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The Problems of Contemporary Education

The Formation of Digital Communicative Competence by Means of the Twee Neural Network

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Abstract

In the digital economy, the mastery of digital communicative competence is becoming a priority not only in the field of education, but also in business and society as a whole. Digital communicative competence provides access to information, educational services and communication at a new level. Modern digital technologies are used to build effective interaction in the digital environment: artificial intelligence, neural networks, podcasts, blogs, etc. The goal of this article is to study the Twee neural network as a means of the digital communicative competence formation. This article reviews the possibility of the formation of this competence in the field of a foreign language among first and second-year undergraduate students of a non-linguistic specialization of the Ural Federal University. During the research, we have studied the linguistic and didactic potential of Twee, identified its features, modeled the educational process according to the topic of the module of the educational program, highlighted the advantages of implementation of this digital tool, determined the significance of the survey. The results obtained indicate the fact that the Twee neural network with digital communication platforms creates effective interaction in the digital environment, in other words, Twee contributes to the formation of digital communicative competence.

Keywords: communication, digital competence, digital communicative competence, digital technologies, digital literacy, neural network, Ural Federal University, foreign language.

1. Introduction

Personal success is largely determined not only by professional skills, but also by communication skills (Nikulina, 2022). It is well known that communication has always been the

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essence of any interaction (Tretyakova, 2012), and professional skills are secondary to determine the outcome of a person's performance in a job. In the modern world, when the use of computers and access to the Internet have become an everyday reality, the mastery of digital competence (one of the competencies dictated by the digital economy) is becoming a priority in all areas of activity. And the improvement of digital competencies is a key factor in the progressive and innovative development of the Russian Federation. The expectations of the government and employers towards university graduates regarding the issue of digital competencies are due to the active implementation of digital technologies into various sectors of the economy. Moreover, the formation process of this competence is also an integral part of the modern education and pedagogical science, as a result of the digital transformation of the Russian economy (Savelyeva, 2024). As the government and employers' expectations towards the graduates grow, so does the need to develop communication skills in the digital environment. Also, in the digital economy, the labor market is constantly changing, the mastery or development of this competence helps everyone successfully adapt to changing requirements, promote productive interaction with other people, increase the digital literacy, competitiveness and overall productivity of a specialist. Therefore, having digital competence is more actual than ever before. Based on this, it would be reasonable to define this concept. Digital competence is the ability of a person to apply digital technologies in every area of life confidently, effectively and safely (Tokareva, 2021). This competence includes the ability to use digital tools, software, the ability to use information on the Internet, as well as the use of various messengers and effective communication skills in the digital environment. However, digital communicative competence is becoming particularly relevant in modern digital realities. It is, in turn, the ability to use digital technologies, such as artificial intelligence, neural networks, blogs, podcasts, forums, webinars and more, for effective interaction or communication in the digital setting. It also includes the ability to interact with digital communication platforms and understanding of communication ethics or the so-called netiquette (network + etiquette) in the digital sphere (Baimuratova, 2018). Thus, digital communicative competence is a priority in the context of digital realities.

In the educational process, innovative technologies are no longer an exception, but are essential, meeting the modern demands of the digital society. The influence of the digital transformation in the field of education is obvious, as its goal is to improve the entire educational system (Robert, 2020).

This article considers the possibility of the digital communicative competence formation among first and second-year undergraduate students of a non-linguistic specialization of the Ural Federal University using the Twee neural network in the field of a foreign language.

The development of neural networks is of significant importance in the era of digital technologies, and the future of foreign language learning is undoubtedly intertwined with the development of technologies and innovations in the sphere of communication and information.

Thus, the relevance of this research is explained by public demand and digital transformation concept (Robert, 2020), which is mainly defined by the integration of digital technologies in education, the development of digital infrastructure, personalized educational trajectory and creation of high-quality digital educational content. The novelty lies in the fact that application of Twee in the educational process provides a comprehensive approach to foreign language learning and its didactic and methodological potential can be used to create individual teaching methods developing digital competences.

2. Methodology

In the last decade, we have witnessed rapid digitalization, and education is no longer an exception. A number of new innovative resources and platforms have emerged that are fundamentally changing the way we teach. One of these resources is the Twee neural network, which uses the capabilities of artificial intelligence. In general, a neural network is a type of artificial intelligence that models and simulates the work of the human brain (Rastorgueva, 2023). The founders of this service, specialists in education and cognitive sciences, experts in the field of AI and natural language processing, as well as communication technologies, dreamed of creating an intelligent platform for multimodal language learning that would combine adaptability and personalization. Multimodal learning is based on the use of multiple forms of data such as text, images and graphics (Zhu, 2021). In general, the creators of this digital tool have demonstrated

their success in modeling the service capable of generating different tasks for language learning of high-quality level.

Twee appeared at the end of 2022. This tool is a great option for teachers but can also be useful for studying the language on one's own provided that one has a good level of English (Robert, 2024). The interface of the service ensures that any user can easily understand and use it without any difficulties, and the available features are clearly described. So, the service is accessible for users of various levels of digital literacy: those who have high level of experience with digital technologies and those who have less experience.

As M.N. Evstigneev noted, Twee can be considered an effective tool and in the forthcoming future it will be used more and more often in linguistic education (Evstigneev, 2023). Then, what is the didactic potential of Twee? This neural network is able to plan and organize the learning process. It allows you to generate material for teaching the main types of speech activities (listening, speaking, reading, writing), covering such aspects of language as vocabulary and grammar. Let's delve into the details of these activities.

