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Learner Perspectives on Artificial Intelligence-Supported Feedback in Thai as a Foreign Language Learning: A Q Methodology Study

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ABSTRACT

This study examines how Chinese university students learning Thai as a foreign language interpret artificial intelligence (AI)-supported feedback. Using Q methodology, 40 learners ranked 42 statements concerning feedback quality, teacher involvement, personalization, and communicative practice. By-person factor analysis identified four perspectives: Human-Centered Traditionalists, Optimistic Tech-Adopters, Guided Personalization Seekers, and Cautious Pragmatists. The perspectives differed in their trust in AI, preference for teacher mediation, and willingness to use AI for writing, grammar, pronunciation, and independent practice. Across factors, learners generally viewed AI as useful when its feedback was clear, contextually appropriate, and supported by human explanation. The findings show that AI-supported feedback should not be implemented as a uniform replacement for teacher feedback. Instead, effective integration requires flexible task design, learner training in critical feedback use, and alignment with communicative and cultural demands. The study offers a learner-centered basis for context-sensitive AI integration in less commonly taught language classrooms.

Keywords: artificial intelligence-supported feedback; second language learning; Thai as a foreign language; learner perspectives; Q methodology

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Introduction

The growing integration of artificial intelligence (AI) into second language (L2) education has increased attention to its role in feedback, interaction, and classroom learning (Wang et al., 2026; Wiboolyasarin et al., 2025a). AI-supported systems, including automated writing evaluation tools and conversational agents, can provide immediate and adaptive responses that extend opportunities for writing, speaking, and revision (Yeh, 2024; Yusuf et al., 2025). Their educational value, however, depends on how learners interpret and use feedback within the broader instructional environment.

Research has largely examined perceived usefulness, satisfaction, and behavioral intention toward AI technologies (Almulla, 2024; Ayanwale & Ndlovu, 2024; Jeong et al., 2024), offering less insight into learners' engagement with AI-generated feedback. In L2 learning, feedback involves more than error correction; it helps learners notice problems, negotiate meaning, revise their output, and develop appropriate language use (Li & Zhang, 2022; Liu & Feng, 2023). Understanding how learners relate AI feedback to teacher guidance and communicative practice is therefore essential.

This issue is especially important for less commonly taught languages (LCTLs). Learners of Thai as a foreign language (TFL) must manage tonal distinctions, a non-alphabetic writing system, and culturally embedded communicative norms. These features may challenge the accuracy, interpretability, and contextual appropriateness of AI-supported feedback (Díaz & Nussbaum, 2024; Mohammed et al., 2025). Moreover, systems trained mainly on high-resource languages may not capture linguistic variation or pragmatic nuance adequately (Barnes et al., 2024; Hortal, 2024).

Learners may therefore adopt different orientations toward AI. Some may value it for independent practice and linguistic accuracy, whereas others may depend more on teacher feedback for explanation, expression, and communicative development (Baralt et al., 2016; Zhang, 2020). These differences suggest that AI-supported feedback cannot be implemented through a uniform instructional approach.

Nevertheless, relatively few studies have examined how learners systematically organize their perspectives toward AI-supported feedback. Existing variable-centered research commonly measures general attitudes or usage patterns (Liu et al., 2024, 2025; Zhang, 2025) but may overlook how learners prioritize different dimensions of feedback. A method that identifies structured configurations of perspectives can therefore provide a more context-sensitive account of learner experience (Buchholtz & Vollstedt, 2024).

To address this gap, the present study uses Q methodology to investigate how Chinese university students learning TFL interpret AI-supported feedback. It identifies shared orientations toward feedback use, teacher involvement, and communicative practice, thereby offering a learner-centered contribution to technology-enhanced language learning and informing context-sensitive classroom and instructional design.

Literature Review

AI-Supported Feedback and Communicative Processes in L2 Learning

Foreign language education increasingly uses digital technologies to support learners' engagement through feedback, interaction, and repeated practice. AI extends these possibilities through automated feedback systems, intelligent tutoring platforms, and conversational agents that provide immediate and adaptive responses (Ericsson & Johansson, 2023; Yeh, 2024). Such tools allow learners to produce language, receive feedback, and revise their output, supporting writing,

speaking, and grammar development (Guo et al., 2024; Wiboolyasarin et al., 2025b; Yuan & Liu, 2025; Zhang, 2025).

Recent research demonstrates that AI-supported language learning includes written corrective feedback, peer feedback, collaborative writing, chatbot-based learning, public-speaking support, and AI-assisted speaking practice (Hou et al., 2024; Isotalus et al., 2024; Jinowat et al., 2024; Wang et al., 2024a; Wiboolyasarin et al., 2024a, 2024b). Its pedagogical value depends on how feedback is integrated into revision, interaction, and communicative activity.

Learners' responses are shaped by perceived accuracy, clarity, relevance, and alignment with instructional expectations (Barnes et al., 2024; Wang et al., 2024b; Xu et al., 2025). They may accept, question, or disregard AI-generated suggestions depending on whether feedback clarifies language problems and supports meaningful correction (Ayanwale & Ndlovu, 2024; Escalante et al., 2023; Pillai et al., 2024). Engagement is also influenced by classroom climate, teacher support, confidence, and opportunities for clarification (Mallahi, 2026). Feedback is most useful when learners act on it through revision, reflection, and further performance rather than receive it as isolated information (Poupore, 2024; Zhang & Hyland, 2022).

AI-supported feedback should therefore not be treated as a uniform solution. Its effectiveness depends on how learners interpret it, how teachers frame its use, and how closely it is connected to meaningful language practice. Understanding these processes is essential for explaining AI's contribution to L2 development and designing effective classroom integration.

