Methods of using digital technologies for the development of students' listening comprehension strategies in higher educational institutions

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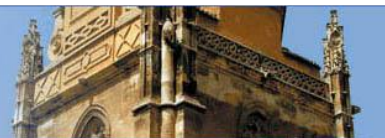**Olena Konotop[1],Oleksandra Bondar[2],Liubov Terletska[3],Svitlana Kyrychenko[4],Ganna Ovsyanko[5]**

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ABSTRACT

The research is topical because of the mass inclusion of students in the digital world, the importance of listening comprehension in foreign language studies in higher educational institutions, the challenges of distance and blended learning. The aim of the study was to establish the effectiveness of digital technologies (Zoom, YouTube channel, Instagram, Kahoot, Google Forms, Padlet) in the development of listening comprehension skills in students of higher educational institutions (HEIs). The research involved qualitative and quantitative analysis of data, simulation. The author's programme intended for the development of students' listening comprehension strategies in HEIs was elaborated and experimentally tested in the course of the research. The implementation of the proposed programme allowed improving the level of respondents' academic performance in terms of listening comprehension. The programme involved the adequate student participation, a differentiated approach, the variability of digital technologies used (Zoom, YouTube channel, Instagram, Kahoot, Google Forms, Padlet), providing opportunities for creativity. The programme implementation resulted in the increased number of students with excellent grades in listening comprehension by 11.7%, with good grades — by 25%. The study confirmed the positive attitude of students to the use of digital technologies in foreign language learning, outlined the conditions for the development of students' listening comprehension strategies in HEIs. The research results can be used to develop students' listening comprehension skills in distance or blended learning. The prospect for the further research is the application of the obtained results to the development of students' skills in other types of speech activity in foreign language classes. A separate area of research is the study of the impact of digital technologies on the development of students' foreign language competence and the preparation of methodological advice for foreign language teachers.

Keywords: digitalization, foreign language competence, students, content of education, speech activity, non-linguistic majors, foreign language.

INTRODUCTION

Powerful digitalization encompasses all spheres of activity. Digital technologies have a significant impact on the educational processes. They enabled the educational process in the context of total social distancing. Digital technologies have minimized the destructive impact of the pandemic on educational processes. Digital technologies have significant potential in teaching a foreign language in HEIs. They allow to fully realize the content of education and to develop students' foreign language competence. This is especially true for students of non-linguistic majors. Lack of direct communication entails difficulties in full mastering of various types of speech activities. Listening comprehension is one of them. It involves listening, comprehension and reproduction of the material. Digital technologies have enabled teachers to develop adequate listening strategies in students. This also necessitates the elaboration or adjustment of methods of using digital technologies to develop students' listening comprehension strategies in HEIs.

The main approaches to the methods, techniques and forms of using digital technologies in the development of listening comprehension skills in students of non-linguistic majors require further research. The issues of the effectiveness of various digital technologies applied in listening comprehension with different levels of academic performance in a foreign language remain poorly studied. The introduction of a differentiated approach in the development of listening comprehension strategies in students of non-linguistic majors requires a detailed justification. It is important to establish the correlation between the effectiveness of foreign language teaching methods with the help of digital technologies and the level of listening comprehension skills of students of non-linguistic majors.

The aim of the study is to empirically test the effectiveness of the use of digital technologies in the development of listening comprehension strategies in students of non-linguistic majors.

The research objectives:

- work out an author's programme for the use of digital technologies for the development of listening comprehension skills in students of higher educational institutions;
- establish the current and achieved level of students' listening comprehension skills;
- determine the effectiveness of the introduction of author's use of digital technologies for the development of listening comprehension skills in students of higher educational institutions.

Research hypothesis: the use of digital technologies contributes to the improvement of students' listening comprehension strategies in higher educational institutions.

LITERATURE REVIEW

Learning and digital technologies are important concepts of the present in general and in the pandemic period in particular (Williamson et al., 2020). Digital technologies are tools used to improve the quality and management of education, increasing the competitiveness of graduates of HEIs in the labour market (Khamidov & Kahhorov, 2020). The education is digitalized through access provided to educational content around the world, through learning in an interactive environment (Ordov et al., 2019). Digital technologies are considered as tools to make teaching more professional, improving learning effectiveness and are the result of optimal consideration of digitalization in the design of educational programmes (Alonso de Castro & García-Peñalvo, 2020). Digital media is a lever to create competitive advantages between educational institutions in the market of educational services (Kryukov & Gorin, 2017). Digital technologies have penetrated into educational and professional activities, and may completely replace traditional teaching methods in the long run (Qureshi et al., 2021).

