



Цифровая среда как один из способов интенсификации процесса обучения иностранному языку в старших классах (на примере английского и китайского языков)

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АННОТАЦИЯ

Введение. В эпоху многополярного мира знание иностранных языков становится важной стратегической задачей для России, требуя интенсификации процесса обучения. Исследование посвящено оптимизации обучения иностранным языкам в условиях цифровизации образования. Ключевая идея статьи заключается в том, что использование цифровых технологий в обучении соответствует новому способу мировосприятия современных старшеклассников.

Цель исследования – на основе анализа теоретических и практических аспектов провести анализ эффективности применения цифровых образовательных ресурсов и выявить их лингводидактический потенциал в обучении английскому и китайскому языкам старшеклассников.

Материалы и методы. Для решения задач проводимого исследования были проанализированы научно-методические статьи из периодических изданий, диссертации и монографии российских и зарубежных авторов по данной тематике. Экспериментальная работа проводилась в МБОУ «Гимназия №11 города Ельца» с сентября 2024 года по май 2025 года и охватила 28 учеников 10-го класса. Учащиеся были разделены на две группы: контрольную (14 учеников) и экспериментальную (14 учеников). Эксперимент включал входное и итоговое тестирование. Для проверки гипотезы об улучшении результатов использованы: Парный t-критерий Стьюдента (основной анализ), Критерий Вилкоксона для связанных выборок (непараметрическая проверка при нарушении нормальности), Расчёт размера эффекта (Cohen's d для связанных выборок).

Результаты исследования. Результаты эксперимента, входного и итогового тестирования, опросов школьных учителей и анализа источников по теме исследования подтверждают обоснованность предположения об эффективности использования цифровых ресурсов для интенсификации процесса изучения английского языка, усвоения большего объема информации за более короткое время и повышения интереса и мотивации к изучаемому предмету. Эффект статистически значим при умеренном размере ($d = 0,65-0,73$).

Заключение. Особенностью обучения иностранному языку в старших классах на современном этапе развития общества является возрастающая необходимость привлечения инновационных методов обучения, в том числе с использованием цифровых ресурсов. Полученные результаты свидетельствуют о том, что использование цифровых ресурсов в контексте цифровой образовательной среды способствует интенсификации процесса обучения английскому и китайскому языкам, а именно, формированию предметных, метапредметных и личностных результатов, усваиванию большего объема информации в более короткие сроки, а также повышению интереса и мотивации к изучаемому предмету.

КЛЮЧЕВЫЕ СЛОВА

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Digital Environment as A Way to Intensify the Process of Teaching a Foreign Language in Senior School (On the Example of English and Chinese)

N. V. OSIPOVA, A. N. PUZATYKH

ABSTRACT

Introduction. In the era of a multipolar world, knowledge of foreign languages such as English and Chinese is becoming an important strategic objective for Russia. This research focuses on optimizing foreign language teaching in the context of digitalization of education. The key idea of the article is that the use of digital technologies in education corresponds to the new worldview of modern high school students.

The purpose of the study is to analyze the effectiveness of digital educational resources and identify their linguodidactic potential in teaching English and Chinese to high school students based on theoretical and practical aspects.

Materials and methods. To address the objectives of this study, scientific and methodological articles from periodicals, dissertations, and monographs by Russian and foreign authors on this topic were analyzed. The experimental work was carried out at the Municipal Budgetary Educational Institution "Gymnasium No. 11 of Yelets" from September 2024 to May 2025 which covered 28 students in Year 10 at school. The students were divided into two groups: control (14 students) and experimental (14 students). The experiment included entry and final tests. To test the hypothesis of improved results, the following methods were used: Paired Student's t-test (main analysis), Wilcoxon's signed-rank test for related samples (nonparametric test for violations of normality), and Effect size calculation (Cohen's d for related samples).

Research results. The results of the experiment, entry and final testing, surveys of school teachers, and analysis of sources on the research topic support the validity of the assumption regarding the effectiveness of the use of digital resources for the intensification of the English language learning process, the assimilation of a greater volume of information in a shorter time, and an increase of interest and motivation in the subject being studied. The effect is statistically significant at moderate size ($d = 0.65-0.73$).

