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FORMATION OF LISTENING SKILLS AT ENGINEERING STUDENTS OF TECHNICAL HIGHER EDUCATION INSTITUTIONS

ФОРМУВАННЯ НАВИКІВ АУДІЮВАННЯ У СТУДЕНТІВ ІНЖЕНЕРНИХ СПЕЦІАЛЬНОСТЕЙ У ТЕХНІЧНИХ ЗАКЛАДАХ ВИЩОЇ ОСВІТИ

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The relevance of this study is driven by the increasing demand for future engineers equipped with effective English listening skills, capable of participating in intercultural communication and professional collaboration in a globalized environment. Listening is recognized as a core component of communicative competence for engineers.The purpose of the research is to identify and justify methodological approaches to the development of English listening proficiency among engineering students in technical higher education institutions and to evaluate their pedagogical effectiveness. A comprehensive methodological framework was applied, including theoretical analysis of scholarly sources, systematization of didactic strategies, and synthesis of instructional practices. Comparative analysis of teaching models was also conducted. The study hypothesizes that the integration of active, incidental, direct, and eclectic teaching methods can enhance the listening competence of engineering students. Influential motivational, cognitive, and sociocultural factors were characterized. The research methods included curriculum analysis, observation of instructional activities, implementation of authentic materials, and evaluation of digital tools. Barriers to understanding were identified; motivational factors were assessed; the effectiveness of multimedia learning was evaluated. The findings systematize current approaches to English listening instruction and offer pedagogical recommendations for the development of students' professional listening competence. Educational technologies were summarized to align with students' technical profiles. The theoretical significance lies in the conceptual basis provided for updating professional language instruction in engineering education. The practical significance is seen in the adaptation of proposed methodologies to specific learner needs. The originality of this study lies in a synthesized model for profession-oriented listening instruction using blended methodologies. Conclusions highlight the interdisciplinary relevance of listening competence. Future research will include testing this model in experimental settings. A limitation of the study is the variability of language proficiency levels among students. Article type - theoretical.
Key words: *listening competence; engineering education; methodological approaches; intercultural communication; pedagogical effectiveness; educational technologies.*

Актуальність цього дослідження зумовлена зростаючим попитом на майбутніх інженерів, які володіють ефективними навичками аудіювання англійської мови, здатними брати участь у міжкультурному спілкуванні та професійній співпраці в глобалізованому середовищі. Аудіювання визнається ключовим компонентом комунікативної компетентності інженерів. Метою дослідження є визначення та обґрунтування методологічних підходів до розвитку рівня аудіювання англійської мови серед студентів-інженерів у вищих технічних навчальних закладах та оцінка їхньої педагогічної ефективності. Було застосовано комплексну методологічну базу, що включає теоретичний аналіз наукових джерел, систематизацію дидактичних стратегій та синтез навчальних практик. Також було проведено порівняльний аналіз моделей навчання. Дослідження висуває гіпотезу, що інтеграція активних, випадкових, прямих та еклектичних методів навчання може підвищити рівень аудіювання студентів-інженерів. Було охарактеризовано впливові мотиваційні, когнітивні та соціокультурні фактори. Методи дослідження включали аналіз навчальної програми, спостереження за навчальною діяльністю, впровадження автентичних матеріалів та оцінку цифрових інструментів. Було виявлено бар'єри для розуміння; оцінено мотиваційні фактори; оцінено ефективність мультимедійного навчання. Результати систематизують сучасні підходи до навчання аудіювання англійської мови та пропонують

педагогічні рекомендації щодо розвитку професійної аудіювальної компетентності студентів. Освітні технології були узагальнені для відповідності технічним профілям студентів. Теоретична значущість полягає в концептуальній основі, що забезпечується оновленням професійної мовної підготовки в інженерній освіті. Практична значущість полягає в адаптації запропонованих методологій до конкретних потреб учнів. Оригінальність цього дослідження полягає в синтезованій моделі професійно-орієнтованого навчання аудіювання з використанням змішаних методологій. Висновки підкреслюють міждисциплінарну актуальність компетенції аудіювання. Подальші дослідження включатимуть тестування цієї моделі в експериментальних умовах. Обмеженням дослідження є мінливість рівнів володіння мовою серед студентів. Тип статті - теоретичний.
Ключові слова: *аудіювальна компетенція; інженерна освіта; методологічні підходи; міжкультурна комунікація; педагогічна ефективність; освітні технології.*

