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Developing Receptive Competences in Pre-Service Foreign Language Teachers Using Artificial Intelligence

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Abstract. The swift evolution of artificial intelligence has profoundly transformed language instruction, generating innovative educational methods alongside complex new hurdles. The **purpose** of the study is to develop and theoretically substantiate a methodological model for forming listening and reading competence in pre-service foreign language teachers using Claude large language models (LLMs) and Natural Reader Text to Speech AI, and to verify its effectiveness through a pedagogical experiment. The research **methods** encompass a theoretical analysis of scholarly literature, synthesis of approaches to teaching receptive language skills, a pedagogical experiment involving 55 students of the specialty A4 Secondary Education, subject specialty A4.02 Secondary Education (Language and World Literature), specialization A4.021 English Language and World Literature, as well as methods of mathematical statistics (Student's t-test, Pearson correlation analysis) for processing empirical data. The **results** of the study demonstrated that systematic use of Claude LLMs and Natural Reader Text to Speech AI significantly enhances the level of receptive competences formation in pre-service teachers. According to post-experimental assessments, the listening competence indicator in the experimental group increased by an average of 18.4%, compared to only 6.7% in the control group. Reading competence indicators in the experimental group improved by 21.2% versus 8.1% in the control group. Participant surveys and focus group discussions confirmed subjective satisfaction among 89.3% of students regarding the use of Claude LLMs and Natural Reader Text to Speech AI in the educational process, as well as increased motivation for independent improvement of foreign language communicative competence beyond formal class time. The **scientific novelty** of the study consists in the fact that, for the first time, a step-by-step methodological model for forming English-language listening and reading competence in pre-service foreign language teachers has been developed and tested based on the systematized application of pedagogically appropriate AI tools. The **practical significance** of the research findings lies in the possibility of their direct implementation in the educational process of pedagogical universities within disciplines aimed at forming foreign language communicative and professionally oriented competence in higher education students, as well as in in-service training programs for English language teachers.

Keywords: artificial intelligence, listening, reading, pre-service foreign language teachers, receptive skills, methodological model, pedagogical experiment, digital educational technologies, language training.

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Формування рецептивних компетентностей у майбутніх учителів іноземних мов з використанням штучного інтелекту

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Анотація. Стрімка еволюція штучного інтелекту зумовила трансформацію підходів до навчання мов, започаткувавши інноваційні педагогічні методики та водночас створивши низку нових комплексних викликів. **Мета** дослідження – розробити та теоретично обґрунтувати методичну модель формування компетентності в аудіюванні та читанні у майбутніх учителів іноземних мов із застосуванням великих мовних моделей Claude і застосунку Natural Reader Text to Speech AI, а також перевірити її ефективність в умовах педагогічного експерименту. **Методи** дослідження охоплюють теоретичний аналіз наукової літератури, синтез підходів до навчання рецептивних видів мовленнєвої діяльності, педагогічний експеримент із залученням 55 студентів спеціальності А4 Середня освіта, предметної спеціальності А4.02 Середня освіта (Мова та зарубіжна література), спеціалізації А4.021 Англійська мова та зарубіжна література, а також методи математичної статистики (t-критерій Стьюдента, кореляційний аналіз Пірсона) для опрацювання емпіричних даних. **Результати** дослідження засвідчили, що систематичне використання великих мовних моделей Claude і застосунку Natural Reader Text to Speech AI значно підвищує рівень сформованості рецептивних компетентностей у майбутніх учителів. За результатами постекспериментального зрізу, показник рівня сформованості вмінь аудіювання в експериментальній групі зріс у середньому на 18,4%, тоді як у контрольній – на 6,7%. Показники читацьких умінь в експериментальній групі покращились на 21,2% порівняно з 8,1% у контрольній групі. Анкетування та обговорення у фокус групах учасників педагогічного експерименту підтвердило суб'єктивну задоволеність 89,3% студентів використанням великих мовних моделей Claude і застосунку Natural Reader Text to Speech AI в освітньому процесі, а також зростання їхньої мотивації до самостійного вдосконалення іншомовної комунікативної компетентності поза межами аудиторних занять. **Наукова новизна** дослідження полягає у тому, що вперше розроблено та апробовано поетапну методичну модель формування англомовної компетентності в аудіюванні та читанні майбутніх учителів іноземних мов на основі систематизованого застосування педагогічно доцільних великих мовних моделей Claude і застосунку Natural Reader Text to Speech AI. **Практичне значення** результатів полягає у можливості їх безпосереднього впровадження у навчальний процес педагогічних університетів у межах дисциплін, спрямованих на формування іншомовної комунікативної та професійно орієнтованої компетентності здобувачів вищої освіти, а також у системі підвищення кваліфікації вчителів англійської мови.