Conclusion. A particular feature of foreign language teaching in high school at the current stage of social development is the increasing need to employ innovative teaching methods, including the use of digital resources. The obtained results indicate that the use of digital resources in the context of a digital educational environment contributes to the intensification of the learning process in English and Chinese, namely, the development of subject-specific, meta-subject, and personal learning outcomes, the assimilation of a greater volume of information in a shorter time, and increased interest and motivation in the subject being studied.

KEYWORDS

foreign language, English, Chinese, digital environment, digital educational resources, intensification of the learning process

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INTRODUCTION

The realities of the modern world require each member of the society to be ready for mobile changes in their goals and objectives, to quickly adapt to new requirements of the time and modern society. The education sector is undergoing the greatest changes. Today, the main direction in the field of education is its continuity, lifelong learning, digitalization. The United Nations Educational, Scientific and Cultural Organization (UNESCO) pays special attention to the use of digital technologies and artificial intelligence (AI) stressing that they have the potential to address many big challenges in education as well as bring innovation to teaching and learning practices. According to "Beijing Consensus on Artificial Intelligence and Education", AI has enormous potential to transform education, making it more personalized, inclusive, and effective [1]. On the other hand, it is necessary to address the risks, presented by the growing connection between AI and education which are discussed in UNESCO publication "AI and education: guidance for policy-makers" [2].

All these changes also influence teaching and learning foreign languages. The idea of using computer technologies in foreign language teaching emerged over 80 years ago. In 1997 M. Warschauer identified three stages of computer technology use in foreign language teaching: behavioral, communicative, and integrative [3]. Each stage was characterized by a certain level of technological development and a corresponding teaching method. Today, with the advent of the digital era, the use of mobile [4] and cloud technologies [5] is considered in teaching foreign languages.

Thus, the relevance of our study stems from the pressing need to optimize and search for effective teaching methods in the context of broadening opportunities for the use of digital educational resources in teaching foreign languages, particularly English and Chinese, in schools, in the context of widespread digitalization of all spheres of human life.

The purpose of the study is to study the effectiveness of using digital educational resources as components of the digital educational environment in teaching foreign languages to high school students.

LITERATURE REVIEW

The theoretical foundations of foreign language teaching methods and the development of foreign language competence have been studied by such Russian educators and psychologists as E.I. Passov, E.N. Solovova, I.A. Zimnyaya for many decades.

Modern scholars are also contributing to the development of foreign language teaching methods. T.V. Ermolova, S.M. Makhmudova, A.V. Litvinov draw attention to the fact that such psychological factors (motivation, self-efficacy, cognitive characteristics) and linguistic aspects (for example, the role of the first language, age restrictions, methods of presenting language material) are of key importance for the successful acquisition of a foreign language [6]. N.S. Alsaedi proposes to move the research of second language acquisition to a new level, focusing on the neurobiological foundations, the interaction of the brain and cognitive processes, and sets tasks for further scientific research in order to create a full-fledged theory of second language acquisition [7]. Ch. Anam and M. Firmansyah point out that successful acquisition of a second language requires creating a more supportive environment, using communicative and contextual teaching methods (e.g., role-playing, group discussions), addressing the negative influence of the native language by explaining the differences in language structures, and increasing students' motivation through relevant and interesting materials [8].

S. Dhillon and N. Murray tried to investigate EAP (English for Academic Purposes) teachers' views and experiences of e-learning technology. The results of the research showed that teachers as a rule use a range of online tools such as video, plagiarism software and corpus linguistics tools. The respondents mentioned increased students' motivation, their developed learner autonomy and desire to improve their digital literacy. The authors give some recommendations concerning developing EAP teachers' competences and facilitating the use of e-learning in their practice [9].

T.V. Demidova, T.M. Solovieva, S.A. Barov try to understand the cognitive-semantic approach to the Chinese language while teaching and learning it in higher education [10]. And T.L. Guruleva offers her own model for the co-study of languages and cultures, the essence of which "lies in students

mastering the linguistic picture of the world and other culturally conditioned aspects of the language being studied (grammar, discourse) through the prism of the cultural and real pictures of the world of Oriental and Western cultures as a means of implementing intercultural communication from the standpoint of the theory of new Russian Eurasianism" [11].

A number of researchers are now turning to studying the impact of digital technologies on foreign language teaching. J. Sim and H. Ismail studied English teachers' perceptions of involving information technologies in the process of teaching foreign languages. Their research showed positive perceptions regarding the use of digital instruments in teaching. They come to the conclusion that digital tools play an effective role in language learning outcomes and are worth using [12].