The mass introduction of digital technologies in the educational field urges the study of their role in supporting students' achievement of higher education goals (Lacka et al., 2021). The reasonability of the introduction of digital technologies in the educational process is also motivated by the fact that modern students belong to the generation of millennials with a high level of their involvement in the digital world (Ayala-Perez & Joo-Nagata, 2019). It remains important to develop practice-oriented video content, recommendations for the most effective use of digital technologies in foreign language training of students (Mashenskaya & Kozhevnikova, 2020).

When implementing digital technologies in HEIs, it is advisable to take into account the technological, organizational, methodological and professional readiness of the institution to do so and develop an optimal model (Kryukov & Gorin, 2017). The effectiveness of digital technology in higher education depends on the level of digital literacy skills as a basis for improving teaching and learning strategies (Tohara et al., 2021). The positive attitude of the subjects of the educational process to the use of digital technologies, awareness of their disadvantages and advantages are equally important (Štemberger & Čotar Konrad, 2021; Camilleri M. & Camilleri A., 2017).

The effectiveness of the use of digital technologies in foreign language communicative training of students is empirically proven (Kotsyuba & Prokop, 2020). In particular, the use of mobile applications in teaching foreign languages to students is effective (Badan & Onishchenko, 2021).

There is a positive impact of the introduction of digital technologies in foreign language training of students on self-study and independent research activities, the development of critical thinking (Akay et al, 2019). The digital content used in teaching should be aimed at ensuring quality and stable education in the future (Nicolaou, 2021). The digital content used in teaching should be aimed at ensuring quality and stable education in the future (Nicolaou, 2021). Digital technologies make it is easier for students to learn foreign languages, intensify the learning process and improve student academic performance (Pisarenko, 2017). The introduction of digital technologies should take into account the conditions for successful learning a foreign language, in particular the focus of the educational environment on the development of students' creative thinking, communication skills (Horbatiuk et al., 2021). When using digital technologies in the development of listening comprehension strategies, it is appropriate to consider the understanding of learning strategy as a complex of students' conscious learning (Shapran Y. & Shapran O., 2019). The main areas of use of digital information technology in higher education include the development of educational websites and promising tools, methods and technologies of learning with a focus on development and promotion of personalized education (Kraus et al., 2021).

Researchers point to the appropriateness of using online services, WhatsApp and Instagram applications (Andujar, 2020), online courses, project-oriented programming, creative communication-oriented classes (Zubkov, 2020; Yaroslavova et al., 2020; Taufiqurrochman et al., 2020; Almazova et al., 2019), web quests, online quizzes (Mulyadi et al., 2020; Krasnova & Shurygin, 2020; Taghizadeh & Hajhosseini, 2020) in foreign language training of students. Such tools contribute to the transformation of the roles of participants in the educational process (Kacetla & Semradova, 2020), promote the development of students' foreign-language competence (Moradimokhles & Hwang, 2020; Gulnaz et al., 2020). Digital technologies motivate the subjects of the educational process, lay the foundations for continuous foreign language training of students (Tadeyeva et al., 2021). The reason is students' inclination to perceive vivid images, videos, audio, reading texts, chatting, discussion forums in the course of foreign language training (Gulnaz et al., 2020). Researchers see correlations between the use of digital technologies and providing flexibility, convenience and effectiveness of learning (Ivanova et al., 2020) and the level of ICT competence of the teaching staff of HEIs (Asadchykh & Pereloma 2021).

Despite numerous studies on the use of digital technologies in the development of students' skills in various types of speech activities, including listening comprehension, the methodology of using digital technologies in the development of strategies for listening comprehension for students of non-linguistic majors requires adjustment. The reviewed scientific literature foregrounds the need for an empirical study of the effectiveness of the use of digital technologies in the development of students' listening comprehension strategies in higher educational institutions.