Ключові слова: штучний інтелект, аудіювання, читання, майбутні вчителі іноземних мов, рецептивні вміння, методична модель, педагогічний експеримент, цифрові освітні технології, мовна підготовка.

Introduction

Relevance of the issue. The rapid advancement of artificial intelligence (AI) technologies has fundamentally reshaped foreign language education, creating both unprecedented opportunities and new pedagogical challenges. In Ukraine, the integration of digital tools into

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higher education has been accelerated by national strategic mandates that explicitly require incorporating AI-enhanced methodologies into professional training programs. Pre-service foreign language teachers, who will shape the linguistic competencies of future generations, must themselves acquire advanced receptive language skills through innovative, technology-mediated pedagogical approaches [17], [20].

Despite the growing body of research on technology-enhanced language learning, a significant gap persists in the methodological preparation of Ukrainian pedagogical university students. According to official national quality assurance assessments, only a small minority of foreign language methodology programs in Ukrainian universities systematically incorporate AI tools into listening and reading instruction [1]. This deficit is particularly concerning given that, according to international standards, pre-service language teachers are expected to achieve at least C1 proficiency in all four language skills, with receptive competences forming the foundation for productive abilities [4], [15], [25]. Consequently, there is an urgent need for evidence-based methodological models that guide the deliberate, structured use of AI applications to develop listening and reading competence in this target group.

Analysis of recent research and publications. The intersection of AI and foreign language learning has attracted considerable scholarly attention over the past decade. Researchers provide a comprehensive overview of AI-assisted language learning environments, arguing that adaptive platforms powered by natural language processing can offer personalized listening practice that exceeds the individualization capacity of traditional classroom instruction [19], [22]. These findings align with sociocultural perspectives on language acquisition, which emphasize the mediating role of digital tools in the development of higher-order cognitive functions such as comprehension and inference [13]. Systematic literature reviews synthesizing multiple peer-reviewed studies corroborate these trends, confirming that AI integration consistently improves receptive and productive outcomes at secondary and tertiary levels, with AI-generated feedback and adaptive content delivery identified as primary drivers of gain [19], [22].

In the domain of listening skill development, empirical evidence demonstrates that AI-based English learning applications featuring speech recognition and adaptive feedback yield significant listening comprehension gains alongside increased learner motivation and engagement [16]. Further investigations show that AI-enhanced entrepreneurial learning environments integrating authentic English communication tasks produce measurable improvements in both listening and reading ability in EFL students, underscoring the potential of AI to support receptive skills through real-world language exposure [9]. Systematic overviews of AI applications establish that AI-based technologies are particularly effective at selecting listening materials calibrated to individual proficiency levels from large corpora, while simultaneously identifying a research gap regarding AI-assisted reading instruction [22]. This concern is reinforced by critical analyses of AI's role in promoting receptive foreign language skills, which emphasize the value of AI-mediated metacognitive reflection while also highlighting risks such as overreliance on technology and diminished human interaction [8].

Within the Ukrainian scholarly context, researchers examine digital literacy development in pre-service language teachers, identifying persistent barriers to technology integration at the institutional level, including inadequate infrastructure and insufficient teacher educator preparation [17]. More recently, investigations demonstrated that AI tools successfully created multimodal learning environments for pre-service teachers, yielding a significant increase in reading comprehension through systematic use of AI-generated audio content [5]. Scholars further corroborate these findings, showing that AI tools can generate stimulus texts for listening and reading tasks and hold significant potential for modernizing pre-service English language teacher preparation [17].

