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USING ADAPTIVE ARTIFICIAL INTELLIGENCE TECHNOLOGIES TO DEVELOP UNIVERSITY STUDENTS' ENGLISH LISTENING COMPREHENSION SKILLS

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ABSTRACT

The diversity of university students' English proficiency makes uniform listening instruction insufficient for many learners. This article explores the use of adaptive artificial intelligence technologies for developing English listening comprehension skills in higher education. The research is designed as an analytical-methodological study that synthesises CEFR proficiency principles, metacognitive listening theory, responsible AI guidance and recent evidence from AI-supported EFL listening research. The main result is an adaptive listening cycle in which diagnostic evidence guides the selection of differentiated audio input, task complexity, scaffold availability, feedback and subsequent practice. The model defines adaptation across five variables: speech rate and audio length, lexical and syntactic complexity, task demand, transcript support and feedback type. It further provides a progression matrix for B1 to B2 listening work and a teacher-controlled implementation algorithm. The article argues that adaptive technology can reduce both overload and under-challenge, but only where adaptation is transparent, pedagogically justified and monitored by a teacher. The study offers a foundation for future experimental implementation in Uzbek university English courses.

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Keywords: Adaptive artificial intelligence; listening comprehension; differentiated instruction; English language teaching; higher education; CEFR

АННОТАЦИЯ

Различия в уровне владения английским языком у студентов высшей школы делают единообразное обучение аудированию недостаточным для многих обучающихся. В статье рассматривается применение адаптивных технологий искусственного интеллекта для развития навыков понимания англоязычной речи на слух в высшем образовании. Исследование выполнено в формате аналитико-методологической работы, объединяющей уровневые принципы CEFR, метакогнитивную теорию аудирования, рекомендации по ответственному использованию ИИ и современные данные исследований ИИ-поддержки в EFL-аудировании. Основным результатом является адаптивный цикл обучения, в котором данные диагностики определяют выбор дифференцированного аудиоматериала, сложности задания, объёма опор, типа обратной связи и последующей практики. Модель описывает адаптацию по пяти параметрам: темп и продолжительность речи, лексико-синтаксическая сложность, требования задания, поддержка транскриптом и тип обратной связи. Делается вывод, что адаптивные технологии способны снизить как перегрузку, так и недостаточную сложность обучения, если адаптация прозрачна, педагогически обоснована и контролируется преподавателем.

Ключевые слова: адаптивный искусственный интеллект; аудирование; дифференцированное обучение; обучение английскому языку; высшее образование; CEFR.

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ANNOTATSIYA

Oliy ta’lim talabalarining ingliz tilini egallash darajasi turlicha bo‘lgani sababli tinglab tushunishni bir xil topshiriqlar asosida o‘qitish ko‘plab talabalar uchun yetarli bo‘lmaydi. Ushbu maqolada oliy ta’limda ingliz tilidagi tinglab tushunish ko‘nikmalarini rivojlantirishda adaptiv sun’iy intellekt texnologiyalaridan foydalanish imkoniyatlari ko‘rib chiqiladi. Tadqiqot CEFR daraja tamoyillari, metakognitiv tinglash nazariyasi, mas’uliyatli SI tavsiyalari va SI qo‘llab-quvvatlagan EFL tinglashiga oid zamonaviy dalillarni birlashtirgan analitik-metodologik ish sifatida tashkil etilgan. Asosiy natija diagnostika ma’lumotlari asosida differensial audio material, topshiriq murakkabligi, tayanch vositalar, qayta aloqa turi va keyingi mashqlarni tanlashga xizmat qiluvchi adaptiv tinglash siklidir. Model moslashtirishning besh o‘zgaruvchisini belgilaydi: nutq tezligi va davomiyligi, leksik-sintaktik murakkablik, topshiriq talabi, transkript tayanchi hamda qayta aloqa turi. Adaptiv texnologiya o‘qituvchi nazorati va pedagogik asos mavjud bo‘lganda ortiqcha qiyinchilik hamda yetarli murakkablik bo‘lmasligi muammosini kamaytirishi mumkin.

Kalit so‘zlar: adaptiv sun’iy intellekt; tinglab tushunish; differensial ta’lim; ingliz tilini o‘qitish; oliy ta’lim; CEFR

INTRODUCTION

A university English group is rarely homogeneous. Some students can follow the main argument in a recorded lecture but miss detail, whereas others cannot segment rapid speech or recognise familiar vocabulary in connected pronunciation. When all students receive the same recording, speed, number of repetitions and task demand, weaker learners may become anxious and stronger learners may be insufficiently challenged. Adaptive instruction aims to address this difference without lowering educational expectations.

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Artificial intelligence technologies can help teachers organise differentiated listening pathways. Audio length and speech rate can be adjusted; scripts may be levelled; prompts and feedback can respond to recurring errors; transcripts may be made available only when needed. Yet pedagogical adaptation cannot be left entirely to an automated system. Listening competence involves meaning, culture and communication, and these require teacher judgement.