Learner Perspectives on AI-Supported Feedback in L2 Learning

Learner-centered approaches view learners as active participants who interpret, evaluate, and apply feedback in ways that shape their learning (Benson, 2013; Lehtinen et al., 2023). AI-supported environments extend these processes through immediate responses and repeated speaking and writing practice (Díaz & Nussbaum, 2024; Jin et al., 2023; Wu & Chiu, 2025). Such systems may support engagement and self-directed learning, but their value depends on how learners understand and use feedback (Guo et al., 2025; Yuan, 2025).

Learners respond differently according to prior experiences, expectations, and preferences (Alshammari & Babu, 2025; Jeong et al., 2024; Li et al., 2025). Some value AI feedback for independent practice and rapid improvement, whereas others rely more on teachers for explanation, error interpretation, and communicative development (Bender, 2024a; Gondwe, 2025; Hortal, 2024). These differences indicate that perceived usefulness alone cannot explain learner engagement; learners also judge whether feedback is trustworthy, understandable, and relevant to their goals.

Individual variation is also evident in personalized and adaptive learning. AI-supported personalization has been linked to self-efficacy, motivation, digital literacy, creativity, and engagement, although outcomes depend on classroom climate, AI literacy, resilience, and learner expectations (Er-Rafyg et al., 2024; Khoso et al., 2025; Li et al., 2024; Lyu & Abdul Salam, 2025; Wang et al., 2025; Yang, 2025; Zhao, 2025). Meta-analytic evidence likewise indicates that contextual, instructional, and social-emotional factors moderate AI's effects in L2 learning (Wu, 2024).

These differences are particularly important among Chinese learners of Thai, whose educational experiences may emphasize structured instruction and teacher guidance (Dong, 2022; Lu & Fan, 2015). Learners may use AI for immediate correction but still expect teachers to explain why a correction is appropriate, verify its accuracy, and demonstrate culturally appropriate Thai usage.

This need is especially salient in less commonly taught languages, whose linguistic and pragmatic features may challenge AI systems.

Despite growing research on AI in language learning, many studies remain variable-centered and focus on general attitudes, acceptance, or usage patterns (Liu et al., 2024, 2025; Zhang, 2025). Such approaches may overlook how learners prioritize and combine different feedback dimensions. Q methodology addresses this limitation by identifying shared configurations of viewpoints and providing a context-sensitive account of AI-supported feedback experiences (Buchholtz & Vollstedt, 2024).

Learner Agency, Blended Intelligence, and Sociocultural Perspectives

This study draws on learner agency, blended intelligence, and sociocultural perspectives to explain how learners engage with AI-supported feedback. Together, these perspectives position AI as one resource within broader instructional, interpersonal, and cultural systems.

From an agency perspective, learners decide whether to accept, reject, or adapt feedback and regulate their learning accordingly (Benson, 2013; Reinders & Benson, 2017). AI-supported feedback can strengthen self-directed learning through immediate responses in writing and speaking tasks (Jin et al., 2023; Mohebbi, 2024). However, learners may use such feedback selectively when explanations are unclear, accuracy is uncertain, or recommendations do not match communicative goals (Arora et al., 2023; Bender, 2024a). Effective agency therefore requires AI literacy: learners need the conceptual and critical capacity to judge when AI output is useful, incomplete, biased, or inappropriate (Bender, 2024b; Ma et al., 2025).

Blended intelligence explains how AI feedback can operate alongside teacher and peer feedback. Rather than replacing teachers, AI can provide an additional source of input that learners compare with human judgment (Díaz & Nussbaum, 2024; Kim et al., 2022). Learners evaluate these sources according to trust, clarity, interpretability, and communicative usefulness (Henderson et al., 2025). AI feedback is more effective when teachers explain, validate, or contextualize it and connect it to meaningful language use (Escalante et al., 2023; Guo et al., 2024). Telecollaborative feedback research shows that learners may value digital and peer feedback while still seeking instructor confirmation, reinforcing the continuing importance of human mediation (Bangun et al., 2026). Concerns about overreliance and dehumanization further support collaboration rather than substitution between teachers and AI (Dang & Liu, 2025; Mustofa et al., 2025).

Sociocultural perspectives emphasize that feedback engagement is shaped by classroom norms, teacher authority, and cultural approaches to learning. Chinese learners may rely on teachers to clarify meaning, validate corrections, and guide communicative application (Baralt et al., 2016; Lu & Fan, 2015; Zhang, 2020). When AI-generated feedback is unclear, culturally inappropriate, or insufficiently contextualized, learners may be less willing to use it without teacher support (Barnes et al., 2024; Hong et al., 2022).

These perspectives suggest that AI-supported feedback is interpreted differently according to learners' experiences, expectations, and instructional contexts. Although previous research has examined attitudes and technology use (Almulla, 2024; Alshammari & Babu, 2025), less attention has been given to how learners organize views toward feedback from multiple sources. This study therefore uses Q methodology to identify structured configurations of learner perspectives in an LCTL context (Buchholtz & Vollstedt, 2024). It addresses the following research questions:

1. What differentiated orientations do Chinese learners of Thai express toward AI-supported feedback in L2 learning?
2. What learner typologies emerge from these orientations as identified through Q methodology?
3. How can these typologies inform the design of context-sensitive and pedagogically grounded AI-supported language learning environments?

Methods

Research Design

This study used Q methodology to examine how learners organize their perspectives toward AI-mediated foreign language learning. Q methodology is appropriate for investigating subjectivity because it identifies shared configurations of viewpoints rather than measuring predefined variables across populations. It therefore suits the study's focus on how learners position AI in relation to feedback, interaction, teacher involvement, and communicative practice.