INTRODUCTION

Future employers of engineering students expect their employees to have good English listening skills. Good active listeners demonstrate skills such as avoiding follow-up responses and providing supportive and appropriate verbal and nonverbal feedback. To help engineering students develop good listening skills, technical higher education institutions have developed an English language curriculum that emphasizes English communication skills and focuses on listening skills. Listening is a crucial part of professional communication in English. It constitutes half of verbal activity and plays an important role in educational, professional, social, and personal situations. It is also an extremely complex activity that requires many different types of knowledge and interacting with other processes. Many English teachers find teaching listening difficult because it is unclear what skills are involved, what actions can lead to their improvement, and what helps good comprehension. Engineering students are also frustrated by the lack of rules to memorize to become good listeners. Developing listening skills takes time and practice.

LITERATURE REVIEW

L. Janusik [1] discovered challenges in teaching listening skills and studied modern practices in listening instruction, offering insight into pedagogical gaps and the need for reflective teaching strategies.

Pedagogical strategies and active Learning are studied in works of J. Huerta-Wong and R. Schoech [2], H. Weger and G. Brown [3]. J. Huerta-Wong and R. Schoech stated that experiential learning environments can foster active listening, linking engagement with real-world skill development. H. Weger and G. Brown proved that paraphrasing during Enlish interviews improves perceptions of listening skills, suggesting interactive methods boost effectiveness.

Technology Integration and Innovations in teaching English listening skills are studied by T. Hasumi [4], B. Warner [5]. T. Hasumi explored technology-enhanced language learning in English language education. B. Warner provided practical uses of Artificial intelligence to support listening activities, including transcription assistance and personalized listening practice.

A. Wolvin and C. Coakley [6] predicted future trends in listening education, highlighting the shift toward metacognitive strategy training and lifelong listening development.

M. Abedin [7] and Z. Alam [8] investigated listening skill instructions in universities, stressing the need for contextualized materials and better teacher training to support non-native learners.

AIMS AND OBJECTIVES

This article aims to analyze and justify methodological approaches to the development of English listening skills at engineering students of technical higher education institutions and to assess their educational effectiveness.

METHODOLOGY AND RESEARCH METHODS

To achieve the outlined research objective, a comprehensive set of theoretical and empirical methods was employed. The theoretical component included: analysis of pedagogical, linguistic, and methodological literature addressing the instruction of English listening skills to engineering students in technical higher education institutions; systematization of educational and professional programs, along with syllabi of relevant academic disciplines; synthesis of instructional practices, aimed at integrating profession-oriented strategies; comparative analysis of teaching models, to evaluate varied methodological frameworks.

The empirical methods comprised: curriculum analysis, to examine the integration of listening instruction within English academic programs; observation of instructional activities, capturing pedagogical dynamics and learner responses; implementation of authentic listening materials, tailored to engineering-specific contexts; evaluation of digital tools, assessing their effectiveness in enhancing listening proficiency.

RESULTS

Most engineering students consider English as a way to good job opportunities, competitive salaries, development of technical skills, meeting industry demand, personal interest in science, problem solving, and much more. To help engineering students develop their skills, universities are designing an English curriculum that emphasizes English communication skills and focuses on listening, speaking, reading, and writing.

In previous decades, teachers have focused more on developing reading and writing skills than listening and speaking. As writing and reading skills were given more importance in the exams, students focused more on writing and reading skills, not focusing on listening and speaking skills as they were not given priority.

Now there is a significant shift toward developing effective listening skills. Listening competence encompasses both the comprehension of spoken discourse and the assimilation of linguistic input. This means not only understanding the words, but also being aware of how the speaker feels about what he or she is communicating. Listening is key to successful working relationships between employees and between management and staff. It is said that good listeners are often some of the best speakers.

Teaching listening skills to engineering students at technical universities involves participating in various types of learning activities, such as listening to professional audio clips, participating in class discussions, using authentic materials such as audio or video recordings, and participating in pre-listened tasks such as prediction or brainstorming. By developing professional listening skills, English teachers improve students' overall language proficiency.

In today's globalized world, engineers are expected to have effective listening skills - a skill that underlies all positive human relationships; developing professional listening skills at university is a way to successful career in future. Many businessmen and top leaders attribute their success to better English listening skills. Good English listening skills are a quality that a successful leader must possess. Those who listen to their employees are in a good position to lead their entire team. It is impossible to imagine any business where English listening skills are not needed. It is known that engineering students have to listen a lot throughout their academic life and professional careers.