1. For the purpose of learning to read:

– Text generation on the specified topic is performed according to certain parameters: language proficiency level A1-C2 according to Common European Framework of Reference (CEFR), length (number of words), genre of the text (the user can choose 7 genres: usual text, descriptive /argumentative article, fictional story, official/unofficial letter, review) (The Twee..., 2024). Additionally, you can specify the lexical units that the generated text should consist of.

– Generation of questions to the text (multiple choice questions, open questions, true/false statements;

– Generation of small texts for reading (announcements, invitations, instructions, etc.);

– Text-based dialogue generation;

– Headline generation to the text.

2. For the purpose of learning to speak:

– Generation of quotes of well-known personalities for discussion and information exchange;

– Generation of key questions on the chosen topic;

– Generation of a dialogue based on active vocabulary, topic or background of the situation as an example for further development of speaking skills;

– Generation of ideas based on the specified lexical units.

3. For the purpose of learning to write:

– Generation of topics for writing an essay;

– Generation of quotes of well-known personalities on the specified topic;

– Generation of "four opinions" for argumentation when writing an essay;

– Sentence generation using key vocabulary.

4. For the purpose of learning to listen (the basis is a YouTube video):

– Generation of discussion questions which cover the key points and ideas of the video;

– Generation of multiple-choice questions, true/false statements, open questions, gaps filling task.

3. Materials and methods

We used the neural network to generate communicative tasks and to practise them in the digital environment, improving communicative language and digital skills. The research was conducted at the Ural Federal University in 2024 (Yekaterinburg). First and second-year students of the training direction «Human Resources» participated in the study with A2 language proficiency level. The total number of them was 78 but not all students agreed to make their results public, so in our research we presented the first group results (12 students, assignment material was generated by the Twee neural network) and the second group results (also 12 students, who had blended learning format). The results taken from 78 students are consistent with those presented in this study. The 1st group consisted of 5 male and 7 female students aged 18. The second group consisted of 4 male and 8 female students aged 19. The data was obtained through questionnaires, interviews, work with target groups, observations and experiment.

The study was carried out in 3 stages:

1) Questionnaire, that allowed us to determine which digital tools were used earlier and what level of digital competence students currently had;

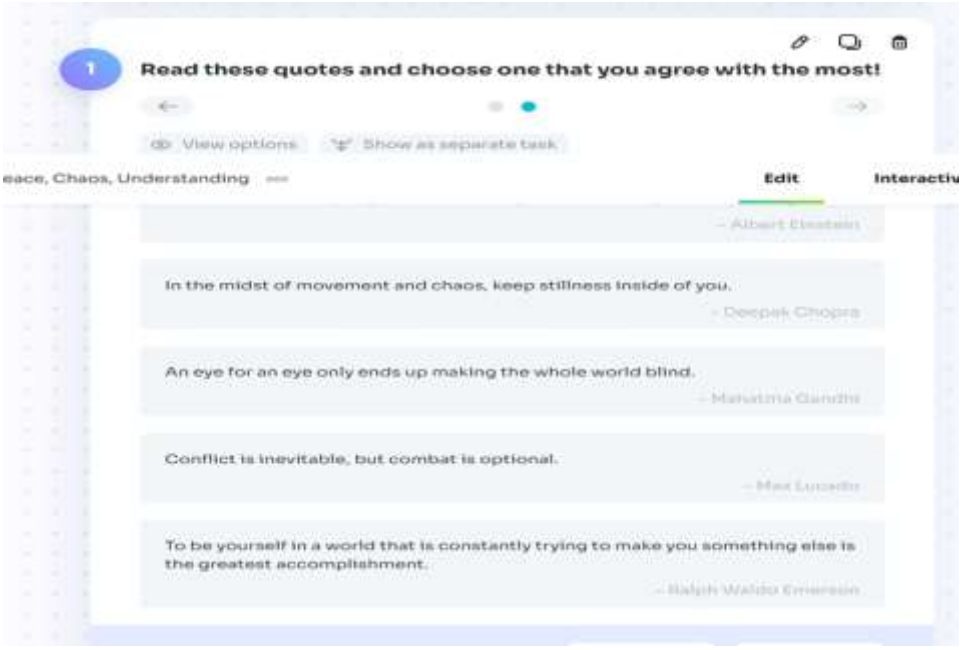
2) The experiment itself in the form of the course on developing communication skills based on the assignments generated by Twee and blended learning format (mainly tasks on Moodle platform). This stage contributed to the development and improvement of knowledge, skills and competences under study;

3) Presentation of the project using multimedia tools and artificial intelligence; questionnaire concerning the level of students' satisfaction about 2 different formats of study. This stage summarizes the work carried out, evaluates the results of academic performance and the level of formation of the studied competence.