METHODS
Research procedure
The study involved three stages: summative, formative and control. The summative stage involved identification of the aim and objectives of the research; groups of students participating in the research were identified, the attitude of respondents to the use of digital technologies in the study of a foreign language was identified, the current level of listening comprehension skills was diagnosed. The formative stage provided for the elaboration and testing of the programme for the development of listening comprehension strategies, taking into account the levels of the respondents' listening skills. The control stage of the study involved re-diagnosing of the achieved level of listening skills, comparative analysis of the current and achieved levels of these skills. Professional text listening comprehension was used to establish the achieved level of listening comprehension skills. At the control stage, the results of the experimental testing of the programme of listening comprehension strategies in students of non-linguistic majors were also summarized.

The experimental study was initiated by the scientific communities of Ukrainian higher educational institutions: Admiral Makarov National University of Shipbuilding, T.H. Shevchenko National University «Chernihiv Colehium», Borys Grinchenko Kyiv University. Academic staff of these educational institutions were the organizers of the experiment. They considered the aim and objectives of the study, developed a questionnaire, carried out a diagnostics, as well as elaborated and tested a programme for the development of listening comprehension strategies.

Research methods used
The study involved such methods as: general scientific methods, surveys of respondents, input and output testing of listening comprehension knowledge, qualitative and quantitative analysis of the data obtained, comparative analysis, simulation to elaborate a programme for the development of listening comprehension strategies. A comparative analysis of the level of listening comprehension skills in students of linguistic and non-linguistic majors was carried out to confirm the effectiveness of the author's programme for the development of students' listening comprehension strategies.

The involvement of students in the creation of educational content was the basis of the author's programme for the development of students' listening comprehension strategies in HEIs. Students were given the opportunity to create texts for listening comprehension, assignments thereto. Students had to share these texts and assignments through the use of digital technology. Texts could be shared via Zoom, YouTube channel, Instagram, Viber. And the questions for listening comprehension were solved through Kahoot, Google Forms. Students were also encouraged not only to compose original texts for further listening comprehension, but also to create presentations for them using Canva tools or Publisher booklets. You could also read the finished texts through the teacher's or your own (if available) YouTube channel.

The author's questionnaire (Appendix) was used to identify the attitude of the participants of the experiment to the use of digital technologies in foreign language training. The questionnaire provides for the identification of the following types of attitudes: positive, contradictory, negative, neutral.

The students were surveyed through Google Forms, the results obtained were processed in Excel. Professional text listening comprehension was used to establish the current level of listening comprehension skills. This level

was determined by the following scales: "excellent" (A-90-100), "good" (B-80-89), (C 70-79); "satisfactory" (D 60-69), (E 50-59); "unsatisfactory" (FX 35-49), (F 0-35).

Sampling

The sample consists of fourth-year students (bachelor's degree) in non-linguistic majors. The respondents from the experimental and control groups were distinguished.

Table 1: Respondents of the survey

Educational institutions	Number of respondents
Admiral Makarov National University of Shipbuilding	50
T.H. Shevchenko National University «Chernihiv Colehium»	47
Borys Grinchenko Kyiv University	81

The age of the respondents is 20-21 years. Two groups of students of Borys Grinchenko Kyiv University were selected to compare the level of listening comprehension strategies in students of linguistic and non-linguistic majors: one — non-linguistic major, the other — linguistic major. The non-linguistic group was a participant in the experiment. The linguistic group had regular studies.

RESULTS

One of the first steps of the summative stage of the study was to determine the attitude of respondents to the use of digital technologies in foreign language training. Figure 1 shows the average survey data on this subject according to the author's questionnaire.
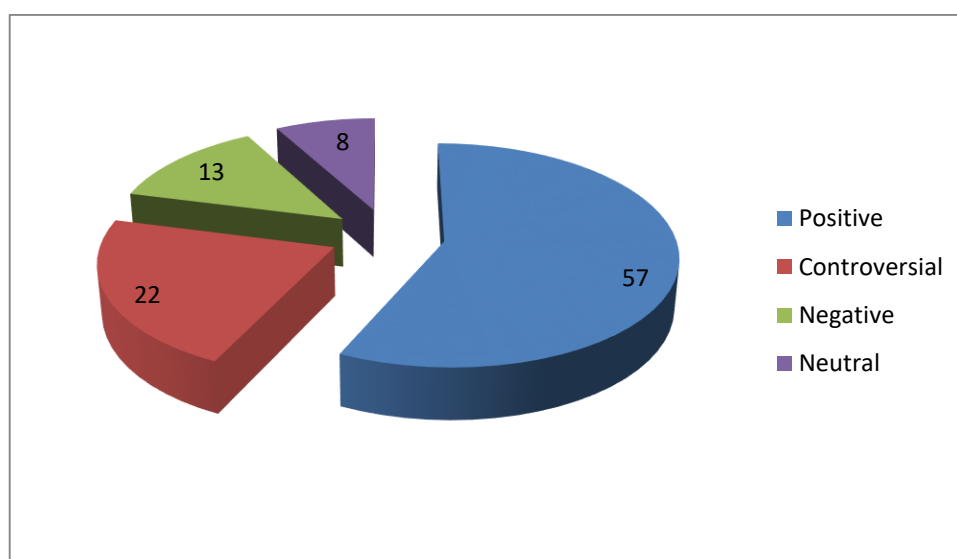