Additional contributions include a systematic typology of prompting techniques for large language models in pre-service teacher training, demonstrating that interaction with AI

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chatbots supports reading competence through exposure to adapted texts and listening competence through work with transcripts [18]. The work on the digital transformation of higher education in Ukraine provides a valuable macro-level context [3], while applied perspectives on the linguodidactic potential of LLMs and AI tools for developing receptive and productive language skills in higher education together establish a growing domestic consensus on the pedagogical value of AI integration [21], [24].

Studies in the domain of pre-service teacher education assess the impact of intelligent tutoring systems on instructional practices of pre-service language teachers, finding that tools offering interactive vocabulary, grammar, and reading comprehension modules with real-time feedback measurably enhance teaching methodologies [6]. It has been found that AI can automatically match listening materials to pre-service teachers based on individual proficiency factors, facilitating personalized and adaptive learning [7]. A quasi-experimental comparison of AI-assisted versus conventional instruction over eight weeks yielded significantly higher post-test linguistic and teaching performance scores for the AI group [10]. Complementary qualitative evidence documents how pre-service English language teachers engaged with generative AI tools to design listening activities and reading comprehension materials, while simultaneously developing their own technological pedagogical content knowledge and self-regulated learning [11].

However, systematic reviews of language educators' generative AI practices identify persistent competency gaps in AI-enhanced task design and content evaluation, underscoring the need for structured methodological models of the kind developed in the present study [14]. While English majors hold predominantly positive perceptions of AI and use LLM tools for language skill development, they frequently employ these tools outside of class and do not fully use AI tools potential for learning, confirming that autonomous AI use requires pedagogical scaffolding to be maximally effective [23].

Identifying the unresolved aspects of the issue. Despite the substantial body of literature on AI-enhanced language learning, a critical gap persists regarding the systematic methodological framework for the simultaneous development of listening and reading competences in pre-service foreign language teachers. Existing studies either address one receptive skill in isolation [16], focus on learner populations that differ substantially from pre-service teachers [9], [23], or treat AI tools as supplementary rather than integral components of a purposefully designed methodological model [11].

Moreover, while systematic reviews confirm the broad effectiveness of AI in language learning [19], [22] and scholars document isolated applications of AI tools in Ukrainian higher education [5], [17], the pedagogical validation of specific AI applications selected according to explicit didactic criteria within a coherent methodological model for pre-service foreign language teachers has received insufficient empirical attention.

The purpose of this article is to develop, substantiate, and experimentally verify a step-by-step methodological model for forming English-language listening and reading competence in pre-service foreign language teachers through the systematic and pedagogically grounded integration of Claude LLMs and Natural Reader Text to Speech AI.

Scientific novelty. A step-by-step methodological model integrating Claude LLMs for the simultaneous development of listening and reading competences in pre-service English language teachers has been developed and empirically validated. The model introduces a three-phase didactic structure (preparatory, operational, and reflective) that systematically embeds metacognitive strategy instruction alongside AI-assisted task completion, distinguishing it from existing approaches that treat AI as an isolated instructional supplement [10], [11].

Practical significance. The methodological model and the curated criteria for AI model selection identified in this study can be directly implemented in institutions training pre-service foreign language teachers. Teacher educators and curriculum developers may use the the three-phase instructional framework as a replicable template for designing AI-enhanced

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receptive skills instruction in both pre-service and in-service teacher education contexts [14], [20].

Methodology

Research methods. The study employed a mixed-methods research design combining theoretical and empirical methods. At the theoretical level, systematic literature review and critical synthesis were used to identify existing approaches to AI-assisted listening and reading instruction, to map the landscape of relevant AI tools, and to construct the conceptual foundations of the proposed methodological model. Comparative analysis was applied to contrast domestic and international approaches to receptive skill development in pre-service teacher education.

