.75	High
C4	Supports speaking development	3.98	0.79	High
C5	Clarifies real communication situations	4.06	0.73	High
C6	Useful for future workplace communication	4.20	0.67	High
C7	More immersive than traditional methods	4.24	0.69	Very high
C8	Interested in using VR	3.78	0.88	High
C9	Increases motivation	4.03	0.76	High
C10	Effective in profession-related contexts	4.12	0.71	High
	Overall VR mean	4.02	0.74	High

Perceptions of Mobile-Assisted English Language Learning

Participants reported the most positive overall perception for mobile-assisted English language learning, with an overall mean score of 4.19. The strongest agreement was found for items related to convenience, accessibility, and ease of integration into daily routines. The item stating that mobile-assisted English learning was convenient for everyday study received the highest mean score in this section ($M = 4.48$, $SD = 0.58$), followed by the item stating that mobile devices could be used anytime and anywhere ($M = 4.45$, $SD = 0.61$), and the item stating that mobile learning fit easily into daily routines ($M = 4.36$, $SD = 0.64$). These results indicate that participants perceived mobile-assisted English learning as the most practical and sustainable option for regular English study. Other items, such as support for self-directed learning and repeated English practice, also received high mean scores, showing that participants associated mobile learning not only with convenience but also with continuity and autonomy in language learning. Mobile-assisted English language learning received consistently positive ratings across items related to convenience, accessibility, and regular use, as reported in Table 5.

Table 5: Perceptions of Mobile-Assisted English Language Learning

Item Code	Item Summary	Mean	SD	Interpretation
D1	Convenient for everyday study	4.48	0.58	Very high
D2	Can be used anytime and anywhere	4.45	0.61	Very high
D3	Helps regular English study	4.21	0.66	Very high
D4	Useful for repeated practice	4.17	0.69	High
D5	Supports self-directed learning	4.16	0.70	High
D6	Practical for listening and speaking	4.03	0.74	High

D7	Fits daily routine easily	4.36	0.64	Very high
D8	Easy to use	4.28	0.62	Very high
D9	Willing to continue using it	4.15	0.71	High
D10	Effective support tool	4.08	0.68	High
	Overall Mobile mean	4.19	0.66	High

Figure 1 compares the overall mean perception scores for the three learning modes and shows that mobile-assisted English learning received the highest mean score.