V. Delplancq et al. write that the effective use of digital tools within active pedagogical approaches enables the development of complex competencies (in particular, cultural intelligence (CI)) in students who learn foreign languages. However, the success of this process directly depends on the balanced management of students' cognitive load (CL) [13].

The general challenges and opportunities of the digital environment are being explored by both Russian and international scholars. P.V. Sysoev and M.N. Evstigneev believe that the integration of artificial intelligence into the linguo-methodological training of future foreign language teachers contributes to improving the quality of education through individualization and adaptation of pedagogical methods [14]. T. Vezirov, Sh. Shahbanov et. al draw attention to the fact that the success of the creation and functioning of a digital educational environment directly depends on the readiness of university teachers to use modern digital tools. To overcome the existing gap between the technical equipment of universities and the actual level of digital competence of teachers, they propose to develop and implement a system of continuous professional development aimed at developing all components of readiness [15].

R. Afrilyasanti, Y. Basthomi and E.L. Zen analyzed the implications of instructors' digital literacy skills for their attitudes to teach critical media literacy in EFL classrooms. To their mind, at present people are heavily reliant on media and information technology [16]. It means that teachers should be more digitally literate themselves. After collecting data from EFL teachers at a high school in Indonesia they found out that the teachers are computer literate but the proficiency of some instructors left much to be desired. It is recommendable for teachers to strengthen their digital literacy if they want to succeed in teaching their students.

A number of researchers come to the conclusion that schools are not yet sufficiently prepared for full digital transformation due to infrastructural, methodological, and personnel limitations. Effective use of digital educational tools by school teachers depends on their qualifications, level of digital literacy and availability of technologies, which requires systematic monitoring and support [17; 18].

As for the direct, active implementation of digital technologies in the foreign language teaching process, it began during the COVID-19 pandemic. M. Foltyn and K. Polok give useful recommendations to teachers of foreign languages concerning a more interactional and rewarding approach to planning EFL teaching process with a technology-based mode of lesson delivery [19]. G. Mucundanyi and X. Woodley found out that in the modern conditions virtual course environment is necessary in the educational process. Many teachers began looking for new resources during the COVID-19 pandemic and used online course delivery on a regular basis. Their research showed that some digital tools provide free access for educators and are beneficial to students [20]. The Malaysian researchers A.Z. Zainal and S.Z. Zainuddin studied using digital technologies in the process of teaching English during the pandemic. Under these conditions teachers began planning and delivering their online lessons. The findings revealed teachers' agentic potential to adapt their lessons to suit their students' needs. The research showed the necessity of providing a differentiated training curriculum that can support language teachers' development by taking into consideration their current technology skills, teaching experience and work contexts [21]. Their findings revealed teachers' agentic potential to adapt their lessons to suit their students' needs. The research showed the necessity of providing a differentiated training curriculum that can support language teachers' development by taking into consideration their current technology skills, teaching experience and work contexts.

The Iranian authors B. Keshtiarast, H. Salehi, O. Tabatabaei and R. Baharlooie analyzed students and teachers' perceptions of integrating information and communication technology into ESP (English for Specific Purposes) instruction [22]. This process in Iran is mainly organized in a traditional way.

The findings of the research showed that the respondents of their survey had positive perceptions of integrating different digital tools for solving problems with traditional methods and materials. The research results revealed that ICT-based activities help teachers promote students' communication skills.

Some researchers draw attention to the use of chatbots based on artificial intelligence to support English language teaching in a mobile environment. Now chatbots are widely applied to educational process. Their research proved high effectiveness of using chatbots in teaching and learning English as a second language [23; 24].

A number of researchers study the possibilities of using immersive augmented reality models for foreign language learning [25] and 360-degree video technology [26]. The results of their findings demonstrate that such technology-supported intercultural learning activities improved students' EFL abilities. This also positively influences the motivation of the "digital generation" to learn a foreign language, making it context-oriented through interaction with specially created virtual models.

E.V. Tikhonova and A.V. Kreider study the possibilities of using generative artificial intelligence to develop teaching materials for translation from Chinese [27].

Thus, we see that the use of digital resources is becoming an important component in the development of not only the educational environment as a whole, but also has a positive impact on the teaching and learning foreign languages.