At the empirical level, a quasi-experimental pre-test/post-test design was implemented to measure the impact of AI-integrated instruction on receptive competences outcomes. The independent variable was the type of instructional approach (Claude LLMs and Natural Reader Text to Speech AI-integrated model vs. conventional instruction), while the dependent variables were scores on standardized listening and reading assessments. Student's t-test for independent samples was used to determine the statistical significance of inter-group differences ($p < .05$), and Cohen's d was calculated to assess effect size. Survey methods, including Likert-scale questionnaires and focus group interviews, were employed to capture learner perceptions of AI tool utility, motivational impact, and self-regulated learning behavior, with qualitative data analyzed using thematic analysis.

Data sources. The empirical base of the study consists of data collected from 55 fourth - year bachelor students of specialty A4 Secondary Education, subject specialty A4.02 Secondary Education (Language and World Literature), specialization A4.021 English Language and World Literature, at Ternopil Volodymyr Hnatiuk National Pedagogical University during the spring semester of the 2025–2026 academic year. The experimental group comprised 27 students who received instruction according to the proposed Claude LLMs and Natural Reader Speech to Text AI-integrated methodological model; the control group comprised 28 students who received conventional instruction aligned with existing curricula. Both groups were assessed using the EF SET standardized test for baseline proficiency, and custom pre- and post-experiment listening and reading assessment instruments. Institutional ethics approval was obtained prior to data collection, and all students agreed to participate in the sudy.

Analysis Tools. Statistical data processing was conducted using JASP. Descriptive statistics (means, standard deviations) and inferential statistics (independent-samples t-test, paired-samples t-test, Pearson correlation coefficient) were computed to analyze pre-to-post gains and inter-group differences. Qualitative data from focus group interviews and open-ended survey questions were analyzed using thematic analysis following standard methodological procedures [2].

Limitations of the study. The findings of this study are generalizable to pre-service English language teachers at pedagogical universities with a comparable digital infrastructure and curricular structure to the study site. The quasi-experimental design, while appropriate for the naturalistic educational setting, precludes full random assignment and therefore limits causal inference. Single-institution sampling further constrains external validity. The duration of the experiment (one academic semester, 19 weeks) may be insufficient to assess long-term retention effects. Additionally, the study does not account for individual differences in prior AI tool experience, digital literacy levels, or learning style preferences as moderating variables, which represent directions for future research.

Results

The proposed methodological model for forming English-language listening and reading competence consisted of three interdependent phases (see Figure 1): (1) the preparatory phase, focused on Claude LLMs and Natural Reader Text to Speech AI tools orientation, metacognitive strategy instruction, and establishment of individualized learner profiles; (2) the

e-ISSN: 2786-586X

operational phase, during which students engaged in structured AI-mediated listening and reading tasks embedded within the existing course curriculum; and (3) the reflective phase, during which students analyzed AI-generated feedback and participated in focus group interviews. This three-phase structure draws on the framework of AI-TPACK integration [20] and the microlearning-plus-generative-AI approach [11]. Claude LLMs and Natural Reader Speech to Text AI were incorporated into the model following a rubric-based selection procedure evaluating pedagogical suitability, CEFR alignment, accessibility, adaptive functionality, and feedback quality – criteria informed by AI tool selection typology in higher foreign language education [15], and grounded in in international linguistic frameworks [4] and sociocultural theory [13].