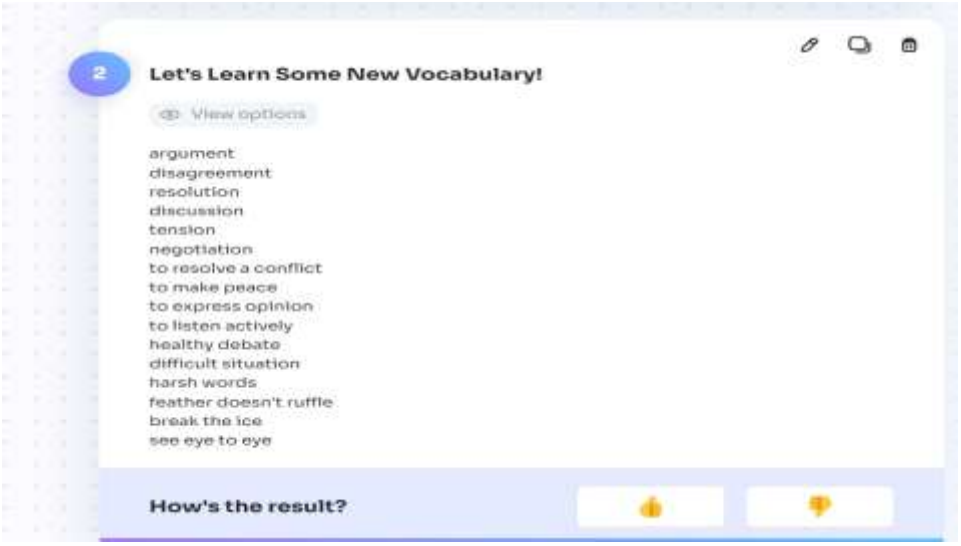
The evaluation was based on a point system: 0 implies that the marker under study was not identified or students had poor skills; 0,5 implies that the marker was identified/basic level of skills necessary to improve; 1 – well-developed skills and competences; 1+ implies high level of developed competences

Examples of assignments generated by Twee, when studying the topic of the module "Conflictology" for the A2 level students:

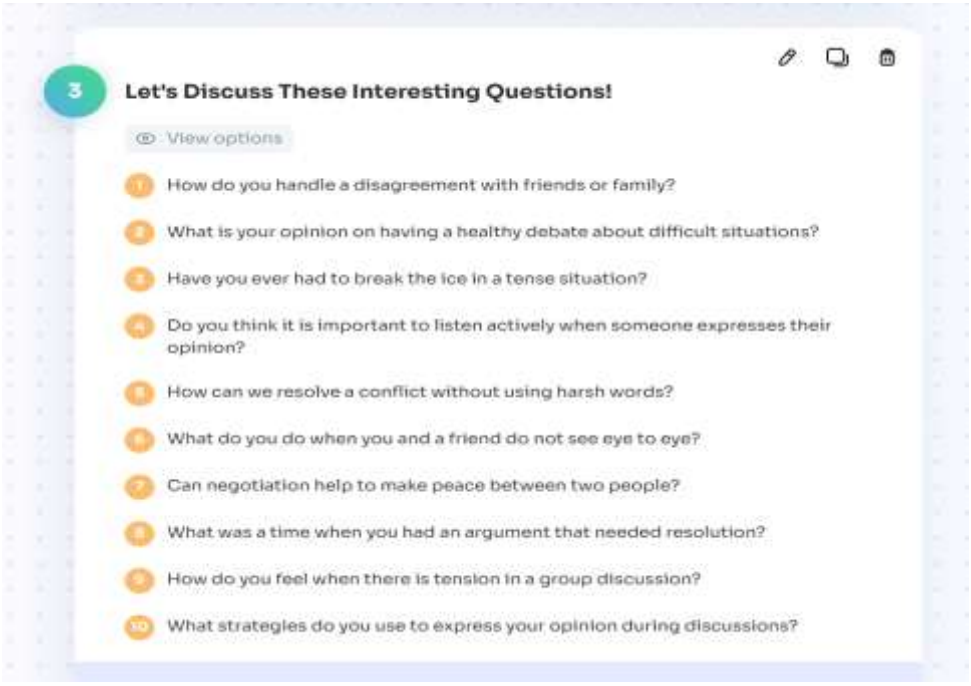
1) As a warming-up activity – generation of quotes of well-known personalities for discussion. The examples of these quotes are given below:



2) Vocabulary introduction to the topic "Conflictology": dispute, disagreement, tension, negotiations, conflict resolution, peace, harsh words;