Participants ranked statements according to their level of agreement. This forced-ranking procedure made the relative importance of their beliefs explicit and enabled factor analysis to identify shared patterns of perspectives. Q methodology thus combines structured ranking with interpretive analysis of learner meaning-making (Guo & Xia, 2025; Xia & Guo, 2025; Yılmaz Virlan & Tomak, 2025).

Participants

The participants were 40 Chinese university students enrolled in Thai language programs at several higher education institutions. Purposive sampling was used to include learners with varied Thai proficiency, years of study, and academic levels. These differences were relevant because prior learning experience may shape expectations of AI-supported feedback, interaction, and teacher support.

Consistent with Q methodological principles, the sample was intended to capture diversity of perspectives rather than achieve statistical representativeness. The gender distribution was 6 males and 34 females. Participant characteristics are summarized in Table 1.

Table 1
Participant Characteristics

Variable	Category	n
Gender	Male	6
	Female	34
Age (years)	Mean = 22.0, range = 20-25	-
Thai learning experience (years)	Mean = 3.0, range = 2-6	-
Language proficiency	Beginner	21
	Intermediate	12
	Advanced	7
Academic level	Bachelor's degree	22
	Master's degree	18

Note. N = 40. M = mean.

Development of the Q Sample

The Q sample was developed through a systematic concourse-to-sample reduction process. An initial concourse of more than 100 statements was generated from literature on language learning, AI-mediated interaction, and learner perspectives in L2 contexts, together with preliminary student interviews. The statements represented views on feedback, communicative practice, personalization, teacher involvement, learner engagement, and ethical concerns.

Three domain experts reviewed the statements for theoretical alignment, clarity, and redundancy. Five Chinese learners of Thai then participated in pilot interviews to evaluate whether the statements were understandable and relevant to their learning experiences. The final Q sample comprised 42 statements, which provided sufficient coverage of the topic while remaining manageable for the sorting task. All statements were translated into simplified Chinese and back-translated into English to ensure semantic equivalence.

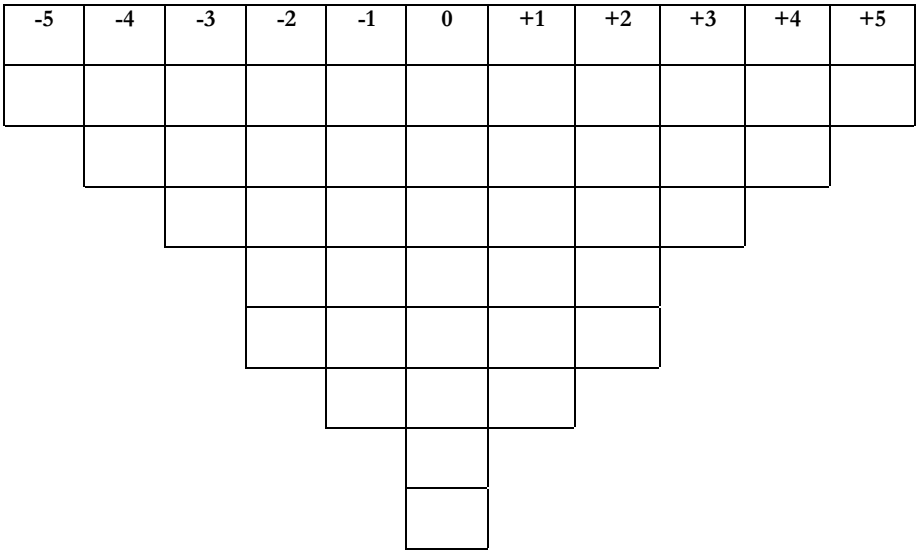
Q-Sorting Procedure

Participants ranked the 42 statements within a forced quasi-normal distribution ranging from -5 (most disagree) to +5 (most agree). They first grouped the statements broadly into agreement, neutrality, and disagreement categories and then placed them within the distribution grid. This two-stage procedure encouraged comparative evaluation and required participants to distinguish between strongly and moderately held views.

The task was administered either in person or online, depending on participant availability. Standardized instructions explained the purpose of the task and the ranking scale. Participants completed the sort independently to minimize social influence, and completion usually required 20–30 minutes. Figure 1 presents the sorting grid.

Figure 1

Q Methodology Sorting Grid Layout for 42 Statements



The forced distribution was used as an analytical device and did not assume that learners' perspectives were normally distributed. It structured reflection and produced comparable Q-sorts representing participants' relative priorities toward AI-mediated feedback, interaction, and language learning.

Data Analysis

Data analysis followed established Q methodological procedures (Watts & Stenner, 2012). Principal component analysis and varimax rotation were used to identify shared configurations of perspectives. In Q methodology, factors represent coherent viewpoints rather than latent variables in the conventional statistical sense.

Factors were retained using eigenvalues greater than 1.00, at least two defining sorts, and the interpretability and conceptual coherence of factor arrays. Interpretability was treated as the principal criterion. A four-factor solution was selected because the three-factor solution showed excessive overlap, whereas the five-factor solution produced an unstable factor with too few defining sorts. The four factors accounted for 42% of the total variance.

The significance threshold for factor loadings was calculated using Brown's formula, $2.58 \times (1/\sqrt{N})$, with $N = 42$, yielding ± 0.40 at $p < .01$. Only Q-sorts that loaded significantly on one factor were treated as defining sorts. Factor 1 contained 10 defining sorts, Factors 2 and 3 each contained 8, and Factor 4 contained 4. Although Factor 4 had fewer defining sorts, it was retained because it displayed a distinct and conceptually coherent perspective. Composite reliability values above .96 indicated high internal consistency. Table 2 presents all factor loadings.