MATERIALS AND METHODS

In accordance with the research plan, the experiment was conducted at the Municipal Budgetary Educational Institution "Gymnasium No. 11 of Yelets" from September 2024 to May 2025 and included that covered 28 students in Year 10 at school. The students were divided into two groups: control (14 students) and experimental (14 students). The experiment included entry and final tests. To test the hypothesis of improved results, the following methods were used: Paired Student's t-test (main analysis), Wilcoxon's signed-rank test for related samples (nonparametric test for violations of normality), and Effect size calculation (Cohen's d for related samples).

The entry test consisted of four sequential tasks. The first involved reading an authentic text and then answering questions by selecting statements that match the text. The second task involved brief description of a picture. The third task required listening to an authentic text and answering questions by selecting statements that match the text. The final, fourth task required students to respond to a letter from a pen pal, taking into account the questions posed.

The experimental learning was conducted in the experimental group with the active use of digital educational resources during each lesson.

The following research methods were used: theoretical analysis of scientific and methodological literature by Russian and foreign authors on this topic; study of regulatory documents; observation of the educational process; pedagogical experiment; questionnaires; qualitative and quantitative data processing; comparative analysis of the obtained results. The material for this study was the content of digital educational resources that can be used during English and Chinese language lessons.

RESEARCH RESULTS

According to the Educational Standard of Secondary (Complete) General Education in Foreign Languages, the study of a foreign language as a compulsory academic subject in senior school is aimed at further developing foreign language communicative competence developed in basic school, represented by speech, linguistic, sociocultural, compensatory, and educational-cognitive competencies. The Federal Educational Program for Secondary General Education is the main document that defines the content of general education and regulates educational activities in the educational organization as a whole, taking into account both in-class and extracurricular activities. The planned outcomes of mastering this program correspond to the modern goals of secondary general education, specified in the Federal State Educational Standard for General Education as a

system of personal, meta-subject, and subject achievements of the student. In the Federal Work Program for Foreign Languages E.M. Kolomiytseva and O.V. Duvanova emphasize the presence of a requirement for the main result of mastering the subject "Foreign Language" – the acquisition of foreign language communicative competence and the ability to actively interact verbally [28].

Yu. A. Golovina argues that a special approach to foreign language learning is necessary for the successful implementation of state educational standards, as language learning occurs in an artificial environment; this subject is not always considered a core subject; and there is a shortage of textbooks and teaching aids that meet modern teaching trends [29].

However, if a student is unmotivated, neither the teacher nor anyone else will be able to impart knowledge. Therefore, one of the main tasks of a foreign language teacher is to maintain interest in the subject and a daily desire to work, to foster positive motivation, and to link it to the student's cognitive needs. Motivation, as a system of incentives [30] leads to the activation of such psychological processes as thinking, perception, understanding and assimilation of foreign language material, which in turn allows us to increase the effectiveness of the learning process. To maintain and increase students' interest, the teacher must not only know their subject, but also seek new methodological techniques. Observations show that the best effect is achieved by non-traditional forms of conducting lessons, such as, for example, a video lesson, a discussion lesson, a lesson-performance, a lesson-excursion, etc. [31]. The use of computer technologies in the classroom also plays an important role today. It is undeniable that children are immersed in virtual reality from an early age, becoming familiar with technical devices and gadgets, which has influenced their ability to perceive any information. Today's youth are representatives of Generation Z; they were born in the digital world. They grow up and develop, rapidly exploring virtual networks. They cannot imagine any activity without the use of gadgets. Therefore, turning to information technology in the learning process is logical and appropriate. We believe that today's relevance is in giving students the opportunity to use various modern devices not only for entertainment, but also for their education, cognition, self-improvement, and personal development.

Thus, a distinctive feature of foreign language teaching in senior school at the current stage of society development is the growing need to employ innovative teaching methods, including the use of digital resources, to achieve higher learning outcomes.

The digital environment is a part of the information environment that gives an opportunity to meet human's needs for various types of information interactions with the environment and its constituent entities through digital resources [32]. It influences all areas of human life, including education. The "digital educational environment" is a unique tool that improves the effectiveness and quality of education, increases student's motivation for learning, and implements the individualized approach. Digital educational resources are an integral part of the digital educational environment. To date a variety of websites, platforms, and programs have been developed, both Russian and international, offering a range of materials from interactive lessons and audio and video materials to grammar and vocabulary exercises, and offering extensive opportunities to enhance the effectiveness of foreign language learning.