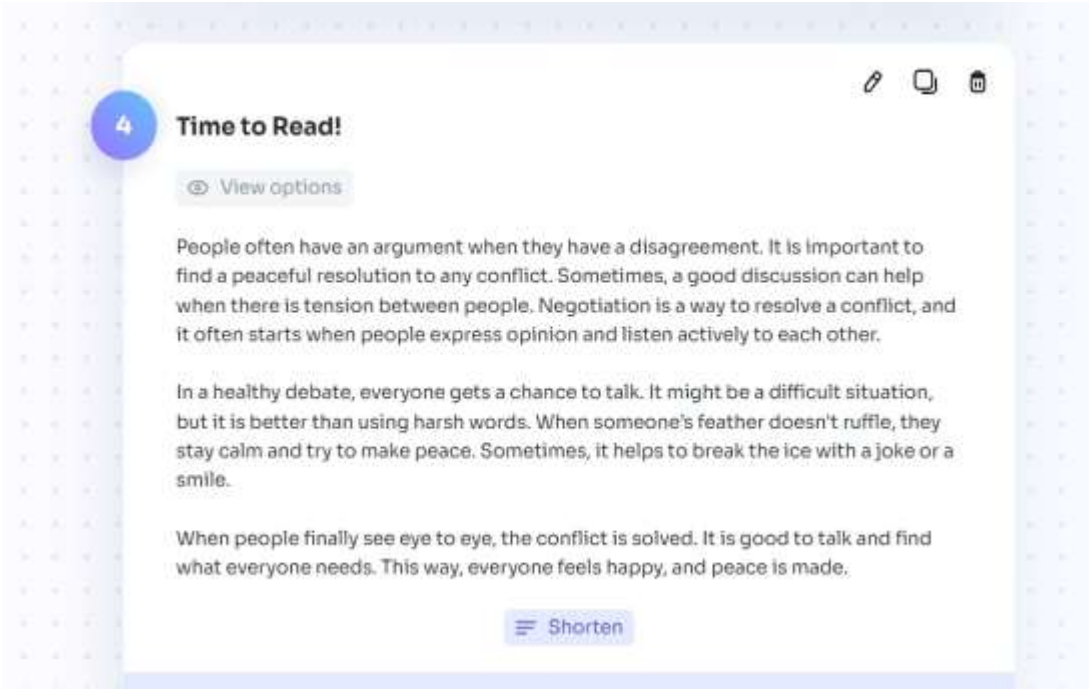


3) Discussion of the questions with active vocabulary presented above;

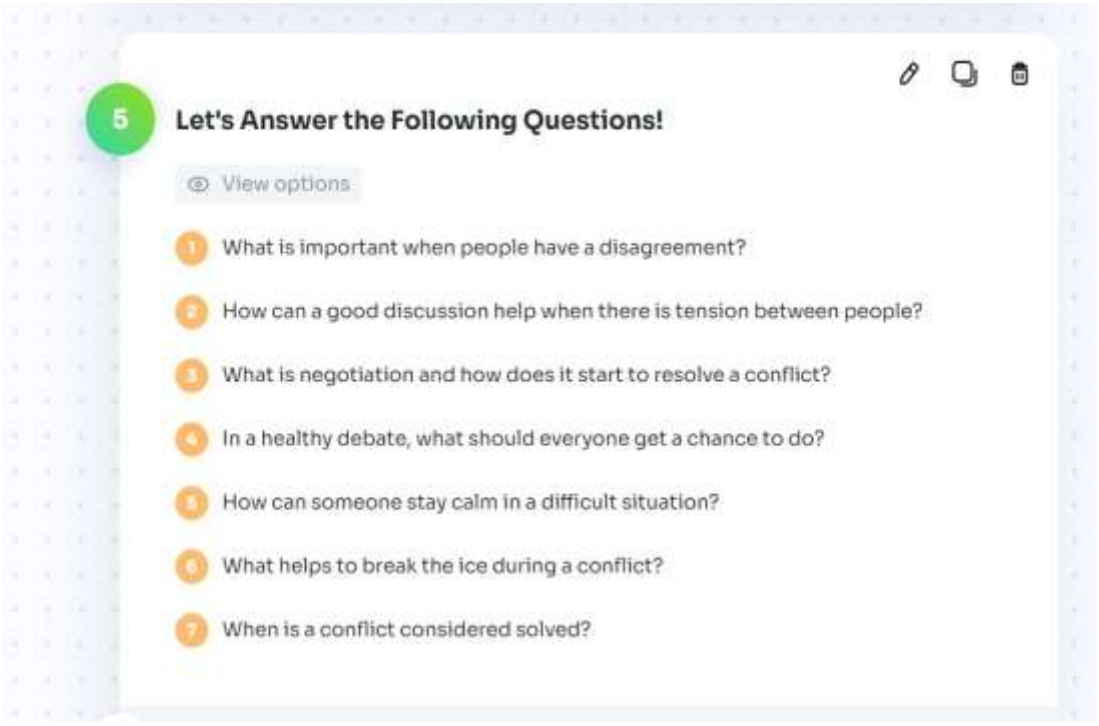


4) Text generation based on active vocabulary;