Fig. 1: Attitudes of respondents to the use of digital technologies in foreign language training, %

The positive attitude of more than half of the respondents to the use of digital technologies in foreign language training was the basis for the elaboration and experimental testing of the author's programme for the development of listening comprehension strategies in students of non-linguistic majors.

The second step of the summative stage of the research was the diagnosis of the current level of listening skills. Similar work was carried out at the control stage of the scientific research. Comparative analysis of the obtained data is given in Table 2.

Table 2: Comparative analysis of current and achieved levels of listening comprehension skills, %

Research stages / % of respondents	Levels of listening comprehension skills						
	A	B	C	D	E	FX	F
Admiral Makarov National University of Shipbuilding							
Experimental group							
Summative	10	15	20	25	30	0	0
Control	25	25	30	20	0	0	0

Control group							
Summative	0	20	30	30	20	0	0
Control	0	20	30	40	10	0	0
T.H. Shevchenko National University «Chernihiv Colehium»							
Experimental group							
Summative	0	10	20	25	45	0	0
Control	10	30	40	20	0	0	0
Control group							
Summative	0	15	20	20	45	0	0
Control	0	15	25	25	35	0	0
Borys Grinchenko Kyiv University							
Experimental group							
Summative	10	20	30	20	20	0	0
Control	20	20	45	15	0	0	0
Control group							
Summative	10	20	40	15	15	0	0
Control	10	20	50	15	5	0	0

Analysis of the current level of listening comprehension skills shows the need to create an adequate programme for the development of students' listening comprehension strategies in HEIs. Comparative analysis of current and achieved levels of listening skills confirms the effectiveness of experimental testing of the programme that we proposed.

The author's programme provided for the development of students' listening comprehension strategies in HEIs at certain stages (Figure 2).