Thus, the digital educational environment represents a manageable and dynamically developing system for the efficient and convenient provision of information and communication services and digital tools to learning entities, taking into account current trends in education modernization [33], which will ensure high quality and accessibility of education at all levels and types [34].

At the secondary (school) level, the digital educational environment of the school presupposes a certain set of information and communication technologies and tools that function in accordance with the requirements of the Federal State Educational Standard for the formation of conditions for the implementation of the main educational program of primary general, basic general and secondary general education and aimed at achieving personal, meta-subject and subject results by students.

Some of the most well-known digital educational resources are shown in Table 1.

We consider it appropriate to define the concept of "digital environment" in the context of foreign language education as a set of digital educational resources which content makes it possible to interact and exchange relevant, authentic information in a foreign language for the effective organization of the educational process. An important characteristic of digital resources for foreign

language teaching is their relevance due to the constant update of materials, interactivity, multimedia content, and the use of new teaching methods and technologies. This allows students to stay abreast of the latest trends in language learning and utilize the most effective methods to achieve their goals.

Table 1 Educational resources

№	Name	Purpose	Web site
1	FSIS "My School" Federal State Information System of the Ministry of Education of Russia "My School"	Образовательная платформа с единым доступом к цифровым сервисам и учебным материалам для учащихся, педагогов и родителей.	https://myschool.edu.ru/
2	RES Russian Electronic School	Interactive lessons for the entire school curriculum from grades 1 to 11.	https://resh.edu.ru/
3	Library of digital educational content	A knowledge base created for all subjects and topics of the school curriculum using the most modern methods of material visualization.	https://urok.apkpro.ru/
4	Uchi.ru	An online educational platform for learning school subjects interactively. It includes interactive tasks, an engaging interface; educational cartoons and logic games; rewards such as certificates, diplomas, and certificates; class and individual student statistics; online lesson streams.	https://uchi.ru
5	Цифровой образовательный контент	Онлайн-платформа с бесплатным доступом к материалам ведущих образовательных площадок страны.	https://educont.ru/
6	Spherum	A free educational social network. Part of the digital educational environment being created by the Ministry of Education and Science and the Ministry of Digital Development, Communications and Mass Media in accordance with the Russian Government decree to implement the national project "Education".	https://sferum.ru/?p=start

We present an overview of digital educational resources for the use during foreign language lessons on the example of the English and Chinese languages.

"Russian Electronic School" is an information and educational environment that offers a complete course of lessons across all school subjects [<https://resh.edu.ru/subject/>], including English and Chinese. The material is classified by subject depending on the topic and grade level. Each lesson is divided into sections: "Let's begin the lesson", the main part (video lesson), practice exercises, and tests. The material is structured identically for English and Chinese. All lesson materials comply with the Federal State Educational Standard (FSSES) and age requirements and are aligned with the topics of the educational and methodological packages recommended by the Ministry of Education, which are fundamental for schools and for the model core curriculum of general education. Exercises and assessment tasks in the lessons are presented in the style of exam tests and can be used to prepare for the state final assessment in the form of the Basic State Exam and the Unified State Exam.

Federal Institute for Pedagogical Measurements is an institute that evaluates the quality of education: it creates exam models, verifies them, and analyzes the results. It was established by the Federal Service for Supervision in Education and Science, the agency that administers the Unified State Exam for eleventh-graders [<https://fipi.ru/>]. The website contains an open bank of assignments on school subjects, as well as demo versions, which can be used to prepare for the Basic State Exam and the Unified State Exam, including in English and Chinese. The website can be used both under teacher supervision and independently. The study material for the English and Chinese languages has a unified structure and includes the following sections: 1. Recommendations for independent study for the current and previous three years. 2. Revision by topic. It is divided into four types of speech activity (listening, speaking, reading, and writing), as well as grammar, vocabulary, and practice tasks. 3. Video consultations for the current year. Keys are available for each option.

The constant search for the most effective teaching techniques and methods, as well as forms of organizing the educational process, leads foreign language teachers to turn not only to federal but also to international websites. This is also explained by the continuing interest of researchers to use authentic materials in foreign language teaching [35].

We present an overview of international digital educational resources for the use in foreign language lessons, using English and Chinese as examples.

Duolingo is an online service for learning a wide range of foreign languages, both through a web-application and mobile devices [<https://ru.duolingo.com/>]. This free language learning application, which uses fun, short lessons to learn a language from scratch, allows users to learn English, German, French, Spanish and Chinese.