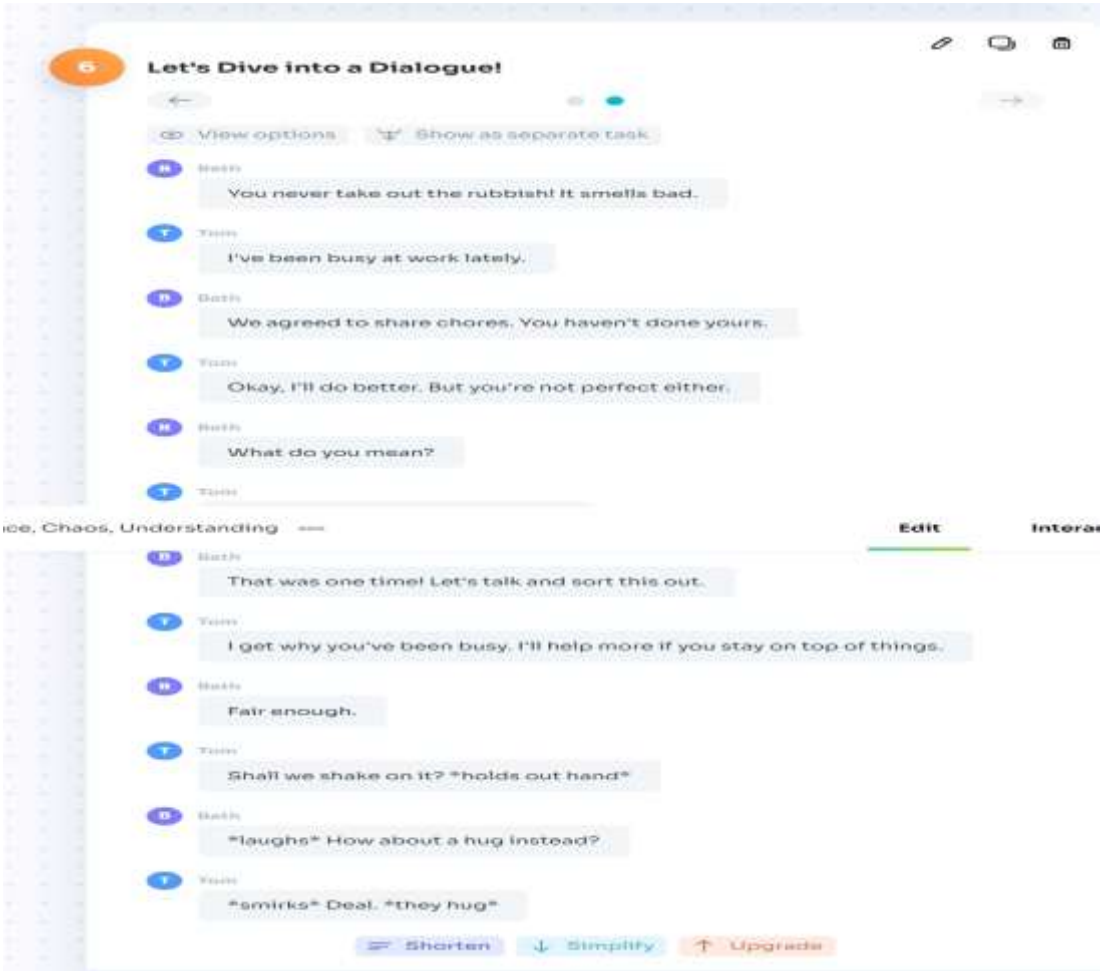
This option is of great interest to the teachers of higher educational establishments as it accelerates the process of searching, simplifying or upgrading different texts for «Human Resources».



5) Generation of questions to check the understanding of the content of the given text;



6) Dialogue generation for practicing active vocabulary related to the topic "Conflictology"; In this task there is an option of shortening the given dialogue, simplifying or upgrading the level when necessary.



4. Results

To determine the general level of students' digital competence a survey was conducted among first and second-year students of «Human Resources» to define the digital tools they used throughout the educational process up to the second course. The data is demonstrated in Figure 1 below:

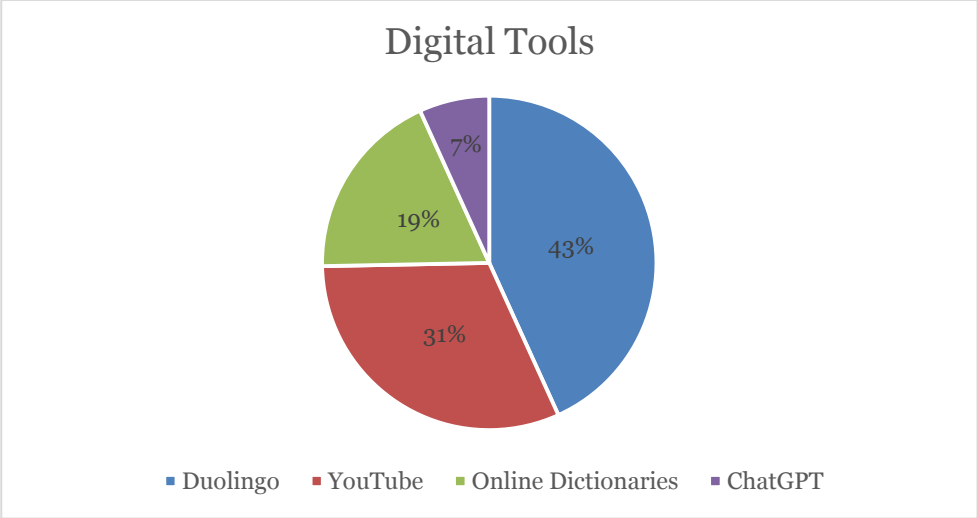


Fig. 1. Digital tools applied in education in general

The results of the development of key components of digital communicative are given below in the diagrams:

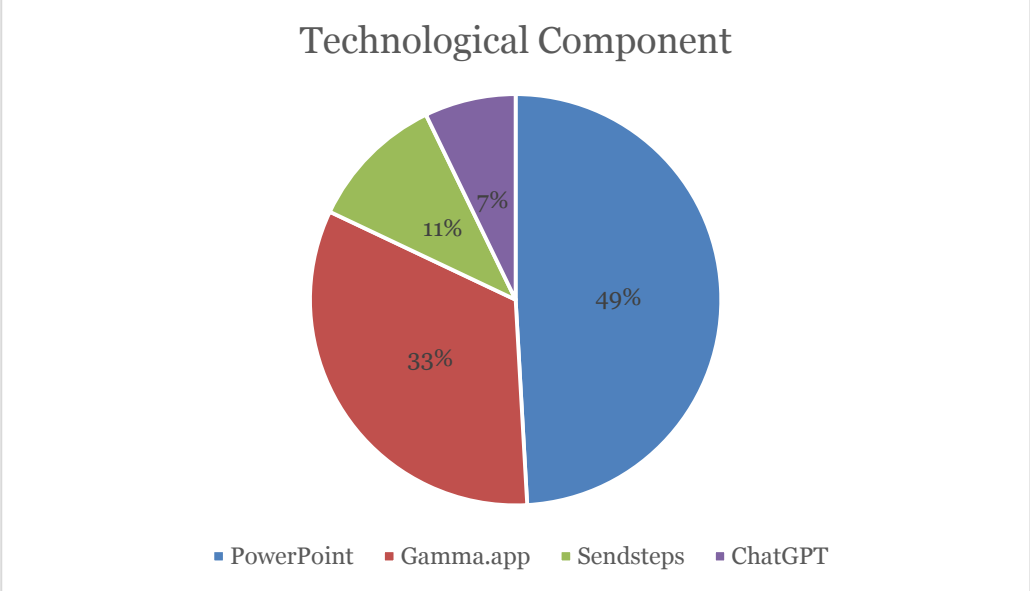


Fig. 2. Technological component of digital communicative competence

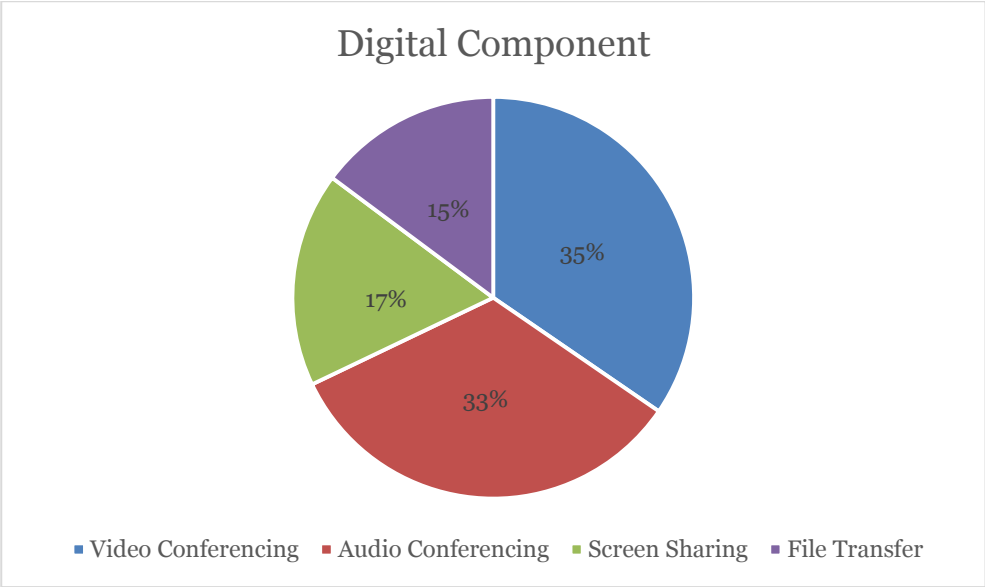


Fig. 3. Digital component of digital communicative competence

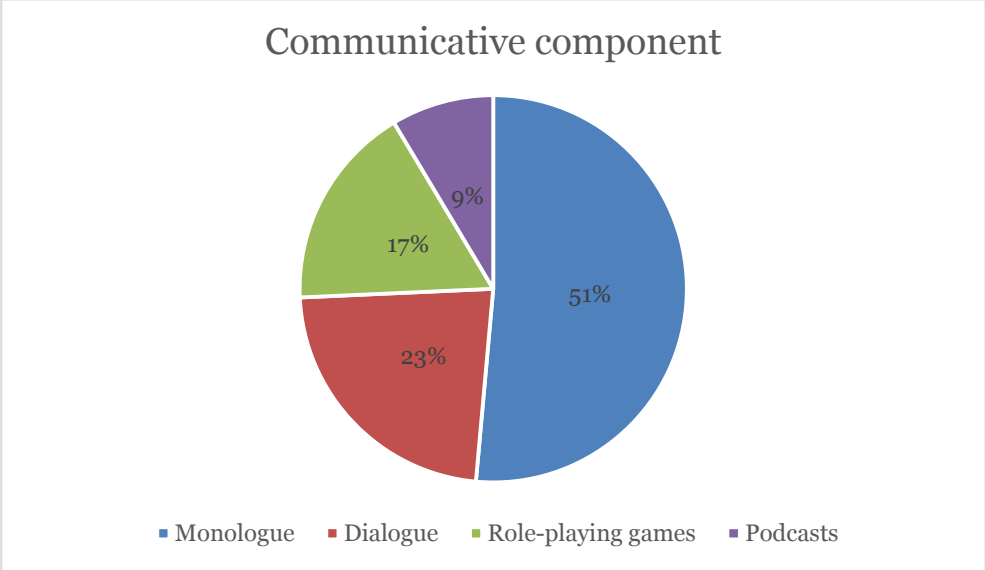


Fig. 4. Communicative component of digital communicative competence

Let's have a look at the general results of our research on the formation of digital communicative competence by means of Twee, they are presented in the table below.