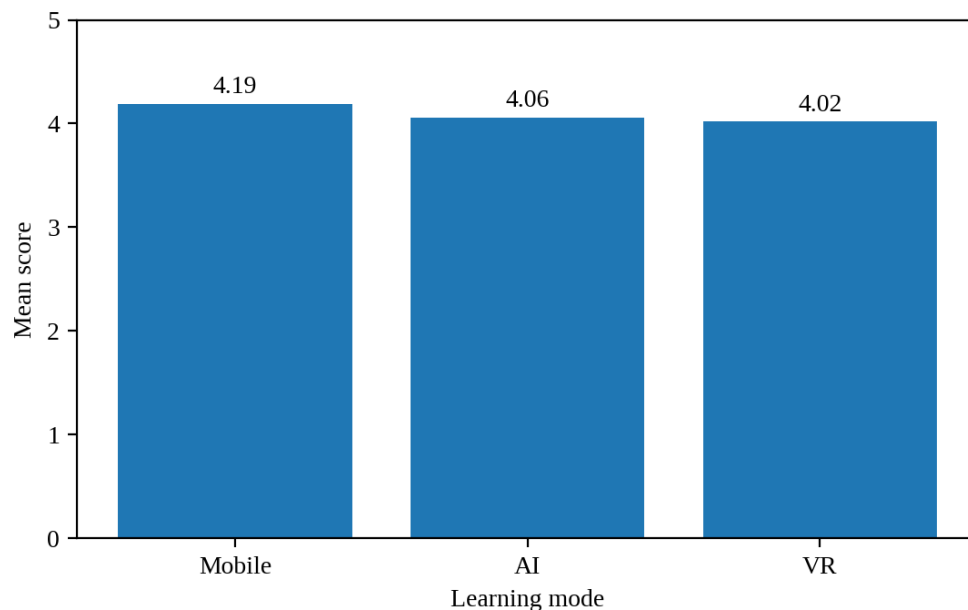


Figure 1: Overall Mean Perception Scores

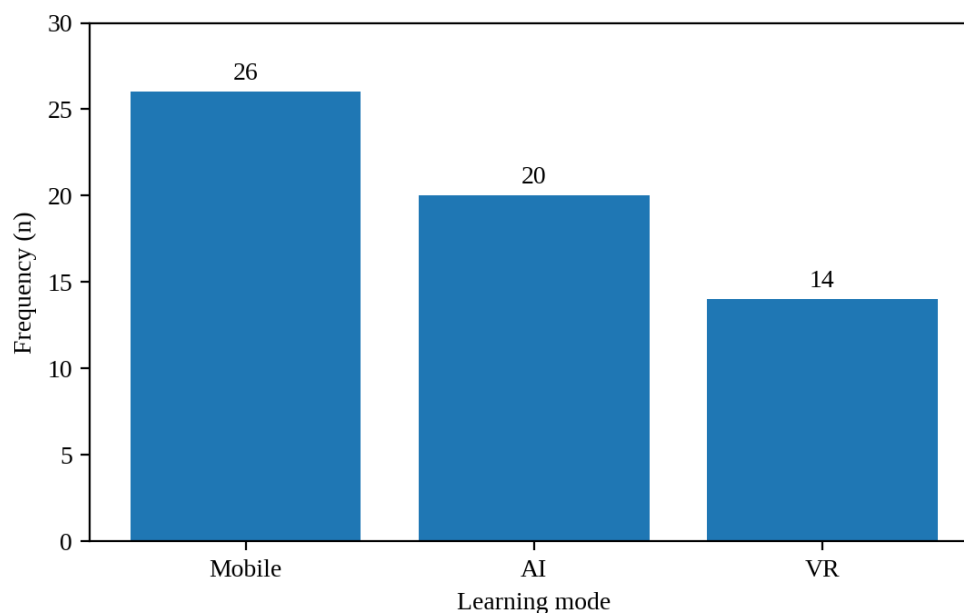
Comparative Perceptions Across the Three Learning Modes

A comparison of the overall mean scores showed that participants held positive perceptions of all three technology-assisted English learning modes. However, mobile-assisted English learning received the highest overall mean score ($M = 4.19$, $SD = 0.66$), followed by AI-assisted English learning ($M = 4.06$, $SD = 0.72$), and VR-assisted English language learning ($M = 4.02$, $SD = 0.74$). Although the differences were not large, the pattern suggests that participants viewed mobile-assisted English learning slightly more positively than the other two modes overall. AI-assisted learning appeared to be particularly valued for feedback and efficiency, while VR-assisted learning appeared to be especially valued for realism and immersion. In contrast, mobile-assisted learning stood out most clearly in relation to convenience, accessibility, and regular use. A comparison of overall mean scores is provided in Table 6, showing that participants viewed all three learning modes positively, although mobile-assisted learning was rated slightly higher overall.

Table 6: Comparison of Overall Mean Scores Across AI-, VR-, and Mobile-Assisted English Learning

Learning Mode	Overall Mean	SD	Rank
Mobile-assisted English learning	4.19	0.66	1
AI-assisted English learning	4.06	0.72	2
VR-assisted English learning	4.02	0.74	3

As reflected in Figure 2, mobile-assisted English learning was selected most frequently as the preferred learning mode, followed by AI-assisted and VR-assisted learning.

