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Using a WebQuest Technology in Preparing for an English Language Exam in a Technical University

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Abstract

The purpose of this article is to create a web-quest aimed at preparing for an English exam in a technical university, namely to practice those lexical topics from the exam that are challenging for most students. The issues of creating of a WebQuest aimed at preparing for the English language exam in a technical university, namely, working out those grammar and lexical topics from the exam that cause particular difficulty for most students, are considered. The role of Internet technologies in the educational process was determined, the importance of this technology in preparation for passing the English language exam in a technical university was indicated; the obtained results of the work were analyzed. The following tasks that were approached during the study: to define the concept of "Internet technology"; to define the role of Internet technology in the educational process; to define the term "WebQuest technology"; to identify the role of WebQuest technology in the educational process; to conduct a questionnaire in order to identify the most difficult exam topics for students; to develop and test a WebQuest aimed at working out the most difficult exam topics; to analyze the results of the conducted research. The theoretical basis of the topic was studied, questionnaires in order to identify the most difficult topics were developed and conducted, the possibilities of uploading a WebQuest at various platforms, their advantages and disadvantages, were analyzed. Based on the material studied, a WebQuest was developed and conducted. In order to identify the effectiveness of the WebQuest, a survey of participants was conducted. As a result, the developed WebQuest turned out to be effective.

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1. Introduction

All through the time the world exists there has been a continuous search for and improvement of the methods and techniques for the transfer of the knowledge accumulated in all fields of human activity (Smirnov et al., 1999; Zemenkova et al., 2022; Pashkevich et al., 2023). The rapid development of computer technologies contributes to acceleration of this search (Potekhin, Galkin, 2023; Sholokhovich, 1998; Cherepovitsyn, Tretyakov, 2023) by encouraging the design of novel feasible techniques and methods that keep in line with the realities of today and help to enhance learners motivation, which finally leads to improving the quality of education (Bauer-Ramazani, 1998–2005; Polat et al., 2002).

As of today, pedagogical science has accumulated a substantial number of established educational techniques, with some sources listing over one hundred ones (Boyko et al., 2022; Borisova, 2022; Barinova, 2019, Kharlamova, et al., 2023, Oblova, et al., 2023). The classification of the known educational methods developed by V.G.Selevko (Selevko, 2005) numbers over 50 varieties (Bovtenko, 2008). The list includes:

- educational technologies based on student-centered education;
- educational technologies aimed at improvement and enhancement of learner performance (game-based methods and communicative teaching techniques developed by E.I. Passov);
- alternative techniques (free work method of Célestin Freinet);
- nature-aligned techniques (the Montessori method);
- developmental teaching techniques (self-development learning techniques).

As a result of further development of teaching and learning technical aids, new technologies appear (Yarasheva et al., 2014; Zakharov et al., 2022; Zaitsev, 2012). Of special interest are information and communication technologies (ICT), which can be explained by intense computerization on the social level and by introduction of technical aids in education. Now, Internet-based technologies are also used as a part of teaching and learning process. In terms of foreign language training, the most relevant are online training programmes or tutorials as well as search, play-based and imitation learning online tools (Vorobyov, 2004; March, 2001; Safonov, 2017).

One of the factors in information technologies is using a variety of schemes aimed at applying a choice of online resources in the teaching and training process (Zemenkova et al., 2022, Zhuk, 2006). Further improvement of computer technologies and implementation of machine learning (Potekhin et al., 2023; Filippov, 2022) in various industries will contribute to introducing more internet-based technologies in the current education and boost their appeal for teaching practice. (Nikonova et al., 2023; Zemenkova et al., 2022)

Taking into account the factors mentioned above, we can identify the purpose of this study as the implementation in the analysis and selection of specialized platforms, as well as the further implementation of the Internet technology "WebQuest" in the process of preparing students of a technical university for the English language exam.

2. Literature review

In the case of foreign language teaching methodology, we can note the tendency towards the emergence and development of such interdisciplinary areas and branches as computer-based and later, electronic linguodidactics, considering theoretical aspects of informatization (Gartsov, 2010) mainly in teaching Russian as a foreign language. Practical experience of integrating information technologies and rethinking the role of information technologies in language education can be traced in the studies of a number of Russian and foreign researchers as M.V. Botvenko (Bovtenko, 2005; Bovtenko et al., 2006; Bovtenko 2008), O.V. Volkova (Volkova, 2010), L.G. Zhuk (Zhuk, 2006), P.V. Sysoev (Sysoev, Evstigneev, 2008; Sysoev, Evstigneev, 2010), etc. WebQuest technology is one of those in question: E.I. Baguzina (Baguzina, 2010), G.A. Vorobiev (Vorobyov, 2003; Vorobyov, 2004), Bauer-Ramazani Chr. (Bauer-Ramazani, 1998–2005), Lamb A. (Lamb, 2004) etc.