Table 1. Digital communicative competence (Twee)

Number of students	**Technological component**		**Digital component**		**Communicative component**	
	start	final	start	final	start	final
1	0,5	1	0,5	0,5	0,5	1
2	0,5	1	0,5	1	0,5	1
3	0,5	1	0,5	1	0,5	1
4	0,5	1	1	1	0,5	1
5	1	1	1	1	1	1+
6	1	1	1	1	1	1+
7	1	1	0,5	0,5	0,5	1
8	1	1	1	1	0	0,5

Number of students	Technological component		Digital component		Communicative component	
9	0	0	1	1	0	0,5
10	0	0,5	1	1	0	0,5
11	0,5	0,5	1	1	0,5	0,5
12	0,5	0,5	0,5	0,5	1	1

The results of digital communicative competence development by means of Moodle platform (without Twee) are presented in the table below.

Table 2. Digital communicative competence (Moodle platform)

Number of students	Technological component	Digital component	Communicative component
1	0,5	0,5	0,5
2	0,5	1	0,5
3	0,5	1	0,5
4	1	1	0
5	0,5	1	0
6	1	1	1
7	0,5	0,5	1
8	0,5	1	0,5
9	0,5	1	0
10	0,5	0,5	0
11	0	1	0,5
12	0,5	0,5	0,5

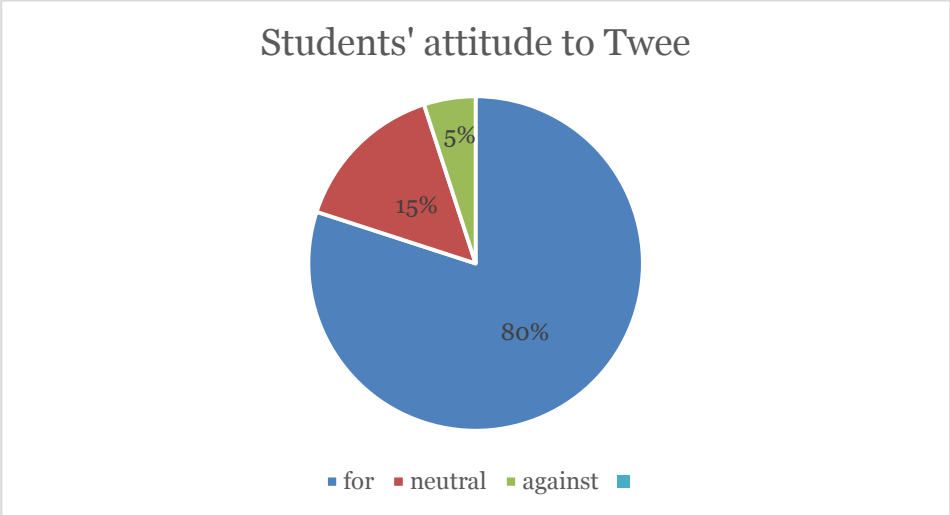


Fig. 5. Students' attitude to the practice of applying Twee

5. Discussion

The results in Figure 1 showed that all students, to some extent, used digital tools for their study. The survey also showed that Duolingo, YouTube, and working with online dictionaries are well-mastered by students. These results also highlighted that when it comes to working with artificial intelligence and neural networks students used Chat GPT to a lesser extent, but didn't use neural networks. Thus, they have limited knowledge or awareness of the application of neural networks in education, especially in developing communicative competence in digital language environment.

When discussing digital communicative competence, it is important to highlight the components making up this competence: technological, digital and communicative. Technological component implies the ability to safely use the networks, software to achieve specific goals. Digital

component includes the ability to use knowledge and skills to search, process, analyze and store information while using digital tools. And communicative component is about the ability to conduct online communication in various forms (in our case, using the English language): e-mail, blogs, dialogue, podcasts, chats, etc.

When working with the neural network Twee the development of these components were diagnosed in the following ways: 1) technological component was diagnosed by the application of PowerPoint, Gamma.app, Sendsteps and Chat GPT to create visually-appealing, dynamic and informative presentations; 2) digital component was diagnosed by the ability to effectively interact on platforms MTS Link, Zoom, using platforms' features and functions such as video/audio conferencing, screen sharing, file transfer; 3) communicative component – the diagnostic process was conducted through role-playing games, dialogues, monologue, presentation of the podcast based on the course materials already covered.

Based on Figure 2 results, it is fair to say that technological component is rather well-developed, as the students are able to use a variety of digital tools: PowerPoint, Gamma.app, Sendsteps, Chat GPT. However, it is worth noting that the low percentage of Chat GPT usage suggests there may be room for further development in terms of exploring new technologies and their potential application in education.

In Figure 3 it is clear that the students in the study are comfortable using video conferencing tool, as over 35 % of them apply this feature. They are also familiar with audio conferencing tool (33 %), sharing their screen (17 %) and sharing files (15 %). This suggests they have a basic level of comfort and competence with these instruments, and are able to use them in communication and collaboration.

As for communicative component in Figure 4, from the percentages provided, we can make the following conclusion: the students prefer monologues as a method of communication, as 51 % of them reported choosing this option. 23 % of students indicated a preference for dialogues, 17 % stated for role-playing games and the least popular option was creating podcasts. Judging by these results, the majority of students seem to favor more conventional forms of communication due to different factors: lack of knowledge or experience with these, especially taking into account their current level of English (A2), general preference for more familiar forms of communication. Further study may be needed to explore these reasons.