At the stage of explaining the aim and objectives of the programme to its participants, detailed instructions were provided to the subjects of the educational process on the creation of texts for listening comprehension and assignments on their content. The students were informed about the variability of using different digital means of conveying texts to classmates and performing assignments based on the listened text. Teachers grouped students into small groups using a differentiated approach at the stage of distribution of functions of participants. Each group had to create their own professional text and assignments for it. This was followed by an exchange of texts and assignments thereto between small groups. Professional texts were developed by students on arbitrary topics. However, they were also offered choices (for those who find it difficult to select). The approximate volume of the professional text was 140-150 words. The next stage involved creation of 12 assignments for the professional text.
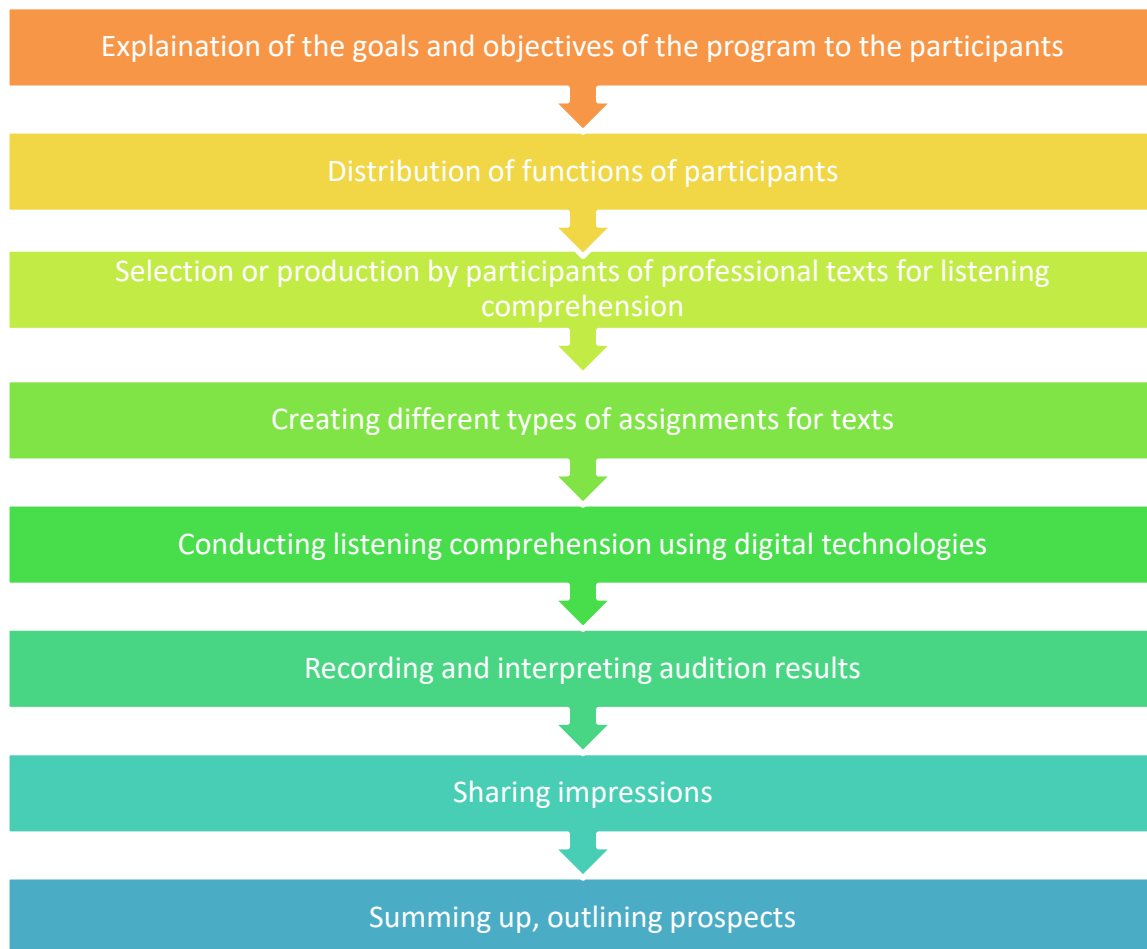
Explaination of the goals and objectives of the program to the participants

Distribution of functions of participants

Selection or production by participants of professional texts for listening comprehension

Creating different types of assignments for texts

Conducting listening comprehension using digital technologies

Recording and interpreting audition results

Sharing impressions

Summing up, outlining prospects

Fig. 2: Stages of the author's programme for the development of students' listening comprehension strategies in HEIs

Different types of assignments had to be used. These are the assignments of filling in the gaps in the text, the answer to the question, expressing the attitude to the event/person in the text, determining the topic and purpose of the statement. At the stage of conducting listening comprehension using digital technologies, students read the composed texts online. They used Zoom, YouTube channel (optional, depending on skills) for this purpose. The reading of the texts was preceded by a mini-presentation to invite as many classmates as possible to work on the text. Students created a presentation using Canva tools or a Publisher booklet for this purpose. The presentation or booklet had to be distributed among classmates in Instagram or via Viber. The purpose of the presentation was to involve as many participants as possible in the work on the text. After the students-authors read the texts online, they offered the assignments that they prepared. They could be made through Kahoot or Google Forms. The results were recorded, which determined the score for the respondents' listening comprehension of the text.

Zoom, YouTube channel, Instagram, Viber (depending on the students' choice) were used for the exchange of impressions and summarizing. Students were also invited to take part in the creative exercise My Listening Comprehension Skills using the capabilities of the Padlet online board.