The site primarily offers written lessons and dictations, with less emphasis on speaking skills. Duolingo features a gamified skill tree, through which users progress based on their progress in completing tasks. The training feature requires students to complete approximately 20 questions within a 30-second time limit. As they progress through the lessons, they earn points, making language learning feel like a game. Duolingo uses a learning approach based on the analysis of extensive statistical data. At each stage, the system records which questions users found difficult and which mistakes they made. It then aggregates these data and uses it for machine learning, creating personalized lessons.

TED Talks [<https://www.ted.com/talks>] is a platform featuring a series of short talks on various topics given as part of the TED conference. Since many of the talks in English are available with subtitles, they can serve as a valuable resource for language learning and vocabulary development.

A separate category of digital resources are construction kits for creating your own assignments. These types of assignments can be used both directly in the classroom to reinforce new knowledge and to test students' understanding of material already covered. These resources are useful and in demand by foreign language teachers.

Quizlet [<https://quizlet.com/>] is a platform for creating and learning flashcards with terms, phrases and definitions in English. It can be used to learn new words, word combinations and expressions, as well as to review and reinforce existing material.

Wordwall.net [<https://wordwall.net/>] is a resource containing interactive games for practicing grammar and vocabulary. Teachers and students can also create their own games. For example, match-up (match words with their meanings), quiz, unjumble (correct jumbled words in a sentence), gameshow quiz (a quiz with a bonus round and extra lives), random wheel (roulette), crosswords, and much more.

OnlineTestPad [<https://onlinetestpad.com/>] is a free builder that lets you create a variety of online tasks: tests, crosswords, scanwords, surveys, logic games, and dialogue simulators. The test builder offers options for 14 question types, including: sequencing, fill-in-the-blank, sequential elimination, dictation, multiple-choice or one-choice questions, number and text entry, and file attachment. You can create classic crosswords, scanwords, fillwords, and sudoku.

Learningapps [<https://learningapps.org/>] is a modern interactive task designer for various types of assignments. All student assignments are immediately checked, the HTML code for any exercise can be retrieved and embedded into your web page, and student accounts and class lists can be created to organize homework. The exercises created in this service are convenient for the use during the reinforcement phase. Varied tasks make using the site feel like an engaging game.

As part of our research, we were also interested in examining digital resources for learning Chinese. In our opinion, the most challenging aspect of learning Chinese is listening comprehension. One of the reasons is the tonal system, which often confuses beginners. This feature significantly distinguishes Chinese from Russian, and even from the most widely studied English. However, regularly listening to Chinese speech helps overcome this challenge, as well as the second challenge: listening to spoken language. It is no secret that the language studied in a textbook is the official language of news and television, but a considerable part of the vocabulary is of little use even in subsequent sections of the same textbook, not to mention in real-life communication with native speakers.

Hello Chinese [<https://hellochinese.cc/>] is a website for learning Chinese from scratch. Learning the language begins with Pinyin, the system for writing Chinese words in Latin letters. The application clearly explains the rules of writing and reading transcription using the simplest syllables and words, and provides all the necessary information.

Learning Chinese through stories [<https://learningchinesethroughstories.com/>] is a website offering podcasts on a variety of topics and language levels, revealing information about Chinese culture and providing insight into how native Chinese speak, think and act. The podcasts cover a wide range of topics, making them useful to a wide range of users. Each podcast lasts from 5 to 60 minutes.

This digital resource helps improve listening comprehension of Chinese and can be used by teachers as a source of listening material, as the podcasts cover a wide range of topics. Teachers can easily select material that suits the lesson topic. The website can also be used by students for independent work and skill improvement.

A separate group of websites is based on neural networks. For example, PickLang [<https://picklang.ml/>] is an app that allows you to learn languages naturally by exploring the world around you.

The neural network generates exercises in real time based on user-submitted photos or those taken from a library of existing photos. The application works like this: you take a photo, upload it to the program, and the neural network generates a task based on its content.

Two types of exercises are available:

- choosing the name of the object highlighted in the photo;
- filling in missing words in the photo description.

There are concepts that allow you to track your progress in learning new words and your activity, and the smart feed will adapt according to your preferences. You can also choose a game mode that allows you to associate language with images using visual frames or filling in missing sentences.

So, we have presented examples, but by no means a complete list of digital educational resources. A key advantage of using online resources is that they serve as a means of optimizing individualized learning.