Table 1 shows average progress in the group. 70 % of students are attributed to the average level of digital communicative competence formation: rather good and conscious orientation in digital and communicative components, a bit selective orientation in technological component. Two students presented significant results, especially in communicative component. The level of their digital communicative competence is characterized as high. One student didn't show any progress in general, so his level is low. All in all, the necessary skills represented by these components were improved or developed to some extent.

We compared the given results with the results of the students of the same level but having blended learning format (online component on Moodle platform + traditional model). Blended learning format was adopted by the department of foreign languages and educational technologies for non-linguistic students of the Ural Federal University in 2022. Online component contains such modules as speaking, vocabulary, writing and grammar.

Table 2 shows the results of students working on Moodle platform, their results are worse. Communicative component is not developed at all. The indicators for technological component are lower too. What factors influenced the low level of the development of this competence? They are the following: communicative tasks generated by Twee are individually and adaptively worked out for every topic of the module than the tasks presented in Moodle; interactivity is higher while working with Twee. Communication in Moodle is limited, no emotional intelligence and necessary feedback, common technical problems. Generation Z students are more motivated due to the interest to Twee as a new innovative digital instrument.

Also, at the end of the term students were offered to list out negative features of their courses, that could affect the process of digital communicative competence development and their academic performance as a whole. The results are presented below (Table 3).

Judging by this data we can conclude that there are more negative features while working with Moodle platform than with the neural network. Students are more negatively inclined towards Moodle. So, the result is evident – low level of digital communicative competence formation and low level of academic performance.

Table 3. Students' attitude to Twee and Moodle platform

Twee	Moodle platform
– for introverts it is hard to communicate with others; – abundance of communication tasks (reaction of low-motivated students)	– lack of communication; – lack of feedback; – lack of individual approach; – no emotional intelligence; – monotonous and similar tasks; – mediocre and boring format; – self-organization problems; – lack of self-presentation; – lack of opportunity to improve digital skills; – technical problems (unsaved students' results; site «freezing», etc.)

Figure 5 shows the result of the survey of students who dealt with Twee. According to it, students are positively inclined towards this neural network as 80 % are for applying it in educational process, 15 % are neutral and 5 % are against. Therefore, we consider this service is perfectly suited for non-linguistic students and teachers working with them.

Thus, the research was conducted among first and second-year students of non-linguistic specialization to define the possibility for digital communicative competence formation by means of the Twee neural network in educational process. During the study structural components and their diagnostics were determined. The levels of formation of digital communicative competence were characterized as low, average and high. The results of comparative analysis of Twee with Moodle platform and students' attitude were taken into account. So, the research traces the efficiency of Twee in foreign language teaching, as it is able to easily create tasks for developing communication skills and contributes to the development of digital communicative competence, increasing the level of digital literacy, improving the ability to use digital technologies effectively and safely.

6. Conclusion

In general, when creating exercises using this service and practicing them with the students, we identified both its advantages and disadvantages. However, as it is known, pluses and minuses are present in any technology or service. According to Elsen-Rooney, educational technologies based on artificial intelligence should be prioritized and it is necessary to develop effective strategies to eliminate these challenges (Elsen-Rooney, 2024). Therefore, we have come to the conclusion that it has more positive aspects than negative ones, as this digital tool is pedagogically beneficial, it allows to expand and replenish teachers' methodological thinking, upgrading the necessary skills and competences of the students and teachers. That is why we will proceed the advantages of this neural network highlighting the following:

1) Individualized learning: Twee analyzes information about language skills and professional needs and adapts content to these needs;

2) Adaptive approach: adapts real-time content, offers exercises of varying difficulty depending on the progress and language level (Sysoyev, 2024);

3) Effective communication: it includes tasks aimed at improving professional language skills: conducting discussions and dialogue;

4) Provides interactive content: video and audio allow to immerse oneself in authentic language environment. Twee can also be connected to the digital communication platforms, for example, MTS Link, Zoom, which enhance the interactive and communicative component of the course;

5) The neural network uses a huge amount of data to update knowledge and skills;

6) It saves time;

7) Creation of the material for the four main types of speech activity.

The significance of the present study is, firstly, in the ensuring the opportunities for further research in the development of methodological recommendations to foreign language teaching with the implementation of digital tools and upgrading digital competence, especially digital communicative competence, secondly, in defining the new structural content of the phenomenon under study and enhancing the effectiveness of educational process in general.

The modern use of the Twee neural network in language learning today is the next step in the effective and individualized language learning process in the world where technology is constantly changing the ways how to teach and communicate. Besides, it is also productive in organizing the educational process in cooperation (Khmarenko, 2021). Twee, with its adaptability and personalization of the content (Sysoyev i dr., 2023; Sysoyev, 2023; Fahimirad, 2018), provides an opportunity to create a comfortable and efficient language environment in which students can easily improve their skills in the given professional setting. With such communication platforms as MTS Link and Zoom, it also promotes fast and effective communication, expanding the area of its application. The implementation of digital tools into the language learning process of students of non-linguistic specialization will contribute to the formation of digital competencies (Sysoyev, 2024a), in particular, digital communicative competence, as it was presented in the survey.

Taking into consideration the fact that our research problem hasn't been widely studied by other scholars, we can't compare it with any other results in this field. And we can predict that further research is possible in the development of individual teaching methods of foreign languages and digital competences too.

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