The programme described above was implemented in experimental groups during the semester. It is important during the programme implementation that each student is given the opportunity to play the role of the author of the text, assignment thereto, as well as the role of the respondent. This will contribute to the optimal development of listening strategies in students. Students of control groups had regular studies. They worked on the texts suggested by the teachers for listening comprehension. The programme for the development of listening comprehension strategies has the following component structure (Figure 3).
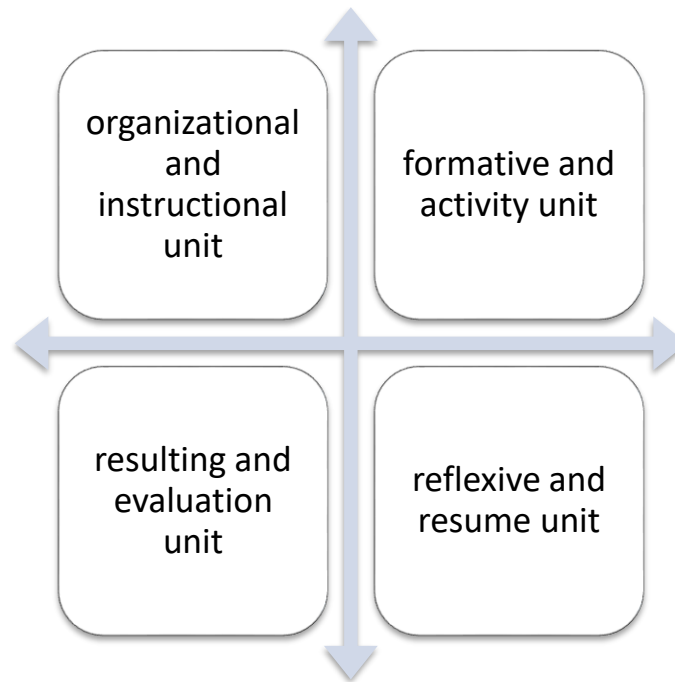
Fig. 3: The structure of the programme for the development of students' listening comprehension strategies in HEIs

The organizational and instructional unit provided instructions to students, consultation with teachers, distribution of roles between the participants. The formative and activity unit involved work on creating texts, preparing questions for them and conducting the listening comprehension itself in digital format. The purpose of the evaluation unit was to record the results of listening comprehension and allotting scores to its participants. The evaluation was carried out according to the following system: "excellent" (A) — 12 correct answers, "good" (B, C) — 11 and 10 correct answers, respectively, "satisfactory" (D, E) — 9 and 8-7 correct answers, respectively; "unsatisfactory" (FX, F) — 6 and 5 or less correct answers. The reflective and resume unit provided for the exchange of impressions, which were the ground for making a conclusion about the expediency of the described form of work.

The programme of the development of students' listening comprehension strategies in HEIs by means of digital technologies is based on a number of principles (Figure 4). The scientific principle is observed through the implementation of the requirements of the educational foreign language programme for the development of listening comprehension skills. The professional orientation principle was implemented through the professional orientation of texts for listening comprehension. Students-authors of texts for listening comprehension are required to have a professional orientation of their statements. The differentiation principle within the proposed programme was implemented through the division of students into small groups taking into account their level of foreign language competence. The adequate participation of each student in various types of work is realized. This ensures compliance with the inclusiveness principle. The variability principle was realized by providing students participating in the experiment with the choice of methods of presentation of professional texts that they created, their communication to classmates and completion of listening comprehension assignments. Each student, depending on his/her digital skills, was able to complete assignments using digital technologies. Visualization was achieved through the use of such digital tools as Zoom, YouTube channel, Instagram, Kahoot, Google Forms, Padlet.
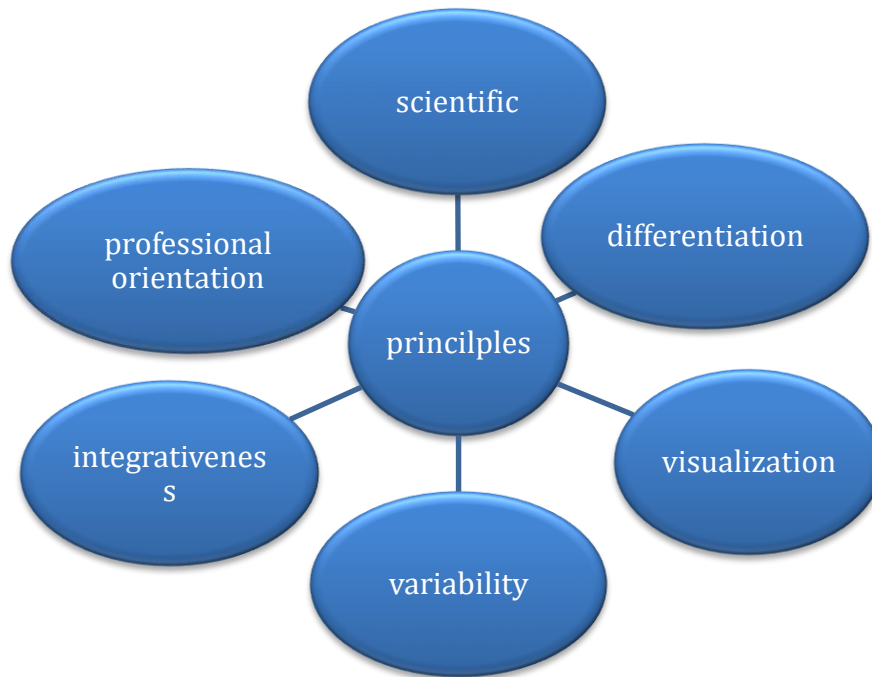
Fig. 4: Principles of the programme of development of students' listening comprehension strategies in HEIs by means of digital technologies