**Figure 2: Preferred Learning Mode (n)**

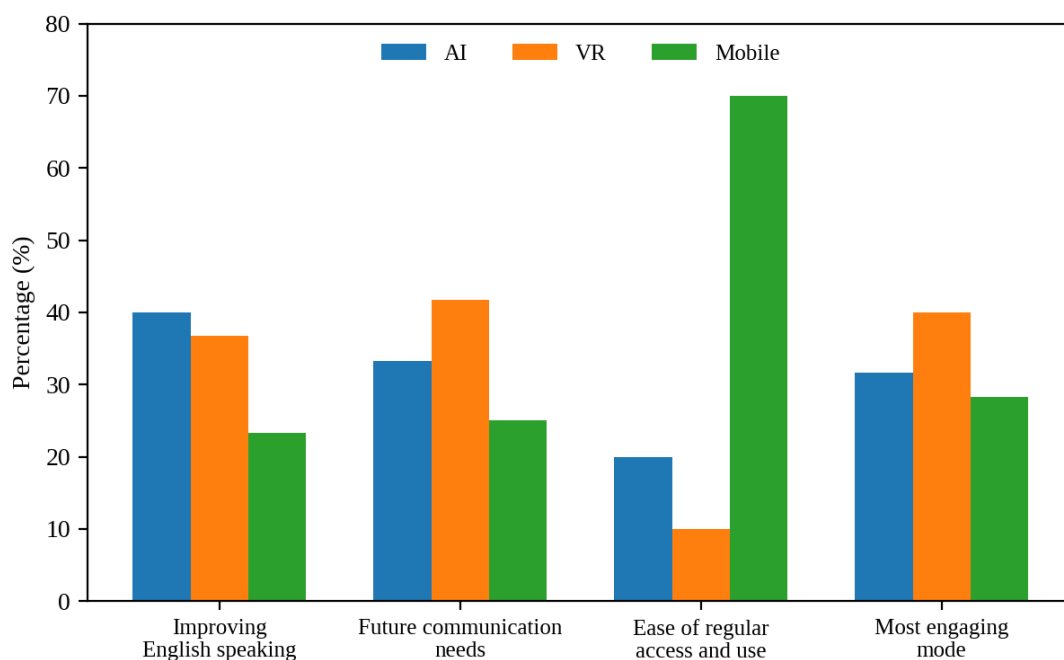
Preferred Learning Mode

When participants were asked to identify their most preferred mode of English learning, mobile-assisted English learning emerged as the most preferred option, selected by 26 participants (43.3%). AI-assisted English learning was the second most preferred mode, selected by 20 participants (33.3%), while VR-assisted English learning was chosen by 14 participants (23.3%). This result is broadly consistent with the comparative perception findings. While participants expressed positive views toward all three learning modes, mobile-assisted English learning appeared to be the most favored overall. This suggests that perceived practicality and daily usability may have played an important role in learners' final preference choices. Participants' preferred learning mode was not evenly distributed across the three options, as seen in Table 7.

Table 7: Preferred Learning Mode for English Learning

Learning Mode	Frequency (n)	Percentage (%)	Rank
Mobile-assisted English learning	26	43.3	1
AI-assisted English learning	20	33.3	2
VR-assisted English learning	14	23.3	3

Figure 3 further illustrates that participants' highest preferences varied according to the specific purpose of English learning.

**Figure 3: Highest Preference by Purpose (%)**

Preferred Mode by Specific Learning Purpose

Participants' preferences varied depending on the specific learning purpose. For improving English speaking, AI-assisted English learning was selected most frequently ($n = 24$, 40.0%), followed by VR-assisted learning ($n = 22$, 36.7%) and mobile-assisted learning ($n = 14$, 23.3%). This suggests that participants associated AI particularly strongly with interactive practice and feedback for speaking development. For future communication needs as pre-service flight attendants, VR-assisted English learning received the highest number of selections ($n = 25$, 41.7%), followed by AI-assisted learning ($n = 20$, 33.3%) and mobile-assisted learning ($n = 15$, 25.0%). This indicates that participants viewed VR as especially relevant to profession-related and situational communication. For ease of regular access and use, mobile-assisted English learning was clearly dominant ($n = 42$, 70.0%), far exceeding AI-assisted learning ($n = 12$, 20.0%) and VR-assisted learning ($n = 6$, 10.0%). A similar pattern appeared for engagement, although the difference was smaller: VR-assisted learning was selected by 24 participants (40.0%), AI-assisted learning by 19 participants (31.7%), and mobile-assisted learning by 17 participants (28.3%). These results indicate that participants did not evaluate the three learning

modes in exactly the same way across all learning purposes. Instead, different technologies were preferred for different functions. This variation becomes clearer in Table 8, which shows that different learning modes were preferred for different learning purposes rather than in a uniform way.