Table 2
Factor Loadings

Sort No.	Factor 1	Factor 2	Factor 3	Factor 4
u10	0.7584	0.2843	0.0386	0.0569
u38	0.6958	0.1049	0.136	0.2609
u23	0.6956	-0.0551	0.2702	0.273
u14	0.6871	0.0151	0.1654	0.0203
u11	0.6166	0.0002	0.0742	0.0527
u29	0.5761	0.0866	0.1848	-0.1118
u2	0.5604	0.0289	0.4061	-0.0273
u39	0.5035	0.0304	-0.0522	0.2068
u37	0.4363	-0.0786	0.1261	0.2941
u1	0.4254	0.3235	0.3649	0.1027
u13	0.4239	0.3908	0.251	-0.015
u18	0.4233	-0.0649	0.18	-0.0105
u19	-0.2103	0.6957	-0.0216	-0.0064
u36	0.0061	0.5926	-0.0387	0.2648
u26	0.2357	0.5429	0.1307	-0.2892
u34	-0.0236	0.5328	0.2338	-0.0167
u12	0.3055	0.5231	0.3176	0.1998
u22	0.1201	0.4632	0.1886	0.1327
u27	0.1285	0.4628	-0.2695	-0.2929
u31	0.2257	0.4552	0.1727	0.4124
u17	-0.0978	0.4422	-0.0225	-0.1881
u30	0.1832	0.1752	0.6653	0.3377
u7	0.4894	0.1417	0.6324	-0.1062

Sort No.	Factor 1	Factor 2	Factor 3	Factor 4
u4	0.3493	-0.1553	0.5997	0.0678
u35	0.2559	-0.0035	0.5707	0.3152
u16	0.0274	0.1738	0.5207	0.0679
u21	0.1361	0.3989	0.5175	-0.0531
u6	0.0674	-0.0995	0.3887	0.3157
u25	0.0621	0.0803	0.2422	0.0746
u9	-0.0552	-0.166	-0.1788	-0.0024
u24	0.1003	-0.0205	0.1788	0.1255
u28	0.0971	0.2223	0.2804	0.7167
u40	0.1088	-0.1617	0.0084	0.618
u8	0.0625	-0.0159	0.267	0.5902
u3	0.4597	0.4481	-0.0336	0.5612
u5	0.4348	0.3252	-0.081	0.5529
u15	0.4544	0.2202	0.3082	0.5339
u33	-0.0235	0.0951	0.3796	0.5335
u32	-0.1678	-0.1493	-0.0475	0.4104
u20	0.2045	-0.0125	0.1168	0.334

Results

Q-sorts from 40 Chinese learners of Thai were analyzed using principal component analysis with varimax rotation in KADE. Four factors were retained based on eigenvalues, explained variance, and, most importantly, the interpretability of the factor arrays. Together, the factors accounted for approximately 42% of the total variance. Each factor represents a shared configuration of perspectives rather than a fixed learner category. The configurations show how learners differently position AI in relation to feedback, teacher involvement, communicative practice, personalization, and the interpretation of linguistic input.

Factor 1: Human-Centered Traditionalist

Factor 1 reflects a strongly human-centered view of language learning. Learners understood communicative competence as developing primarily through authentic interpersonal interaction, contextualized explanation, and teacher guidance. AI-mediated feedback was not rejected, but its value depended on whether it supported rather than displaced these human processes.

As shown in Table 3, the highest-ranked statement, *"I want more speaking practice with native speakers, not just AI"* (Z = +2.057), indicates a strong preference for authentic communication. Learners also valued responsiveness, as shown by *"I feel more motivated when my learning is tailored to my performance"* (Z = +1.861). At the same time, the high ranking of *"AI cannot fully assess my tone and cultural appropriateness in speaking"* (Z = +1.537) highlights perceived limitations in AI's ability to interpret pragmatic and culturally embedded language use.

Teacher mediation was also central to this perspective. Strong agreement that *"AI can assist, but not replace, language teachers"* (Z = +1.336) and that AI feedback lacks the human touch needed for language learning (Z = +1.143) shows that learners distinguished automated input from teacher-mediated explanation. Teachers were therefore viewed as important for clarifying meaning, contextualizing feedback, and guiding communicative practice.

Moderately ranked statements indicate selective engagement with AI. Learners valued pronunciation feedback (Z = +0.995) and grammar support (Z = +0.818), but these preferences

appeared alongside support for teacher-provided explanations (Z = +0.805). AI was therefore regarded as useful for specific language functions when combined with human guidance.

Table 3
Distinguishing Statements for Factor 1

No.	Q Statement	Z-Score	Ranking
17	I want more speaking practice with native speakers, not just AI.	2.057	5
10	I feel more motivated when my learning is tailored to my performance.	1.861	4
15	AI cannot fully assess my tone and cultural appropriateness in speaking.	1.537	4
31	AI can assist, but not replace, language teachers.	1.336	3
3	AI feedback lacks the human touch needed for language learning.	1.143	3
4	I learn better when I receive explanations along with AI suggestions.	1.056	3
18	I prefer AI tools that provide pronunciation scoring and suggestions.	0.995	2
12	I prefer learning with materials selected by a teacher over AI recommendations.	0.972	2
21	I prefer writing support from teachers instead of AI assistants.	0.960	2
1	AI feedback helps me improve my grammar and writing more quickly.	0.818	2
32	I prefer learning from real teachers who can explain complex ideas.	0.805	2
11	AI systems often give feedback that is too generic to be useful.	0.717	1
5	AI feedback encourages me to revise my work more often.	0.506	1
36	I learn best through real-time conversations, not just with AI.	0.364	1
42	Students should be trained to use AI tools critically and responsibly.	0.328	1
9	AI helps identify my strengths and weaknesses in language learning.	0.297	1
29	I feel disconnected when there is no teacher involved.	0.260	1

The lowest-ranked statements (Table 4) reinforce this interpretation. Learners rejected greater comfort with AI than with people for speaking practice (Z = -2.047) and did not trust AI-generated corrections as much as teacher feedback (Z = -1.685). Overall, the prototype sort shows that AI was valued as a supplementary resource, while human interaction, teacher mediation, and culturally grounded communication remained central.