To confirm the hypothesis, a pilot study was conducted at an online school for teaching English and Chinese.

In the first stage, the experimental site was described, teachers and students were surveyed, and control and experimental groups of 10th-grade students were determined. Students were tested to determine their English language proficiency, and their performance in the classroom was analyzed.

The survey of teachers demonstrates their interest and understanding of the importance of using digital resources and finding effective teaching methods, confirming the relevance of our study.

A mini-survey of students, an analysis of their academic performance and the entry test allowed us to determine their English language proficiency, their attitude toward the subject, and to identify experimental and control groups. The main objective of the "Foreign Language" subject is to develop foreign language communicative competence through the comprehensive development of all its component competencies necessary for the implementation of foreign language communication in various spheres of communication [36]. This is precisely the criterion for the educational outcome, and, consequently, the main component in assessing the effectiveness of the educational activities of schools. This explains the choice of such a criterion for assessing the effectiveness of foreign language teaching in senior school in the context of a digital educational environment as overall academic performance. Therefore, an analysis of student assessments was conducted in each of the subgroups in order to identify the average score in each of them (see Diagram 1), as well as entry test.

As a result, the second group was determined as the experimental one due to the students' lower academic performance.

A set of exercises aimed at developing four types of speech activity was used for the experimental training. The experimental training was conducted in the experimental group with the active use of digital educational resources in each lesson. In the control group, instruction was conducted by a teacher using the teaching and methodological kit recommended by the Ministry of Education.

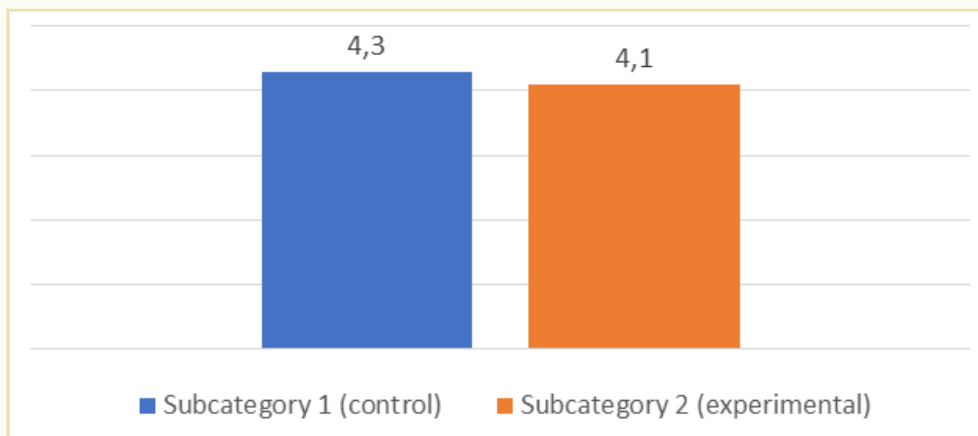


Diagram 1 Average score of students' academic performance

For greater reliability and objectivity of the improved results, the following methods were used: Paired Student's t-test (main analysis), Wilcoxon's signed-rank test for related samples (nonparametric test for violations of normality), and Effect size calculation (Cohen's d for related samples). Statistical significance level: $\alpha = 0.05$.

The largest increase was recorded in listening comprehension (+5.7 percentage points, $d = 0.73$, $p < 0.02$). Similar increases were recorded in reading and writing (+5–5.7 percentage points). The smallest effect was in speaking (+2.1 percentage points, $p > 0.05$). The effect is statistically significant at moderate size ($d = 0.65$ – 0.73).

According to the data obtained, the experimental group's final score for each individual listening, writing, reading, and speaking task increased. The average score increased by 4.7%. Table 2 compares the experimental group's results before and after the experimental training.

Table 2 Comparison of the test results of the experimental group before and after experimental training

Task	1	2	3	4	Total
	Reading	Speaking	Listening	Writing	
Subgroup 2	10=100%	5=100%	10=100%	5=100%	30=100%
Entry test	75,7%	75%	74,3%	77,1%	75,5%
Final test	81,4%	77,1%	80%	82,1%	80,2%

In the control group, the final result for each individual task showed minor changes, and the average indicator increased by only 0.5%. Table 3 compares the results of the control group before and after the experimental training.