Table 8: Preferred Learning Mode by Specific Purpose

Purpose	AI (n/%)	VR (n/%)	Mobile (n/%)	Most Preferred
Improving English speaking	24 (40.0%)	22 (36.7%)	14 (23.3%)	AI
Relevance to future communication needs	20 (33.3%)	25 (41.7%)	15 (25.0%)	VR
Ease of regular access and use	12 (20.0%)	6 (10.0%)	42 (70.0%)	Mobile
Most engaging mode	19 (31.7%)	24 (40.0%)	17 (28.3%)	VR

Factors Shaping Learners' Preferences

The results showed that learners' preferences were shaped by a combination of practical and learning-related factors. The most frequently selected factor was convenience (n = 38, 63.3%), followed by speaking support (n = 34, 56.7%), flexibility (n = 32, 53.3%), professional relevance (n = 31, 51.7%), and immediate feedback (n = 29, 48.3%). Realism (n = 24, 40.0%), motivation (n = 23, 38.3%), and interactivity (n = 21, 35.0%) were also selected by a substantial number of participants. These findings suggest that learners' preferences were not based on enjoyment alone. Practical considerations, such as convenience and flexibility, were highly influential, but factors related to language learning effectiveness and future professional communication were also important. This indicates that participants approached technology-assisted English learning from both an immediate study perspective and a future-oriented professional perspective. When participants were asked to identify the single main reason for their preference, convenience was again the most frequently selected response (n = 16, 26.7%), followed by speaking support (n = 12, 20.0%), professional relevance (n = 10, 16.7%), feedback (n = 8, 13.3%), realism (n = 6, 10.0%), flexibility (n = 5, 8.3%), motivation (n = 2, 3.3%), and other reasons (n = 1, 1.7%). Table 9 shows that learners' preferences were shaped by a combination of practical, linguistic, and profession-related factors.

Table 9: Factors Shaping Learners' Preferences

Factor	Frequency (n)	Percentage (%)
Convenience	38	63.3
Speaking support	34	56.7
Flexibility	32	53.3

Professional relevance	31	51.7
Immediate feedback	29	48.3
Realism	24	40.0
Motivation	23	38.3
Interactivity	21	35.0
Other	4	6.7

The frequency pattern displayed in Figure 4 highlights convenience, speaking support, and flexibility as among the most frequently selected factors shaping learners' preferences.