Table 4
Factor 1 Prototype Sorting

Value of Statements										
-5	-4	-3	-2	-1	0	1	2	3	4	5
30**	26	28	7	23	13	11**	18	31	10	17
	14**	40	39	16	24	6	12*	3	15**	
		19**	2	35	6	36	21	4		
			33	41	8	42**	1			
			20	27	37	9	32			
				34	38**	29**				
					22					
					25*					

Distinguishing statements for Factor 1 *$p < 0.05$, **$p < 0.01$, descending arrangement of statements in columns indicates descending z-scores.

The prototype sort in Table 4 provides an overall representation of how learners within this factor organize their perspectives. Taken together, the configuration suggests that learners prioritize communicative interaction, interpretive guidance, and culturally grounded meaning-making. AI-mediated feedback is incorporated into this system as a supporting resource, but its role remains secondary to teacher-mediated interaction and human communication.

Factor 2: Optimistic Tech-Adopter

Factor 2 reflects an optimistic orientation toward AI as a productive resource for language learning. Learners viewed AI-mediated feedback as expanding opportunities for continued practice, particularly in writing, where immediate responses can support revision and linguistic development.

As shown in Table 5, the highest-ranked statement, *"I believe AI will continue to improve and become more helpful"* (Z = +2.267), demonstrates confidence in AI's future educational value. Strong agreement that *"AI can assist, but not replace, language teachers"* (Z = +2.052) indicates that this optimism did not involve rejecting human guidance. Instead, learners viewed AI as complementary to teachers. Their reliance on AI for improving L2 writing (Z = +1.771) further shows its perceived usefulness for productive language practice.

Learners also associated AI with supportive and enjoyable learning experiences. Receiving explanations alongside AI suggestions (Z = +1.546), finding AI-assisted learning enjoyable (Z = +1.515), and improving grammar and writing more quickly (Z = +1.306) indicate that immediacy and accessibility encouraged sustained engagement with linguistic form.

The ranking of critical and responsible AI training (Z = +1.292) shows that learners did not regard AI as an unquestioned authority. Personalized learning paths were also valued for maintaining engagement (Z = +0.880). Overall, this factor represents learners who welcomed AI's efficiency and personalization while recognizing the continued need for interpretation, responsible use, and teacher involvement.

Table 5
Distinguishing Statements for Factor 2

No.	Q Statement	Z-Score	Ranking
41	I believe AI will continue to improve and become more helpful.	2.267	5
31	AI can assist, but not replace, language teachers.	2.052	4
19	I rely on AI tools to help me write better in an L2.	1.771	4
4	I learn better when I receive explanations along with AI suggestions.	1.546	3
25	Using AI makes language learning more enjoyable for me.	1.515	3
1	AI feedback helps me improve my grammar and writing more quickly.	1.306	3
42	Students should be trained to use AI tools critically and responsibly.	1.292	2
8	Personalized learning paths generated by AI keep me more engaged.	0.880	2
18	I prefer AI tools that provide pronunciation scoring and suggestions.	0.680	2
24	I use AI tools as a guide, not as a replacement for learning.	0.570	2
3	AI feedback lacks the human touch needed for language learning.	0.486	2
15	AI cannot fully assess my tone and cultural appropriateness in speaking.	0.319	1
16	Practicing with AI chatbots improves my confidence in real conversations.	0.317	1
33	AI allows teachers to spend more time helping with difficult topics.	0.280	1
26	I feel more independent when learning with AI.	0.245	1
22	Writing with AI support helps me feel more confident in my work.	0.210	1
5	AI feedback encourages me to revise my work more often.	0.136	1

The lowest-ranked statements in Table 6 support this interpretation. Learners showed little concern about feeling disconnected without a teacher (Z = -1.64) or about AI reinforcing incorrect language patterns (Z = -1.30). These rankings indicate greater confidence in AI-supported practice than was evident in the other factors. Nevertheless, the prototype sort positions AI as a central learning resource that remains connected to the broader instructional process rather than functioning as a complete substitute for teachers.

Table 6
Factor 2 Prototype Sorting

Value of Statements										
-5	-4	-3	-2	-1	0	1	2	3	4	5
29	34**	6**	39	12**	9	15	42**	4	31**	41**
	38	21**	36	40	14	16*	8*	25**	19**	
		11**	20	7	2*	33	18	1*		
			27	28	10**	26	24			
			30**	35	13	22	3*			
				37	23	5				
					32*					
					17**					

The prototype sort (Table 6) illustrates how learners within this factor organize their perspectives, emphasizing efficiency, accessibility, and sustained interaction with language. Overall, this configuration reflects an orientation in which AI is integrated into language learning as a central mediational resource that supports ongoing participation, particularly in writing and feedback-related practices.

Factor 3: Guided Personalization Seeker

Factor 3 reflects a preference for AI-supported learning that remains structured by teacher guidance. Learners did not reject AI but regarded its feedback as most useful when it was explained, contextualized, and connected to communicative practice.

In Table 7, the highest-ranked statement, *"I want more speaking practice with native speakers, not just AI"* (Z = +1.972), indicates that authentic human interaction remained a priority. The preference for materials selected by teachers rather than AI recommendations (Z = +1.474) further suggests that learners valued pedagogically and culturally appropriate input.