Table 3 Comparison of the test results of the control group before and after experimental training

Task	1	2	3	4	Total
	Reading	Speaking	Listening	Writing	
Subgroup 1	10=100 %	5=100 %	10=100 %	5=100 %	30=100 %
Entry test	78,2%	76,3%	75,6%	79,4%	77,4%
Final test	79,1%	76%	76,8%	79,5%	77,9%

Regarding the academic performance, the average academic performance in the control group – 4.3 – remained unchanged. Meanwhile, in the experimental group, where the academic performance was initially lower (4.1), it increased to 4.4, surpassing that of the control group. Table 4 compares the results of the control and experimental groups after the experimental training.

Table 4 Comparison of the test results of the control and experimental groups after experimental training

Task	1	2	3	4	Total
	Reading	Speaking	Listening	Writing	
Subgroup	10=100 %	5=100 %	10=100 %	5=100 %	30=100 %
Subgroup 1 (control)	79,1%	76%	76,8%	79,5%	77,9%
Subgroup 2 (experimental)	81,4%	77,1%	80%	82,1%	80,2%

Having analyzed all the data obtained, we can conclude that the experimental group's results, both for individual tasks and for the average score, were higher than those of the control group. This proves that the use of web resources in foreign language lessons contributes to the development of subject-specific (mastery of the lesson topic), meta-subject (development of the ability to plan one's speech behavior; development of communicative competence; development of meaningful reading, including the ability to identify the topic, predict the content of the text using keywords, highlight the main idea and key facts, omitting secondary ones, and establish a logical sequence of key facts; implementation of regulatory actions of self-observation, self-control, and self-assessment during communicative activity in written speech) and personal outcomes (academic collaboration, an informed choice of a future profession), etc.

Thus, we can conclude that experiential learning in the context of the digital environment contributed to the intensification of the English language learning process, the assimilation of a greater amount of information in a shorter time, as well as an increase in interest and motivation in the subject being studied.

DISCUSSION

New requirements to foreign language education in today's digital educational environment are forcing educators to seek new approaches to organizing the educational process to ensure its effectiveness [12; 14]. Every educator must understand that when students are not actively engaged, any informative material will evoke a contemplative interest in the subject, which will not be cognitively meaningful. By organizing a system of activities that not only allows but necessitates the use of modern digital technologies, students' cognitive interest can be aroused. The use of digital educational resources helps eliminate monotony and significantly expand learning opportunities. From a teaching methodology perspective, the use of the internet in foreign language teaching is relevant and currently offers the most effective way to develop all types of speech activity.

The study, which aimed to examine the effectiveness of digital educational resources as components of the overall digital educational environment in teaching foreign languages to high school students, and to conduct a pedagogical experiment involving a combination of English and Chinese lessons aimed at enhancing the development of students' foreign language competence, made it possible to achieve these objectives.

Having analyzed the works of both foreign and domestic authors, we note that the purpose of learning a foreign language as a compulsory subject in senior school is to further develop the foreign language communicative competence developed in basic school, represented by speech, linguistic, sociocultural, compensatory, and educational-cognitive competencies [6; 37]. A distinctive feature of foreign language teaching in senior school at the current stage of social development is the increasing need to employ innovative teaching methods, including the use of digital resources, to

achieve higher learning outcomes. The digital environment is a part of the information environment that enables people to engage in various types of information interactions with the environment and its constituent entities through digital resources. It impacts all areas of human life, including education. We agree with M.V. Rybakova [38] and S.E. Tsvetkova [39] that the digital educational environment is a unique tool that improves the efficiency and quality of education, enhances student motivation, and implements a personalized approach. Digital educational resources, in turn, are one of the components of the digital educational environment. Existing Russian and international websites and platforms offer a variety of materials, from interactive lessons and audio and video materials to exercises on grammar and vocabulary, as well as regional studies, and offer extensive opportunities for enhancing the effectiveness of foreign language learning.

CONCLUSION

Analyzing the obtained results, we can conclude that a particular feature of foreign language teaching in senior school at the current stage of social development is the increasing need to employ innovative teaching methods, including the use of digital resources. The process of teaching a foreign language in senior school can be optimized if digital educational resources, as components of the digital educational environment, are presented as an intensifying tool.

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© Осипова Н. В., Пузатых А. Н., 2026 Автор заявляет об отсутствии конфликта интересов	© Nadezhda V. Osipova, Alexander N. Puzatykh, 2026 The author declared no conflicts of interest