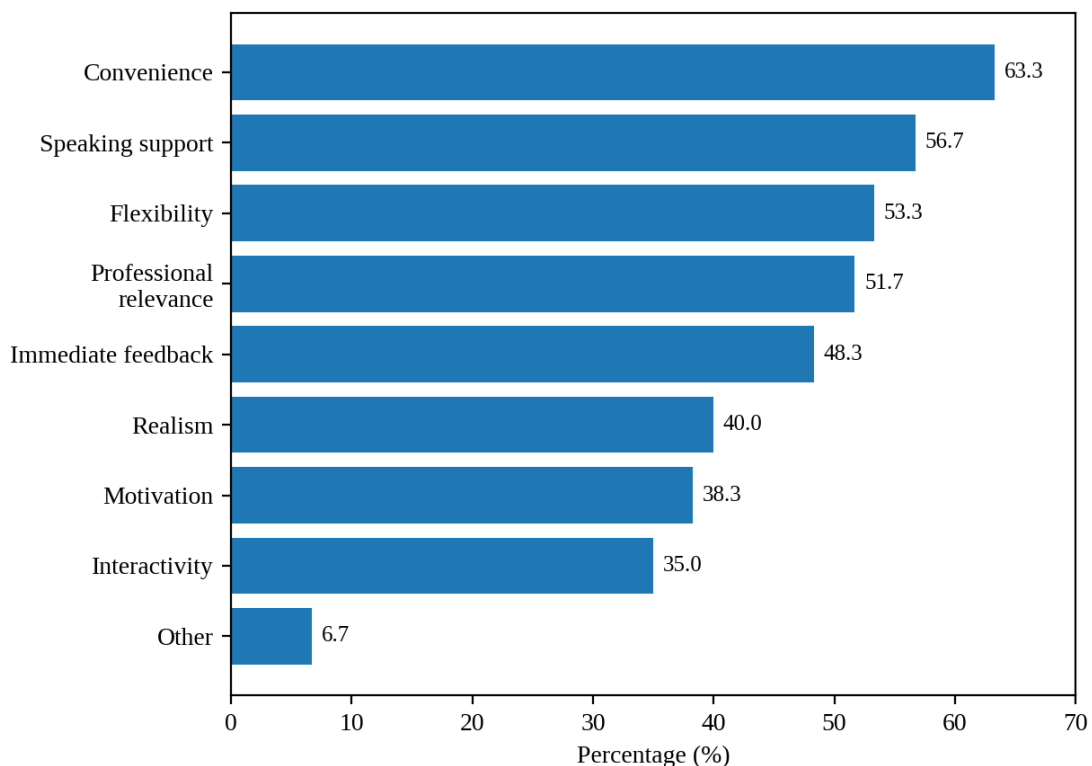


Figure 4: Most Frequently Selected Preference Factors (%)

Convenience emerged as the single most frequently selected main reason for learners' preferred mode, as reported in Table 10.

Table 10: Main Reason for Preferred Learning Mode

Main Reason	Frequency (n)	Percentage (%)
Convenience	16	26.7
Speaking support	12	20.0
Professional relevance	10	16.7

Feedback	8	13.3
Realism	6	10.0
Flexibility	5	8.3
Motivation	2	3.3
Other	1	1.7

Supplementary Open-Ended Responses

The two open-ended questions were reviewed to provide brief supplementary support for the quantitative findings. The responses broadly reflected the same patterns found in the close-ended survey items. Participants who preferred AI-assisted English learning often referred to immediate feedback, fast responses, and efficiency. Participants who preferred VR-assisted English learning tended to emphasize realism, immersion, and future professional communication. Participants who preferred mobile-assisted English learning most often mentioned convenience, flexibility, and everyday usability. Overall, these supplementary comments supported the quantitative results by showing that learners connected AI with feedback and efficiency, VR with realism and professional context, and mobile-assisted learning with convenience and continuity. The supplementary comments in Table 11 provide qualitative support for the main quantitative patterns identified in the survey.

Table 11: Illustrative Supplementary Comments

Theme	Illustrative response
AI	"AI helps me get answers quickly and practice English more efficiently."
AI	"It can correct mistakes immediately."
VR	"VR feels more like a real working situation."
VR	"It helps me imagine how to communicate with passengers in the future."
Mobile	"It is easy to use every day."
Mobile	"I can practice English anytime."

Discussion

A central pattern emerging from the study is that ESL pre-service flight attendants perceived all three technology-assisted learning modes positively but did not value them in the same way. Rather than identifying one clearly superior mode, the participants appeared to associate each technology with a different kind of learning advantage. Mobile-assisted English learning was evaluated most positively overall, which points to the importance of convenience, accessibility, and continuity in everyday study. At the same time, the data show that AI-assisted English learning and VR-assisted English learning held distinctive value profiles that were not fully

captured by overall preference alone. This is an important point because it suggests that learner judgment in technology-assisted English learning is better understood as differentiated rather than uniform. In other words, the three modes were not functioning as interchangeable tools, but as different resources that learners connected to different purposes within the same learning context. This differentiated pattern aligns with the broader literature reviewed in the study. Recent work has increasingly moved away from treating technology-assisted language learning as a single broad category and has instead emphasized the distinct affordances of specific technological modes. In this respect, the present findings support the view that learners respond not only to the presence of technology, but also to the particular type of support that each tool appears to offer. For these participants, who were preparing for future flight attendant work, perceived usefulness was linked not only to general study convenience but also to speaking practice, realistic communication, and future professional relevance. The discussion therefore needs to be organized comparatively rather than as three isolated descriptions of AI, VR, and mobile learning.

Differentiated Value Across AI-, VR-, and Mobile-Assisted English Learning

The strongest comparative pattern in the findings concerns the different strengths associated with each learning mode. AI-assisted English learning was most closely connected with immediate feedback, efficiency, and speaking support. This suggests that participants saw AI primarily as a responsive tool for active language practice rather than simply as a general digital resource. This interpretation is consistent with recent research showing that AI-powered language tools, especially chatbots and conversational systems, can support repeated interaction, low-pressure practice, and rapid feedback in speaking-related tasks (Du & Daniel, 2024; Lai & Lee, 2024). The present study extends this line of work by showing that learners themselves recognized these strengths and associated AI particularly strongly with performance-oriented speaking development.