Learners were also concerned about the interpretability of automated feedback. The high ranking of *"AI systems often give feedback that is too generic to be useful"* (Z = +1.390), together with the preference for explanations accompanying AI suggestions (Z = +1.342), shows that feedback was considered meaningful only when learners understood its rationale and application.

At the same time, participants recognized AI's value for specific language functions. Pronunciation scoring and suggestions were positively evaluated (Z = +1.073), indicating that AI was useful for focused practice. However, learners preferred to use AI as a guide rather than a replacement for learning (Z = +0.986) and continued to favor teacher support for writing (Z = +0.964). Overall, this factor combines interest in personalized AI assistance with a clear need for teacher explanation and communicative interaction.

Table 7
Distinguishing Statements for Factor 3

No.	Q Statement	Z-Score	Ranking
17	I want more speaking practice with native speakers, not just AI.	1.972	5
12	I prefer learning with materials selected by a teacher over AI recommendations.	1.474	4
11	AI systems often give feedback that is too generic to be useful.	1.390	4
4	I learn better when I receive explanations along with AI suggestions.	1.342	3
10	I feel more motivated when my learning is tailored to my performance.	1.286	3
18	I prefer AI tools that provide pronunciation scoring and suggestions.	1.073	3
24	I use AI tools as a guide, not as a replacement for learning.	0.986	2
21	I prefer writing support from teachers instead of AI assistants.	0.964	2
31	AI can assist, but not replace, language teachers.	0.946	2
16	Practicing with AI chatbots improves my confidence in real conversations.	0.930	2
15	AI cannot fully assess my tone and cultural appropriateness in speaking.	0.786	2
5	AI feedback encourages me to revise my work more often.	0.563	1
9	AI helps identify my strengths and weaknesses in language learning.	0.536	1
13	AI speech recognition helps me improve my pronunciation.	0.525	1
20	AI corrects my grammar, but I don't always understand why.	0.457	1
6	I prefer receiving delayed feedback from a teacher over instant AI feedback.	0.373	1
1	AI feedback helps me improve my grammar and writing more quickly.	0.369	1

The lowest-ranked statements in Table 8 reinforce this interpretation. Learners did not feel more comfortable speaking with AI than with people (Z = -1.77) and did not regard translation applications as their primary means of learning Thai (Z = -1.23). The prototype sort therefore shows that AI was accepted selectively as a supportive tool, while human interaction, teacher-curated input, and guided interpretation remained central.

Table 8
Factor 3 Prototype Sorting

Value of Statements										
-5	**-4**	**-3**	**-2**	**-1**	**0**	**1**	**2**	**3**	**4**	**5**
39**	38	27	36	3**	8	5	24	4	12	17
	35**	26	40	7	25	9	21	10	11**	
		37**	29*	2	28**	13	31	18		
			34	42**	30	20	16*			
			33	41	19*	1	15			
				32*	14	6				
					22					
					23					

The prototype sort (Table 8) reflects a configuration in which AI-mediated input is selectively integrated into learning processes that remain structured by teacher guidance and communicative practice. Overall, this factor represents an orientation toward guided mediation, where AI contributes to language learning when it is embedded within systems of explanation, interaction, and contextualized meaning-making.

Factor 4: Cautious Pragmatist

Factor 4 reflects a critical and selective orientation toward AI-mediated language learning. Learners recognized AI as potentially useful but evaluated its feedback carefully in terms of accuracy, interpretability, and contextual appropriateness.

As shown in Table 9, the highest-ranked statement, *"I prefer learning with materials selected by a teacher over AI recommendations"* (Z = +1.811), indicates a strong preference for reliable and pedagogically grounded teacher input. Nevertheless, learners valued AI for specific functions. Speech recognition was considered helpful for pronunciation development (Z = +1.713), while personalized learning increased motivation (Z = +1.626). These rankings show that learners accepted AI when it addressed clearly defined learning needs.

Concerns about AI's limitations remained prominent. Learners preferred explanations alongside AI suggestions (Z = +1.261), worried that AI writing tools could reduce attention to grammar learning (Z = +1.167), and perceived AI feedback as lacking the human dimension of language learning (Z = +1.016). These responses indicate that AI-generated feedback was not accepted uncritically but required explanation and contextual validation.

Learners therefore adopted a balanced approach, using AI as a guide rather than a replacement for learning (Z = +0.760) while continuing to prefer teacher support for writing (Z = +0.536). Overall, this factor represents learners who use AI pragmatically but retain human guidance for interpreting and applying feedback.

Table 9
Distinguishing Statements for Factor 4

No.	Q Statement	Z-Score	Ranking
12	I prefer learning with materials selected by a teacher over AI recommendations.	1.811	5
13	AI speech recognition helps me improve my pronunciation.	1.713	4
10	I feel more motivated when my learning is tailored to my performance.	1.626	4
18	I prefer AI tools that provide pronunciation scoring and suggestions.	1.417	3
17	I want more speaking practice with native speakers, not just AI.	1.273	3
4	I learn better when I receive explanations along with AI suggestions.	1.261	3
23	AI writing tools sometimes make me lazy about learning grammar.	1.167	2
3	AI feedback lacks the human touch needed for language learning.	1.016	2
20	AI corrects my grammar, but I don't always understand why.	0.907	2
32	I prefer learning from real teachers who can explain complex ideas.	0.886	2
19	I rely on AI tools to help me write better in an L2.	0.797	2
24	I use AI tools as a guide, not as a replacement for learning.	0.760	1
21	I prefer writing support from teachers instead of AI assistants.	0.536	1
15	AI cannot fully assess my tone and cultural appropriateness in speaking.	0.397	1
33	AI allows teachers to spend more time helping with difficult topics.	0.322	1
26	I feel more independent when learning with AI.	0.296	1
25	Using AI makes language learning more enjoyable for me.	0.230	1

The lowest-ranked statements in Table 10 further illustrate this cautious position. Learners did not strongly endorse the view that AI reinforces incorrect language patterns (Z = -1.25), yet they also did not trust AI-generated corrections as much as teacher feedback (Z = -1.17). The prototype sort therefore suggests selective rather than resistant use: AI was accepted when its output could be checked, explained, and aligned with communicative and contextual needs.