The purpose of this article is to develop a teacher-controlled adaptive AI model for university English listening comprehension. It identifies the adjustable variables, defines a progression mechanism and specifies how adaptation can be evaluated in future classroom research.

MATERIALS AND METHODS

An analytical-methodological approach was applied. Sources were reviewed for three purposes: to identify listening outcomes appropriate for level-sensitive instruction; to identify evidence-based advantages and risks of AI support; and to formulate an ethically responsible adaptation cycle. The CEFR Companion Volume supplies descriptors for comprehending spoken language, while recent research (Ha, 2025; Xiao, 2025; Jantakoon et al., 2025) provides evidence on AI-supported listening. UNESCO guidance informs privacy, transparency and teacher oversight.

The model was constructed by matching common learner difficulties with five adaptation variables and by arranging them within a diagnostic, instructional and evaluative cycle. The proposed design is not an experimental result; it is a systematic framework for later application and measurement.

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RESULTS

Five Variables of Adaptive Listening Support

Table 1. Variables for AI-supported adaptation

Adaptive variable	Lower-support demand / emerging learner	Higher challenge / progressing learner
Speech rate and length	Shorter audio; strategic pauses; replay enabled.	Longer audio; natural rate; fewer replays.
Lexical and syntactic complexity	Controlled core vocabulary; shorter clauses.	Academic vocabulary; embedded clauses and discourse markers.
Task demand	Gist and explicit detail identification.	Inference, attitude, evaluation and note-taking.
Transcript support	Delayed transcript excerpts and keyword support.	Transcript withheld until reflective review.
Feedback type	Specific hints and replay suggestions.	Analytical feedback and self-correction prompt.

Adaptive Listening Cycle

Table 2. Teacher-controlled adaptive listening cycle

Cycle step	Input or evidence	Adaptive decision
1. Baseline diagnosis	Short listening test and self-assessment.	Allocate initial level-sensitive pathway.
2. Target setting	CEFR-linked outcome for the lesson or unit.	Keep same competence goal across pathways.
3. Differentiated task delivery	AI-prepared versions and task sets.	Adjust input and support, not learning value.
4. Formative evidence	Answers, error categories and reflection logs.	Increase, retain or reduce scaffolding.
5. Transfer task	Authentic human audio or communicative activity.	Check whether learning transfers beyond AI material.

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A key principle is equal educational dignity: differentiated material should not permanently label learners or restrict them to simplified content. Students may move between pathways according to evidence. Adaptation should make the route appropriate while preserving a shared objective, such as understanding the main point and supporting evidence in a short academic talk.

Progression Matrix for B1–B2 University Listening

Table 3. Proposed adaptive progression

Progression stage	Illustrative audio input	Target outcome	Support
B1 foundation	Two-minute campus dialogue on arranging study tasks.	Identify situation, purpose and explicit details.	Vocabulary preview and one transcript excerpt.
B1+ transition	Two-to-three-minute interview on study abroad experience.	Identify opinion and supporting reasons.	Optional replay and post-listening transcript.
B2 developing	Three-minute mini-lecture on AI ethics in education.	Take notes and distinguish claim from example.	No initial transcript; reflective feedback.
B2 transfer	Authentic podcast/interview excerpt.	Summarise and evaluate speaker viewpoint.	Strategy checklist only.

Ethical and Pedagogical Control

Adaptive technologies may generate useful learner data, but data collection must be proportionate and transparent. Teachers should avoid uploading names, personal profiles or assessment records to unapproved platforms. Students should be informed when an audio file or feedback activity has been supported by AI. The teacher must also audit whether the tool repeatedly directs certain learners towards overly simplified practice, as such patterns could limit progress rather than enable it.

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DISCUSSION

The proposed adaptive model strengthens the connection between differentiation and listening competence. Xiao's (2025) randomised trial suggests that AI-supported listening environments can contribute to comprehension and affective benefits, while Ha's (2025) findings show that learners still require guidance concerning voice naturalness and the usefulness of materials. An adaptive model responds to both findings: it expands personalised support while making quality assurance and transfer to authentic listening mandatory.

In Uzbekistan, the model corresponds with the demand to improve foreign-language teaching quality while using contemporary educational technologies responsibly. It is feasible for higher education courses because teachers can begin with a small set of graded listening texts rather than a technically complex fully automated system. A controlled classroom model may include three versions of an audio task, a learning management system for distribution and a teacher-maintained progress sheet.

A future empirical study may compare an adaptive AI-supported group with a group using uniform digital recordings. Appropriate measures include parallel listening tests, listening-anxiety questionnaires, learning-log analysis and teacher observations of movement between support pathways. Without such data, claims of effectiveness should remain provisional.

CONCLUSION

Adaptive artificial intelligence technologies offer a practical means of differentiating listening input, task challenge, support and feedback for university students. The model proposed in this article is centred on diagnosis, CEFR-linked objectives, transparent adaptation, teacher supervision and transfer to authentic listening. It provides a defensible basis for classroom implementation and later empirical examination in Uzbek higher education.

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