By contrast, VR-assisted English learning was valued less for everyday practicality and more for realism, immersion, and future professional communication. Participants appeared to interpret VR through a transfer-oriented lens: they did not simply see it as engaging, but as closer to the kinds of communication situations they might encounter in future cabin service contexts. This finding resonates with previous research that highlights the role of VR in creating immersive, context-rich, and scenario-based language learning environments (Parmaxi, 2023; Hua & Wang, 2023). At the same time, the present findings also support a more cautious reading of VR. Although it was strongly associated with realism and occupational relevance, it did not emerge as the most preferred overall mode. This suggests that learners may admire VR for its professional simulation value while still recognizing the practical limitations that have also been noted in the literature, such as access, equipment demands, and irregular opportunities for routine use (Parmaxi, 2023; Esteves et al., 2023).

Mobile-assisted English learning, meanwhile, was most strongly associated with convenience, accessibility, and regular use. Its highest overall evaluation suggests that practical usability played a particularly important role in participants' judgments. This finding is highly consistent with the established MALL literature, which has long emphasized portability, flexibility, learner autonomy, and the ability to sustain language learning across daily settings (Burston, 2015; Karakaya & Bozkurt, 2022; Metruk, 2024). What is especially important in the present study is that mobile learning was not only positively evaluated in general but emerged as the most preferred overall mode. This indicates that in a vocational English context, learners may

prioritize a mode that is easy to integrate into daily routines, even when other technologies appear more immersive or more technologically advanced.

Taken together, these findings suggest that the central issue is not which technology is best in absolute terms, but which technology is perceived as most suitable for a particular kind of learning need. AI was associated with responsiveness and speaking-oriented support, VR with immersive and profession-related communication, and mobile learning with practical continuity. This pattern directly addresses the study's comparative focus and helps move the discussion beyond a segmented description of three separate tools.

Preference as a Function-Specific Rather Than Uniform Judgment

A particularly important contribution of the study is that learner preference did not operate as a single fixed judgment. Although mobile-assisted English learning emerged as the most preferred mode overall, participants did not prefer it across all functions. AI-assisted learning was preferred most strongly for improving English speaking, VR-assisted learning for future communication needs and engagement, and mobile-assisted learning for regular access and daily use. This shows that preference was function-specific rather than uniform. Such a pattern is theoretically important because it complicates the common tendency to ask which technology is best for language learning as a whole. The present findings suggest that this question may be too general. A technology that is regarded as most useful for one learning purpose may not be the most useful for another.

This interpretation strengthens a more ecological view of technology-assisted English learning, in which learners evaluate digital tools according to task fit rather than overall prestige or novelty. In the present study, participants did not appear to select one technology as universally superior. Instead, they differentiated among technologies according to the kind of support they needed. Mobile learning was most manageable for sustained practice, AI was more strongly linked to corrective and interactive speaking support, and VR was valued most for helping learners imagine and rehearse future workplace communication. This suggests that a more effective pedagogical response may not be to replace one mode with another, but to align different technologies with different learning purposes.

This function-specific pattern is especially meaningful in the case of pre-service flight attendants. Their English learning needs are not limited to general language improvement, but are closely tied to future spoken interaction, listening, pronunciation, and context-sensitive communication in occupational settings. It is therefore unsurprising that their preferences were differentiated rather than uniform. Learners preparing for such roles may be especially sensitive to whether a technology supports immediate practice, realistic scenarios, or regular exposure. In this sense, the study extends previous needs-analysis work by showing not only what kinds of communication skills matter to this learner group, but also how those needs shape their evaluations of digital learning tools.

Factors Shaping Preference: Practical Usability and Professional Relevance

The factors influencing learner preference further clarify the main pattern of the study. Convenience emerged as the most frequently selected factor, followed by speaking support, flexibility, professional relevance, and immediate feedback. Realism, motivation, and interactivity were also selected by a substantial number of participants. This combination suggests that learners were not choosing among technologies on the basis of enjoyment or

novelty alone. Instead, they appeared to evaluate the three modes according to two overlapping priorities: present-day usability and future communicative value. This dual orientation is significant because it reflects the position of the participants as both current students and future service professionals. As students, they valued convenience, flexibility, and manageable access. As future flight attendants, they also valued speaking support, realism, and professional relevance. The coexistence of these priorities helps explain why no single technology dominated across all dimensions. Mobile learning best addressed continuity and access, AI better addressed immediate speaking-related support, and VR more strongly addressed occupational simulation and future communication needs. The main pattern, therefore, is not that one technology simply outperformed the others, but that different technologies aligned with different priorities inside the same vocational English learning context.