At the same time, the vector of research activities of the last decade is related to the introduction of digital technologies into the educational process. The project "Modern Digital Environment in the Russian Federation" launched in 2016 only confirmed the need to create conditions for "systematic improvement of the quality and expansion of opportunities for lifelong

learning through the development of the Russian digital educational space" ([Pasport prioritetnogo proekta..., 2016](#)).

In our study one of the Internet technologies, which, in our opinion, can be used today in the process of teaching a foreign language in general, and for effective preparation for the English language exam, in particular, is a web quest – an inquiry-oriented task requiring that most information used by learners comes from online sources.

The term was first introduced in 1995 by B. Dodge, a professor of education technology at San Diego State University ([Dodge, 1997](#)). A learning WebQuest is arranged by a teacher with the aim of organizing the students' learning activity. The concept of the technique was built up by B. Dodge and T. March ([March, 1995](#); [March, 1998](#); [March, 2001](#)). These days, WebQuests are being developed for practically all subjects and, according to E.I. Baguzina ([Baguzina, 2010](#)), can offer a variety of advantages. These include enhanced student's motivation, improving the analytical and creative thinking skills as well as the teamwork abilities, possibility to organize teleworking and create a scenario that keeps students interested.

To the opinion of the authors, the list of educational WebQuests which are considered as the most applicable in foreign language training are narration, compilation, creativity tasks, journalistic research, and persuading the opponent. The quests can cover the widest range of topics; the problem-solving tasks can be planned at different levels of complexity, and the outcomes, depending on the material studied, can be presented in a variety of forms (oral statements, presentations, essays, web pages, etc.).

As a teaching method, educational WebQuest includes and relies on:

- the use of real-life resources (besides basic resources, such as textbooks, learning guides, dictionaries, etc., online resources can be also used in order to complete a task);
- a comprehensive task that reflects real-life issues, which considerably enhances learner motivation;
- the opportunity for the participants to work at individual pace and go back to the material that was not properly learned;
- completing a task through thinking out a puzzle or making an inquiry, similar to doing a quest in a computer game, which appeals to learners;
- the opportunity to put the outcomes on the web, which allows for feedback from real people.

Public support and approval encourages the learners to produce the best possible results.

Like other teaching techniques, WebQuests are never flawless. Their drawbacks include labour-intensive and time-consuming preparation, a certain level of computer skills, difficulty in regulating the time of learners' work, and possible Internet disconnection. It is worth to note, however, that the deficiencies noted are not critical and can be mitigated by teacher's active steps.

The topic of quests can be very different, problematic tasks can differ in varying degrees of complexity, and the results of work, depending on the material studied, can be presented in different forms (oral speeches, presentations, essays, web pages, etc.) ([Lamb, 2004](#)). As part of our research, we refer to such training topics as "Power Engineering," "Electric fields," "Capitals," "Nuclear Energy," "Cogeneration," "Solar cells," which is due to the data of a survey conducted among students, the results of which are presented in detail in the following paragraphs.

There is a wide choice of internet services that allow to start blogs, develop websites or interactive tasks, and many other resources that can be used in a WebQuest design. The work provides the analysis of up- and downsides of some online platforms with regard to running a WebQuest as part of English exam preparation

The first platform to analyze was ZUNAL ([ZUNAL, 2019](#)), the most popular as a tool for developing quests, which is actually an online educational quest design website. With the help of this service a user only needs to sign up, then enter the required information in a sequence of pop-up windows. Thus, the service is actually a ready-made template for a WebQuest for a teacher to fill in. This makes ZUNAL the easiest to use and the best to provide the quickest possible WebQuest preparation. The service is free for users. The disadvantages are, first, the English-only interface and second, the old-fashioned appearance of the website and, consequently, of the WebQuests designed. Today, the trendy and attractive external design, unusualness and novelty are the factors that matter a lot to young people. For this reason, a decision was made to avoid using a standard template in favour of attempting to design an original WebQuest. The platform chosen, therefore, is the one that can be used not only for WebQuest developing but for other educational purposes as well.

A wide range of existing internet services now allows for starting an own website, with Wix, Tildapublishing, uKit, uCoz, and GoogleSites being the most commonly used. These website builders are practically similar and instrumental for creating websites with any topical content with a variety of images, fonts, and add-in items.

As a result of preliminary analysis for each of the services mentioned, GoogleSites was chosen as an optimum platform for developing the target WebQuest. GoogleSites is a free means for designing and co-editing simple web pages, compatible with all other Google web applications. Although it does not allow users to design business websites, it is quite suitable for developing uncomplicated information and communication ones. As for other advantageous characteristics, the platform:

- is user friendly;
- is readily understandable for wide audience, without the necessity for specific computer programming skills and knowledge;
- provides Russian interface;
- allows for integration with other Google web services (tables, spreadsheets, forms, presentations, maps, YouTube videos);
- offers ready-made templates.