Table 10
Factor 4 Prototype Sorting

Value of Statements										
-5	-4	-3	-2	-1	0	1	2	3	4	5
7**	5**	9**	14**	16	30	24	23**	18	13**	12
	2**	29	35	39	36	21	3	17**	10	
		42**	28	27	1	15	20	4		
			38**	6*	11**	33	32			
			8**	41	34	26	19**			
				31**	37	25				
					40					
					22					

The prototype sort (Table 10) illustrates a configuration in which learners engage with AI-mediated resources in a deliberate and evaluative manner. Overall, this factor represents an orientation toward calibrated mediation, where AI is incorporated into language learning only when its outputs can be interpreted, validated, and aligned with communicative and contextual demands.

Discussion

This study examined how learners interpret and engage with AI-supported feedback in L2 Thai learning and identified four learner typologies reflecting different orientations toward feedback use, teacher involvement, and communicative practice. Learners did not respond uniformly; rather, they evaluated and integrated AI according to their expectations, prior experiences, and instructional contexts.

Optimistic Tech-Adopters viewed AI as an accessible and efficient source of feedback for independent practice, particularly in writing and grammar. The immediacy of AI-generated feedback enabled iterative revision, consistent with research highlighting the role of timely feedback in L2 development (Hong & Guo, 2025; Xu et al., 2025). In contrast, Human-Centered Traditionalists relied more strongly on teacher feedback, explanation, interaction, and contextualization (Dong, 2022; Lu & Fan, 2015). For these learners, AI-supported feedback was useful but insufficient for developing communicative competence.

Guided Personalization Seekers used AI selectively, especially for form-focused practice such as pronunciation and grammar but benefited most when teacher guidance helped them interpret and apply feedback meaningfully (Guo et al., 2024; Jiang, 2025). Cautious Pragmatists evaluated AI-generated feedback critically, particularly in terms of accuracy and appropriateness, and limited their reliance on unclear or unreliable output. Together, these findings indicate a continuum from relatively strong reliance on AI to selective, guided, and critical use. This variation shows that learner responses cannot be reduced to a simple distinction between acceptance and rejection; instead, learners combine technological assistance and human support in different ways.

These results suggest that AI-supported feedback should complement rather than replace teacher feedback. Across all learner groups, teacher involvement remained essential for explaining feedback, supporting interpretation, and guiding its communicative application (Díaz & Nussbaum, 2024; Henderson et al., 2025). Learners also need structured opportunities to revise, reflect on, and apply feedback in meaningful speaking and writing tasks (Escalante et al., 2023; Guo et al., 2024). Simply providing automated feedback is therefore insufficient. Its pedagogical value depends on

whether learners are given opportunities to interpret, question, and use the feedback within purposeful language activity.

Feedback design is equally important. AI-supported feedback should be clear, specific, explanatory, and aligned with communicative goals. Learners are more likely to use it when they understand why errors occur and how corrections relate to language use (Guo et al., 2024; Yuan & Liu, 2025). Teacher follow-up through classroom discussion, guided revision, or comparison of AI and human feedback can further connect automated input with interpretation and meaningful application (Escalante et al., 2023; Henderson et al., 2025).

The findings also emphasize the importance of feedback literacy. Learners must be able to evaluate AI feedback, identify its limitations, and decide whether and how to use it (Benson, 2013; Reinders & Benson, 2017). Explicit guidance can help them move from passive reception to active and critical engagement (Ayanwale & Ndlovu, 2024; Pillai et al., 2024). Such training is particularly important because the four typologies differed in their trust in AI and willingness to rely on its output. Feedback literacy can therefore help learners use AI more independently without treating automated suggestions as unquestionably correct.

Trust also shaped learner engagement. Learners assessed AI not only in terms of usefulness but also in relation to accuracy, clarity, and appropriateness, consistent with evidence linking trust to perceived reliability (Gulati et al., 2024). Trust should therefore be treated as both a pedagogical and ethical issue. Transparency, fairness, privacy, and explainability influence whether learners regard AI-supported feedback as legitimate and safe (Kastania, 2024; Radanliev, 2025). These considerations are especially important when learners compare AI output with teacher feedback and make independent decisions about revision. Trust should be developed through transparent use, opportunities for verification, and continued access to human explanation.

Context is another critical factor. In LCTL settings such as Thai, linguistic and cultural complexity often increases learners' reliance on teacher guidance for interpreting meaning and ensuring appropriate language use (Barnes et al., 2024; Lu & Fan, 2015). AI-supported feedback should therefore be integrated into instructional contexts where cultural nuance and communicative appropriateness are emphasized. Support should also be adapted to learners' needs and the language demands of the instructional context rather than applied uniformly (Wu & Richards, 2026). Without such mediation, learners may misinterpret feedback or develop incomplete understandings of language use (Díaz & Nussbaum, 2024; Hortal, 2024).