This result is also consistent with previous research on pre-service cabin crew and flight attendants. Studies have shown that this learner group places strong emphasis on spoken interaction, listening, pronunciation, and profession-specific communication (Kaya, 2021; Keller & Gilabert, 2023; Taghipour et al., 2020). The present study extends that literature by suggesting that these needs shape not only curriculum priorities, but also learner evaluations of digital tools. In this sense, technology preference is not merely a matter of personal liking. It is also a reflection of how learners imagine the relationship between current study practices and future communicative demands.

Overall, the discussion points to a coherent comparative conclusion. ESL pre-service flight attendants perceived AI-, VR-, and mobile-assisted English learning positively, but attached different meanings and functions to each mode. Mobile-assisted learning was preferred for practicality and continuity, AI-assisted learning for immediate feedback and speaking support, and VR-assisted learning for immersive and profession-oriented communication. The study therefore supports a complementary rather than competitive view of technology-assisted English learning, especially in vocational and aviation-related contexts where learners may need different tools for different purposes.

Conclusion

This study examined ESL pre-service flight attendants' perceptions of AI-, VR-, and mobile-assisted English language learning, together with their preferred learning mode and the factors shaping that preference. The findings showed that the participants viewed all three modes positively, but not as interchangeable options. Rather, each mode was associated with a different area of value: AI-assisted learning with immediate feedback, efficiency, and speaking support; VR-assisted learning with realism, immersion, and future professional communication; and mobile-assisted learning with convenience, accessibility, and regular use. Although mobile-assisted English learning emerged as the most preferred mode overall, the results also showed that learner preference was function-specific rather than uniform. AI-assisted learning was more strongly preferred for speaking improvement, VR-assisted learning for engagement and future communication needs, and mobile-assisted learning for sustained access and everyday practice. In addition, preference was shaped by both practical and profession-related factors, particularly convenience, speaking support, flexibility, professional relevance, and immediate feedback.

The study contributes to current research by comparing three technology-assisted English learning modes within a single learner group and by focusing on pre-service flight attendants as a profession-oriented ESL population. The findings suggest that technology use in vocational English learning may be more effective when different tools are aligned with different learning purposes rather than treated as equally suitable for all goals. In practical terms, mobile learning may support regular and sustainable English practice, AI may offer useful feedback and speaking-related support, and VR may provide stronger support for situational and profession-related communication. This study is limited by its relatively small sample from a single vocational college and by its reliance on self-reported perceptions and preferences rather than direct measures of language performance. Future research could examine more diverse learner groups and explore how AI-, VR-, and mobile-assisted English learning relate to actual speaking development and profession-related communication performance.

Acknowledgements: The author would like to express sincere gratitude to Universiti Teknologi Malaysia (UTM) for the academic support provided throughout the course of this research. Special appreciation is also extended to the supervisor for the valuable guidance, constructive feedback, and continuous encouragement that greatly contributed to the completion of this paper.

Funding Statement: No Funding

Conflict of Interest Statement: The authors declare that there is no conflict of interest regarding the publication of this paper. All authors have contributed to this work and approved the final version of the manuscript for submission to the International Journal of Education, Psychology and Counselling (IJEPC)

Ethics Statement: This study was conducted in accordance with accepted ethical research standards. All procedures involving human participants were carried out with informed consent prior to data collection. Participation was voluntary, and respondents were assured of confidentiality and anonymity. The data collected were used solely for academic purposes.

Author Contribution Statement: Both authors contributed significantly to the development of this manuscript. Both were responsible for the conceptualization, methodology, and overall supervision of the study. Both handled data collection, analysis, and interpretation of results, contributed to the literature review, drafting, and critical revision of the manuscript. Both authors read and approved the final version of the manuscript prior to submission.

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