After graduating from technical higher education institution, engineers, as professionals, are required to attend various conferences, seminars, meetings, workshops, and symposiums. During all these events, they should listen to the speakers with great interest, which will help them not only deepen their knowledge, but also give them a basis for reflection or expression of opinion. Only a good listener can properly demonstrate their knowledge and talent in the form of a speech. Engineers have to attend and listen to presentations for various reasons and occasions. Moreover, they have to listen to many people every day, such as friends, colleagues, clients, junior and senior employees.

Teaching English listening skills to engineering students in technical higher education institutions can be a challenging task, as all students have different levels of English language.

Factors that affect listening comprehension:

Language proficiency. Beginners have difficulty with basic vocabulary and sentence structure, while intermediate students may not understand more complex vocabulary and idioms. Students' familiarity with the language and the opportunity to be exposed to a variety of listening will influence their listening skills.

Distraction. Background noise can distract students from understanding. The ability of engineering students to listen to language depends on both their concentration and motivation. Many of them focus only on speaking skills. Active listening, which includes maintaining eye contact, using appropriate body language, and participating in class discussions, can improve listening skills.

Speed. English native speakers often speak at a natural pace, which may be too fast for students.

Cultural and contextual awareness. Students who are unfamiliar with the cultural features or context expressed in English slang, humor, or idiomatic expressions have significant problems with listening comprehension.

Teaching English listening has changed significantly over the years. Traditional methods focused primarily on listening to find general meaning or to memorize content. However, modern approaches offer more variety in terms of techniques, combining theory with practical application to meet the needs of different students. Different approaches to teaching listening skills to students were analyzed by Adin Fauzi [9] in his work about challenges in teaching integrated-listening skill in the university and in the article about innovative approaches to teaching listening skills in language education [10].

The direct approach involves clear, focused listening exercises aimed at improving specific listening skills. In this approach, the teacher controls the listening process by providing specific tasks that direct students' attention to specific elements of the audio recording, such as key vocabulary, main ideas, or detailed information.

For example, a teacher might play a recording of a business conversation and ask students to highlight certain phrases or key terms. Other tasks might involve listening to identify specific information, such as dates, names, or numbers. This approach is effective in providing students with a structured way to develop their listening and language comprehension skills. However, it can sometimes be too rigid, limiting students' ability to engage with authentic, unprepared language. Therefore, the direct approach is often best used in combination with other methods to ensure comprehensive listening.

Within the integrated approach, auditory comprehension is not treated as an isolated ability but is combined with other linguistic competencies like verbal expression, reading, and composition.

This strategy mirrors authentic language use, where interaction typically entails the concurrent application of multiple communication functions.

For example, after listening to a podcast about a business meeting, students might be asked to retell the content in their own words or discuss the topics raised. This method helps students make connections between different skills, contributing to a deeper understanding of the features of language use.

The incidental approach for developing listening skills among engineering students rests on the premise that language acquisition can happen naturally through engaging with the target language in context. In this framework, listrning tasks are embedded into routine academic activities, enabling students to absorb information passively through practical, professional cases. Listening to authentic English speech, such as dialogues from corporate settings, offers students valuable familiarity with varying accents, speech tempo, and informal expressions.

The eclectic approach combines elements of different methods, giving English teachers the flexibility to tailor listening instruction to their students' needs. Teachers can use direct, integrated, and concurrent approaches to create a personalized lesson plan that meets students' professional needs and language proficiency levels.

For example, a teacher might begin a lesson with a structured listening task (direct approach) to focus on specific details, then move on to a more free-form activity. The eclectic approach provides flexibility and ensures that listening tasks are varied and engaging, making it ideal for classrooms with diverse audience.

Now that we've analyzed the basic approaches to teaching listening skills, let's look at some practical ways to incorporate listening instruction into language education. These techniques can make listening exercises more interesting and interactive while still focusing on professional language use:

Limit the use of translation. Translation is a habit that needs to be limited because students tend to panic when they realize they don't know every word. When students hear a new word or expression, they need to connect it to something: context, pictures, action. Using synonyms can be very helpful in explaining an English word using other English words.

Don't confuse listening skills with literacy skills. When an English teacher initially presents a new listening task, students are encouraged to concentrate on listening reception rather than relying on written transcripts. Because students with low literacy levels will be at a disadvantage in mastering the listening experience; students who are confident in literacy often want to see and read the words while listening, but this will deprive them of the opportunity to really listen. This can be a real confidence booster when students realize how much they understand without help. After students have listened to the material for the first time without subtitles or text and discussed some questions, they can listen and watch again with subtitles or text.