Overall, this study shifts attention from whether AI-supported feedback is effective to how different learners use it. Its value depends on feedback design, classroom integration, teacher mediation, and learner support. By highlighting learner diversity, the study provides a basis for more flexible and context-sensitive AI integration in language teaching (Guo et al., 2024; Henderson et al., 2025).

Toward a Subjectivity-Calibrated AI Integration Model (SCAIM)

Building on these findings, this study proposes the Subjectivity-Calibrated AI Integration Model (SCAIM) to guide AI-supported feedback in L2 classrooms. The model assumes that AI integration should respond to differences in how learners interpret and use feedback rather than follow a one-size-fits-all approach across learners, tasks, and instructional settings.

SCAIM has three principles. First, AI-supported feedback should complement teacher feedback by extending opportunities for practice while maintaining teacher guidance. Second, instructional design should provide flexible pathways for independent practice, guided revision, and collaborative

interaction. Third, AI use should align feedback design with communicative goals and classroom context, particularly in linguistically and culturally complex environments.

By centering learner perspectives, SCAIM moves beyond general assumptions about technology use and provides a practical framework for integrating AI-supported feedback into L2 teaching. It emphasizes that successful implementation depends not merely on the availability of technology but on how feedback is designed, interpreted, and used within classroom practice.

Implications for Practice and Policy

AI-supported feedback should be implemented as a structured component of language practice rather than as an optional add-on. A practical sequence is for learners to produce language, receive AI-supported feedback, revise their work, and then discuss or refine their revisions through teacher-guided interaction. This process is especially useful for productive skills such as writing and speaking because it connects feedback with repeated practice and revision. Teachers should also differentiate support by providing guided interpretation for learners who need more assistance while allowing more independent learners to engage in extended self-directed use of AI tools.

The pedagogical value of AI-supported feedback depends on its design and classroom integration. Effective systems should provide clear and specific corrections, explain why an error occurred, and offer contextually appropriate examples. Teachers can strengthen learning by asking students to compare AI-generated and teacher-provided feedback, participate in guided revision, and discuss feedback with peers. These activities help learners connect automated feedback with communicative goals rather than treating corrections as isolated answers.

Learner feedback literacy is equally important. Students need explicit instruction in how to interpret AI feedback, evaluate its accuracy and reliability, and decide whether and how to revise their work. Revision logs, self-assessment, and guided reflection can support more active and critical engagement. Teacher mediation must therefore remain central, especially when feedback is ambiguous or culturally sensitive. AI can extend opportunities for practice, but it should not replace teacher explanation, communicative interaction, or contextual judgment.

Transparency should also guide implementation. Learners should understand how AI-supported feedback is generated, what its limitations are, and how it should be used responsibly. At the institutional level, AI integration should be driven by pedagogical goals rather than technological standardization. Institutions should support flexible use across courses, provide professional development for teachers, and establish policies that address AI literacy, ethics, human oversight, and context-sensitive implementation. These priorities align with emerging policy discussions that recommend clear curricular guidance instead of unregulated adoption (Caiyu, 2025; Funa & Gabay, 202). Technology acceptance alone does not guarantee meaningful learning; responsible use also depends on instructional quality and learner engagement (Chan & Lee, 2023).

Limitations and Future Directions

This study has three main limitations. First, Q methodology identifies distinct configurations of learner perspectives but does not show how widely each perspective is distributed in larger populations. The typologies should therefore be interpreted as patterns of viewpoint rather than generalizable categories. Larger survey-based studies could examine their prevalence across settings.

Second, the study examined learners' interpretations rather than their actual use of AI-supported feedback. It did not directly observe revision behavior, interaction with AI tools, or changes in

speaking and writing performance. Future research should therefore include behavioral evidence such as revised texts, interaction logs, classroom observations, and performance outcomes.

Third, the study focused on Chinese learners of Thai in a specific less commonly taught language context. The findings may not transfer directly to other languages, institutions, or educational traditions. Comparative studies across L2 contexts are needed to determine which perspectives are context-specific and which are more widely shared.

Future research should also investigate how the identified learner types engage with AI-supported feedback over time. Mixed-method and longitudinal designs could combine Q methodology with observations, learning analytics, interviews, and performance measures. Experimental or quasi-experimental studies could compare AI feedback used independently with AI feedback combined with teacher guidance and could examine how different feedback designs affect learner engagement and language development. Such work would provide stronger evidence for how AI-supported feedback can be integrated effectively in L2 classrooms.

Conclusion

This study examined how learners engage with AI-supported feedback in L2 Thai learning and identified four distinct learner typologies that reflect different patterns of feedback use, teacher reliance, and communicative engagement. The findings show that AI-supported feedback is not used in uniform ways; its effectiveness depends on how learners interpret and apply it within their learning processes.

The study demonstrates that AI can support language development when it is integrated into structured learning activities, supported by clear feedback design, and complemented by teacher guidance. At the same time, learner differences play a critical role, indicating that a single approach to AI integration is unlikely to be effective across contexts.

By focusing on learner perspectives, this study provides evidence that successful use of AI in L2 classrooms depends on aligning feedback, instruction, and learner needs. These findings may contribute to a more practical understanding of how AI-supported feedback can be implemented to enhance language learning in diverse and context-sensitive ways.

Declarations

Ethical Approval

This study was approved by the Mahidol University Central Institutional Review Board (MU-CIRB) (Protocol No. MU-CIRB 2025/107.3006). The research was conducted in accordance with the ethical standards of the institutional research committee and with international guidelines.

Competing interests

Not applicable

Authors' contributions

WW designed the research design, the accuracy of the data, and revised the manuscript. PS implemented the research procedure. KW and NJ developed and contributed the research tool.

WW and NJ analysed the data using the inferential statistics. All authors read and approved the final manuscript.

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