Methodological model
Aim: Integrated formation of listening and reading competences in pre-service EFL teachers

Preparatory phase	Operational phase	Reflective phase
Activities		
• EF SET baseline assessment • Claude LLM tool and Natural Reader Speech to Text AI orientation and training • Metacognitive strategy instruction • Individual learner profile creation • CEFR-level task calibration	• Structured AI-mediated listening tasks (podcasts, dialogues) • AI-mediated reading tasks (adapted texts, LLM scaffolds) • Real-time adaptive feedback via Claude • Prompt-guided comprehension practice • Peer collaboration on AI-generated materials	• Analysis of Claude-generated feedback • Focus group interviews and thematic coding • Post-experiment EF SET and custom assessments • Motivation survey (Likert scales)
Outcomes		
✓ Tool proficiency ✓ Strategic self-awareness ✓ Personalized learning profile	✓ Receptive competences development ✓ Autonomous practice habits	✓ Self-regulated learning ✓ Metacognitive transfer ✓ Measurable receptive competence gains
Theoretical foundations		
Theoretical underpinning • Sociocultural theory (Lantolf & Thorne, 2006) • Comprehensible input (Krashen, 1982) • CEFR Companion Volume (Council of Europe, 2020)	AI tool selection criteria (informed by Lisnychenko, 2025): • pedagogical suitability • CEFR alignment • accessibility • adaptive functionality • feedback quality	

Figure 1. Three-phase methodological model for developing receptive competences

Pre-experiment assessment revealed no statistically significant difference between the experimental (M = 61.4, SD = 7.2) and control (M = 60.8, SD = 6.9) groups on the composite listening competence score ($t(53) = 0.47$, $p = .64$), confirming baseline equivalence. After the 19-week intervention, the experimental group demonstrated a mean score of 72.7 (SD = 6.1), representing an improvement of 18.4%, while the control group achieved a mean score of 64.9 (SD = 7.4), an improvement of 6.7%. The inter-group difference at post-test was statistically

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significant (t(53) = 6.83, p < .001, d = 1.29), indicating a large effect size in favor of the AI-integrated instructional model. Full listening competence statistics are presented in Table 1.

Table 1

Listening competence pre- and post-test results by group

Group	Pre-test M (SD)	Post-test M (SD)	Gain (%)	t(53)	p / Cohen's d
Experimental (n = 27)	61.4 (7.2)	72.7 (6.1)	+18.4%	6.83	< .001 / 1.29
Control (n = 28)	60.8 (6.9)	64.9 (7.4)	+6.7%	—	—
Inter-group difference	t(53) = 0.47, p = .64 (n.s.)			t(53) = 6.83, p < .001	**d = 1.29 (large)**

Note. M = mean; SD = standard deviation; t(53) = t-statistic with 53 degrees of freedom; d = Cohen's d; n.s. = not significant.

Reading competence results followed a similar pattern. Pre-experiment scores were statistically equivalent across groups (experimental: M = 58.3, SD = 8.1; control: M = 57.9, SD = 7.8; t(53) = 0.28, p = .78). At post-test, the experimental group reached a mean score of 70.7 (SD = 6.8), a gain of 21.2%, compared to the control group's mean of 62.6 (SD = 7.5), a gain of 8.1%. This difference was highly significant (t(53) = 7.14, p < .001, d = 1.35), again reflecting a large effect in favor of AI-integrated instruction (see Table 2).

Table 2

Reading competence pre- and post-test results by group

Group	Pre-test M (SD)	Post-test M (SD)	Gain (%)	t(53)	p / Cohen's d
Experimental (n = 27)	58.3 (8.1)	70.7 (6.8)	+21.2%	7.14	< .001 / 1.35
Control (n = 28)	57.9 (7.8)	62.6 (7.5)	+8.1%	—	—
Inter-group difference	t(53) = 0.28, p = .78 (n.s.)			t(53) = 7.14, p < .001	**d = 1.35 (large)**

Disaggregated analysis of reading sub-skills revealed that inferential comprehension (+26.8%) showed the greatest improvement in the experimental group, followed by vocabulary in context (+22.3%) and literal comprehension (+14.7%) (see Table 3).

Survey data collected at the end of the experiment indicated high levels of learner satisfaction with Claude LLM-integrated instruction. Specifically, 89.3% of experimental group participants rated the AI tools as either ‘useful’ or ‘very useful’ for developing their listening skills, and 85.7% reported the same for reading. Focus group interview analysis identified three primary categories of perceived benefit: increased access to authentic language input (91.1% of respondents), immediate and personalized feedback (78.6%), and enhanced motivation to engage in self-directed practice outside formal class time (73.2%). Motivational scales revealed a mean increase in self-reported intrinsic motivation toward English listening practice of 1.8

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points (on a 5-point scale) in the experimental group, compared to 0.4 points in the control group.