Use video because students can watch and listen. We want to prepare our engineering students to participate in real professional dialogues. A large part of this listening involves reading the speaker's facial expressions and body language, which can vary by culture. Therefore, most of the time, students need to practice their listening skills by watching professional videos or observing other people's conversations.

Let's think about how Artificial intelligence can help students with improving their listening skills. Artificial intelligence is still not always consistent or accurate enough to trust without testing, and students cannot fully rely on Artificial intelligence when it comes to things like pitch, accents, and all those tricky things that make learning English language both exciting and challenging.

Nevertheless, there are plenty of opportunities for practicing listening skills, and there is no reason to give up on learning, as long as teachers can make it clear to their students that Artificial intelligence will continue to make mistakes, so they should clarify anything they are unsure of with their teacher, not the computer.

Tutoring with ChatGPT Voice. ChatGPT launched its voice control feature and it does a great job of imitating the pronunciation of fast-talking English speakers, although it doesn't always make the necessary adjustments that students need to understand spoken English. However, with its huge data set, clear pronunciation, and the ability to use it anywhere, students can use some life hacks for practice.

Voice Generation. English teachers sometimes need a different voice speaking English to create teaching materials. Whether there are some dialogues, voice-overs, or something else, accessing more voices speaking English in different modes has always been either too time-consuming or not available. Artificial intelligence can help English teachers record teaching audio materials that sound quite natural using voice generators. Teacher can create about 10 minutes of content per month for free and upload it in mp3 format for use in classes.

YouTube Quizzes. YouTube is as an excellent resource for enhancing English auditory comprehension, offering students access to materials across diverse topics and enabling them to grasp the speaker's message. There have been ways for students to develop their listening skills using YouTube videos for a long time, but they have always required a lot of effort from the student. Ultimately, this leads to a more passive process that doesn't help listening skills as much as we would like. There are several tools that allow teachers to instantly create

quizzes from YouTube videos, including Quizizz and one of the most popular educational technology tools, MagicSchool.ai.

While there are many interesting ways to use Artificial intelligence to practice English listening skills, the technology is still in its infancy, and the speaking/ listening aspects seem to be given less attention than the reading/writing aspects.

The advantage of using Artificial intelligence in English lessons is the possibility of improving listening instructions. Specially designed tools that track learning progress in real time, stimulate engagement through professional interactive tasks, and meet the needs of each individual. Therefore, English teachers can develop inventive listening schemes, carefully exploiting the capabilities of Artificial intelligence and equipping students with the necessary skill set to successfully survive in a highly competitive professional environment. The introduction of Artificial intelligence in education means improving pedagogy, increasing the level of learning and inclusion. This makes a significant contribution to the modernization of teaching strategies.

DISCUSSION AND CONCLUSIONS

Since listening plays a vital role in developing communication skills, students need to pay more attention to listening skills and follow the right approach to developing them. English teachers are advised to provide proper training in developing listening skills for effective development of students. Students need to understand the vocabulary and accent of the speaker to better understand the information. If students focus more on listening skills, they will succeed in developing communication skills. It is important for the English teacher to provide students with various opportunities to practice listening skills and actively participate in the listening process. Usual listening exercises may not correspond to the diverse needs of students, leading to disappointment.

Artificial intelligence can be effectively integrated into listening comprehension exercises, thereby radically changing learning strategies and improving student outcomes. Developing different listening tasks based on Artificial intelligence should select the right tools. By adapting tools to students' needs, combining Artificial intelligence with traditional methods, and addressing potential ethical concerns, teachers can use the potential of Artificial intelligence to create engaging and effective listening practices. A thoughtful implementation of Artificial intelligence ensures that it becomes a valuable partner in the learning process, helping students and teachers achieve their goals.

Integrating English listening skills training for engineering students at technical universities is crucial to equipping them with the skills they need to thrive in the complex and ever-changing engineering profession. Technical universities can develop students' English listening skills by implementing their technical expertise through a comprehensive strategy that prioritizes integrated curriculum design, active learning, and technology-enabled learning. By fostering collaboration between faculty, administration, and industry partners, technical universities can equip engineering students with the good listening skills necessary for professional communication, effective collaboration, and contribution to the international engineering community.

Since the theoretical analysis of the selected problem does not claim to be an exhaustive description of the methods of teaching listening skills to engineering students of technical higher education institutions, we see the prospects for further scientific research in the generalization of the latest methods that meet the characteristics of the modern information environment and the challenges of the time.

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