The implementation of the proposed programme for the development of listening comprehension strategies was followed by a knowledge test was conducted among students of all control and experimental groups. A text arbitrarily selected by the teacher was used for this purpose. The growth rates of the academic performance level in groups were established based on the test results (Figure 5).
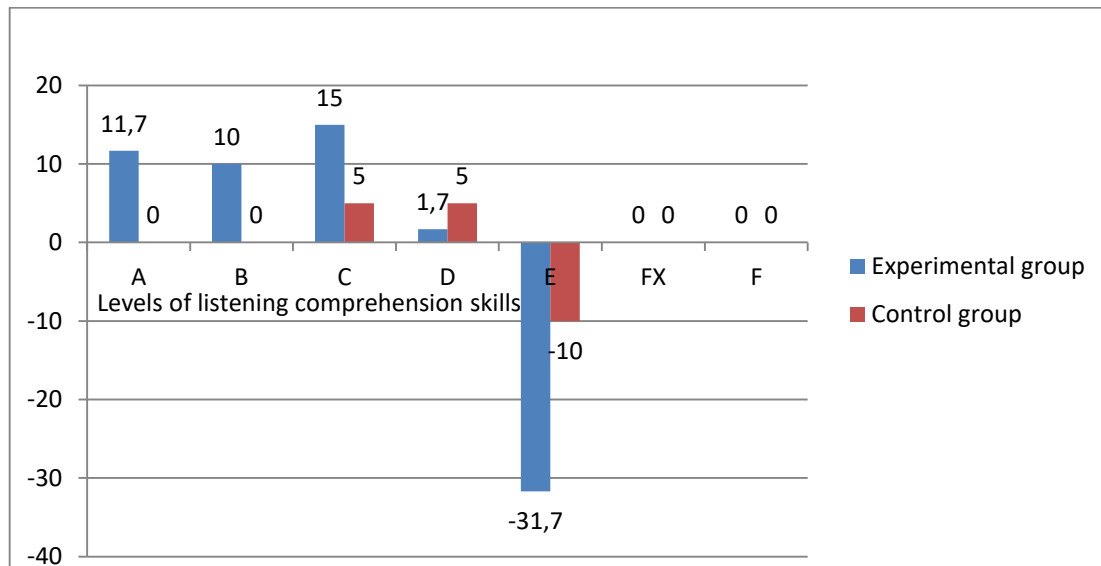

Fig. 5: Growth rates of the academic performance level for listening comprehension of respondents (averaged, %)

The average growth rate of the academic performance level for listening comprehension in the experimental groups of respondents compared to the control groups proves the success of the experimental testing of the programme that we proposed.

A comparative analysis of academic performance for listening comprehension of students of linguistic and non-linguistic majors was conducted in order to confirm the effectiveness of the implemented programme of developing students' listening comprehension strategies in HEIs. The comparison was carried out in higher education institutions which were involved in the experiment. Two groups of students of linguistic and non-linguistic majors from Borys Grinchenko Kyiv University were selected for comparison. The non-linguistic

group was a participant in the experiment. The group of students of a linguistic major had regular studies. Comparative analysis data are structured in Table 3.