Table 3

Experimental vs control group reading sub-skill gains

Reading Sub-Skill	Experimental Gain (%)	Control Gain (%)	Difference (pp)
Inferential comprehension	+26.8%	+9.1%	+17.7
Vocabulary in context	+22.3%	+8.4%	+13.9
Literal comprehension	+14.7%	+6.8%	+7.9

Note. pp = percentage points difference between experimental and control gain.

A Pearson correlation analysis revealed a moderate positive relationship between the frequency of Claude LLMs and Natural Reader Text to Speech AI use outside formal instructional time and post-test listening scores ($r = .54$, $p < .001$), and a similar relationship for reading scores ($r = .49$, $p < .001$), as shown in Table 4. This suggests that students who engaged more consistently with Claude in self-study contexts achieved stronger outcomes, reinforcing the models' emphasis on autonomous, technology-mediated practice as a complement to structured classroom instruction.

Table 4

Correlation analysis results on AI tools use frequency and post-test scores

Variable Pair		Pearson r	p	Interpretation
AI tool use frequency × Post-test listening		.54	< .001	Moderate positive
AI tool use frequency × Post-test reading		.49	< .001	Moderate positive

Note. r = Pearson correlation coefficient; all correlations significant at p < .001.

Discussion

Interpretation of the results. The significantly superior outcomes observed in the experimental group are attributable to several interrelated mechanisms embedded within the proposed methodological model. The adaptive nature of Claude LLMs ensured that each student encountered reading texts calibrated to their individual proficiency level, thereby maximizing comprehensible input [12] and facilitating the zone of proximal development [13]. This mechanism aligns with assessments of intelligent tutoring systems in language teacher education, which similarly attribute effectiveness to real-time feedback and adaptive task design [6].

The integration of metacognitive strategy instruction in the preparatory phase, absent from conventional instruction and often neglected in prior AI-assisted language learning studies, appears to have equipped learners with the self-regulatory tools necessary to exploit AI feedback productively rather than passively. The high percentage of students reporting enhanced autonomous practice (73.2%) corroborates this interpretation and directly responds to warnings that AI-mediated receptive skills instruction risks fostering overreliance if not accompanied by explicit metacognitive development [8].

e-ISSN: 2786-586X

The particularly pronounced gains in inferential comprehension (+26.8%) within reading tasks are consistent with the hypothesis that AI-generated contextual vocabulary supports and comprehension scaffolds reduce the cognitive load associated with lexical gap-filling, thereby releasing processing capacity for higher-order text interpretation. This finding aligns with observations that AI-driven intelligent tutors are highly effective at personalizing reading tasks and providing immediate feedback under the necessary pedagogical conditions for professional teacher training [14], [25], precisely meeting the conditions most conducive to inferential comprehension gains in line with advanced linguistic descriptors [4].

Comparison with other research. The listening comprehension gains observed in the present study (18.4% in experimental group vs. 6.7% in control group) are broadly consistent with theoretical predictions that personalized AI-driven listening environments outperform traditional instruction [19], [22], and with empirical results reporting significant comprehension gains using AI applications with adaptive feedback [16]. Systematic reviews independently corroborate the superior effectiveness of AI-calibrated listening input over static materials, further supporting the present findings [22]. The reading outcomes (+21.2%) align with findings of a substantial reading comprehension increase using AI-generated content, with variation in magnitudes reflecting differences in intervention duration, tool specificity, and the presence or absence of metacognitive scaffolding [5].

The present findings partially diverge from studies reporting that while learners hold positive perceptions of AI tools and use them frequently, they do not fully trust AI-generated output [23]. This trust gap appears to have been partially bridged by the structured metacognitive scaffolding and curated pedagogical conditions applied in our model [25], as evidenced by the high satisfaction ratings (89.3%) among the experimental group.