Table 3: Comparative analysis of academic performance for listening comprehension of students of linguistic and non-linguistic majors, %

Research stages / % of respondents	Academic performance for listening comprehension						
	A	B	C	D	E	FX	F
Students of non-linguistic majors							
Summative	10	20	30	20	20	0	0
Control	20	20	45	15	0	0	0
Students of linguistic majors							
Summative	10	20	40	20	10	0	0
Control	10	20	40	30	0	0	0

The comparative analysis of academic performance for listening comprehension of students of linguistic and non-linguistic majors testifies to the appropriateness of introducing the proposed programme in the educational process of students' foreign language training. Based on the obtained empirical data, we can identify the conditions for the development of students' listening comprehension strategies in HEIs: adequate participation of the subject in the creation of didactic component of the education, differentiated approach to the distribution of functions, variability of digital technologies, opportunities for creativity.

DISCUSSIONS

The conducted research is an important insight for understanding the effectiveness of the use of digital technologies in foreign language training of students of non-linguistic majors of higher education institutions.

The studies similar to our research confirm the need for broad introduction of digital technologies in the educational process of higher education institutions in the context of accelerating innovative changes in education and ensuring competitive image positions of institutions in the market of educational service providers (Kryukov & Gorin, 2017). Empirical research also proves the importance of developing students' digital skills in order to avoid difficulties in learning in the digital environment (Tohara et al., 2021). The study of the reasonability of using various digital tools, online distance foreign language courses is related to the topic of our research (Kotsyuba & Prokop, 2020). Similarly, to our study, the emphasis is on surveying subjects to determine their attitude to the use of digital technologies, as well as on establishing the relationship between attitudes and the ability to use digital technologies in teaching and learning (Štemberger & Čotar Konrad, 2021).

The studies related to our research focus on the benefits of using digital technologies, the positive attitude of teachers to them, and the need to make teachers ready to actively implement these technologies (Camilleri M. & Camilleri A., 2017; Alonso de Castro & García-Peñalvo, 2020). The effectiveness of the online educational process with the use of audio-visual media technologies and audio-visual content as the main trend of the digital age is confirmed (Nicolaou, 2021). The main areas of using digital technologies in higher education are outlined (Kraus et al., 2021). The effectiveness of the use of digital technologies in the development of students' foreign language competence is empirically proven (Badan & Onishchenko, 2021; Pisarenko, 2017).

The similarity of related studies with our research is confirmation of the reasonability of using digital technologies in foreign language training of students of HEIs, their positive impact on student performance. The analogy of our study with others is also in emphasizing the need to prepare students and teachers for using digital technologies in education.

The difference between our research and similar ones is the development and implementation of a professionally oriented programme for the development of listening comprehension strategies using the achievements of digital education. Another distinctive feature of our research is the transformation of students of non-linguistic majors with different levels of foreign language competence from passive recipients into active co-creators of educational content.

The empirical research conducted within the objectives of the study testifies to the students' positive perception of digitalization of foreign language training and improved listening comprehension skills in the digital educational process. The conducted research gives grounds to express intentions for the development of complex programmes and methods of digitization of foreign language training of students of HEIs of linguistic and non-linguistic majors.

CONCLUSION

The research raises the topical issue of developing listening comprehension strategies in students of non-linguistic majors. Listening comprehension itself is the key to understanding a foreign speech and using its lexical means and grammatical structures. It is especially important to solve this problem in the context of the development of foreign language competence of students of non-linguistic majors in distance and blended learning.

The author's programme of the development of listening comprehension strategies in students of non-linguistic majors by means of digital technologies was developed and experimentally tested in the research. The developed programme takes into account the level of foreign language training of students and provides for their active participation in the development of professional texts for listening. Zoom, YouTube channel, Instagram, Kahoot, Google Forms, Padlet were the digital tools used to implement the programme of developing students' listening strategies.

The study established the effectiveness and reasonability of using the proposed programme in foreign language training of students. The research also confirmed the positive attitude of students to the use of digital technologies in foreign language training. The obtained empirical data allowed outlining the conditions for the development of students' listening comprehension strategies in higher education institutions.

The results of the study can be used in foreign language training of students of higher education institutions to develop students' listening comprehension skills. These results can be used in both distance and blended learning.

Prospects for further research in this area involve the development, testing and mass implementation of programmes promoting the development of various types of speech activities in foreign language training in higher educational institutions. The studies of the impact of the digital technologies on the development of students' foreign language competence in higher education in general and various types of speech activities on foreign language classes are of significant interest to researchers. It is advisable to prepare methodological advice for foreign language teachers in higher education institutions on the use of digital technologies for the development of students' listening comprehension strategies.

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