The conclusion that motivational and competence gains need not be mutually exclusive when AI tools are embedded within a structured pedagogical model is supported by findings that AI facilitates both personalized learning and skill enhancement in EFL teacher education programs [7]. In the Ukrainian context, researchers offer converging evidence that LLMs hold significant linguodidactic potential for developing receptive language skills [21], [24], while detailed typologies of prompting techniques provide a complementary theoretical basis for understanding why structured Claude interaction supports receptive competence development [18]. Regarding institutional barriers, constraints identified in earlier digital literacy reviews were partially mitigated through pre-experiment infrastructure auditing and targeted professional training [1], [17], [22].

Scientific novelty (detailed). The present study makes distinct contributions to the scholarly literature. It has developed an empirically validated, three-phase methodological model that integrates Claude LLMs and Natural Reader Text to Speech AI for the simultaneous formation of listening and reading competence in pre-service foreign language teachers whose dual role as language learners and future language educators creates unique training requirements. The study has introduced a replicable AI integration procedure that operationalizes AI selection criteria (pedagogical suitability, CEFR alignment, accessibility, adaptive functionality, and feedback quality), and providing a transferable decision-making framework for teacher educators. The study has empirically demonstrated that metacognitive strategy instruction is a necessary prerequisite for effective AI-mediated receptive skills development – a relationship not previously operationalized within a validated instructional model.

Practical significance (detailed). The methodological model developed in this study offers immediately applicable pedagogical resources for teacher educators, curriculum designers, and university administrators. The three-phase instructional framework and the accompanying assessment instruments are designed for direct integration into existing courses within specialty A4.021 English Language and World Literature curricula, including ‘Practical Course of the English Language’ and ‘Methods of Foreign Language Teaching’. Beyond initial

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teacher preparation, the model is readily adaptable for in-service professional development programs, in line with recommendations for AI integration in both pre-service and in-service teacher training. The study's findings also respond to national quality assurance calls for increased AI integration in language methodology programs [1], as the selected tools are accessible and require minimal institutional investment.

Conclusions

1. A three-phase methodological model comprising preparatory, operational, and reflective phases has been developed for the formation of receptive competences in pre-service foreign language teachers using Claude LLMs and Natural Reader Text to Speech AI. The model systematically integrates metacognitive strategy instruction, structured AI-mediated task performance, and reflective discussions as interdependent didactic components.
2. The experimental validation of the model with 55 students of the specialty A4 Secondary Education, subject specialty A4.02 Secondary Education (Language and World Literature), specialization A4.021 English Language and World Literature at Ternopil Volodymyr Hnatiuk National Pedagogical University confirmed its statistically significant superiority over conventional instruction. Listening competence in the experimental group improved by 18.4% while reading competence improved by 21.2% with both effect sizes classified as large.
3. Claude LLMs and Natural Reader Text to Speech AI were identified as pedagogically appropriate for integration into the model based on a systematic rubric-based evaluation assessing criteria grounded in established frameworks for AI tool selection in higher foreign language education: pedagogical suitability, CEFR alignment, accessibility, adaptive functionality, and feedback quality.
4. Inferential comprehension emerged as the reading sub-skill most responsive to AI-integrated instruction (+26.8%). Learner survey data confirmed that 89.3% of participants found Claude LLMs useful for listening development, and 73.2% reported enhanced motivation for autonomous language practice. These findings extend beyond competence gains to include broader self-regulatory and affective outcomes.
5. The study establishes that metacognitive strategy instruction and the optimization of pedagogical conditions are necessary prerequisites for the effective exploitation of AI-generated feedback in listening and reading tasks. This finding distinguishes the proposed model from prior approaches that treat AI as a standalone supplement.

Prospects for further research include longitudinal studies examining retention effects of AI-integrated instruction beyond the experimental period, multi-institution replication studies, investigation of differential effectiveness for learner profiles with special educational needs, and development of assessment frameworks specifically designed to measure AI-mediated receptive competence development.

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