The disadvantages of the platform (e.g., no possibility to give commentaries and the cloud storage limit of 50Mb) were considered as insignificant. Developing a WebQuest does not involve uploading of materials that require large amounts of memory, since a WebQuest is mostly intended for information search and analysis in order to complete a specific task.

2. Materials and methods

In the process of research, the following scientific methods were used: literature analysis (both academic and methodical/instructional sources), surveying of web-based platforms where the WebQuest can be uploaded, questioning, and modeling representation, methods of statistical data analysis, data processing and graphical presentation were performed using computer programs SPSS 17 (IBM) and Microsoft Office Excel 2017. Various methods of statistical processing were used depending on the type of random variables and the research task. The boundaries of confidence intervals for the mean values were calculated for a confidence probability of 0.95 (CI 95 %). The values of qualitative variables are presented as observed frequencies and fractions (percentages). For fractions, the boundaries of confidence intervals for 95 % confidence probability (95 % CI) using the Wilson method are calculated. For quantitative values, medians, first and third quartiles in the Me (Q1; Q3) format are given. To compare quantitative values of two groups, the nonparametric Mann-Whitney U-test (for independent samples) and Wilcoxon W-test (for related samples) were used. Differences were considered statistically significant at $p < 0.05$, where p is the probability of a first-order error in testing the null hypothesis. Two-sided versions of the criteria were used in all cases.

3. Results

The beginning of our experimental work is associated with the survey among the undergraduate students of the National Research University "Moscow Power Engineering Institute", according to which 65 % of respondents identified the technology of WebQuest as the most useful and convenient in preparing for classes, which is explained by the students themselves extensive functionality of digital platforms for creating WebQuests, the peculiarities of the discipline "Foreign Language" and the requirements for its mastering.

The questionnaire survey conducted among the 1st year students majoring in "Biotechnical systems and technologies" (groups ER-18-23, ER-17-23, ER-16-23) showed:

1. For students, motivation to learn English is related to the specifics of future professional activity (62 %), the possibility of conducting researches (33 %) and self-improvement and development of personal qualities, intellect, imagination, creative thinking (5 %).

2. The majority of students indicated digital gadgets and Internet technologies as an integral part of modern life (86 %) and realize the need to ensure the protection of devices and personal data while working with them (92 %).

3. In the process of preparation for academic classes, the majority of students (88 %) address Internet technologies in 75-60 % of cases. The use of Internet technologies is almost equally related to the fulfillment of everyday tasks (study, work) and leisure time. In addition to the WebQuest,

the technologies used by students to prepare for classes were electronic dictionaries and Microsoft Office tools (25 %), thesauri (20 %), G-Suite cloud services (21 %), video lectures and podcasts on Ted-ED and YouTube (17 %), and open access learning materials (17 %).

5. Besides, one of the important indicators for our study was to identify the students' ability to determine their own professional and learning needs and, to customize the WebQuest toolkit during the course of the learning tasks according to them. The presence of this skill was confirmed by 95% of respondents, while the rest of them (5 %) would prefer to ask for help from the teacher.

The questionnaire survey results are presented in [Table 1](#).

Table 1. Descriptive statistics of questionnaire results of the total sample (n = 40) of control (CG) and experimental groups (EG)

Questionnaire Aspects	Absolute Frequency	Prevalence, %	Confidence Interval	
			Left bound	Right bound
Motivation to learn English is related to the specifics of future professional activity	25	62 %	47 %	75 %
Motivation to learn English is related to self-improvement	13	33 %	20 %	48 %
Motivation to learn English is related to the opportunity to conduct research and development activities	2	5 %	1 %	17 %
Digital gadgets and related technologies are considered to be an integral part of modern life	34	86 %	72 %	94 %
The need to protect devices and personal data while working with them is met	37	92 %	79 %	97 %
Internet technologies are used in 75-60% of time for class preparation	35	88 %	74 %	95 %
Electronic dictionaries and Microsoft Office tools are used for class preparation	10	25 %	14 %	40 %
Thesauri are used for class preparation	8	20 %	10 %	35 %
Cloud services are used for class preparation	9	21 %	11 %	36 %
Video lectures and podcasts on Ted-ED and YouTube are used for class preparation	7	17 %	8 %	31 %
Publicly available learning materials are used for class preparation	7	17 %	8 %	31 %
Professional-learning needs are distinguished the web-quest toolkit during the course of the learning tasks is customized according to them	38	95 %	83 %	99 %
Teacher's assistance is required within the training process	2	5 %	1 %	17 %

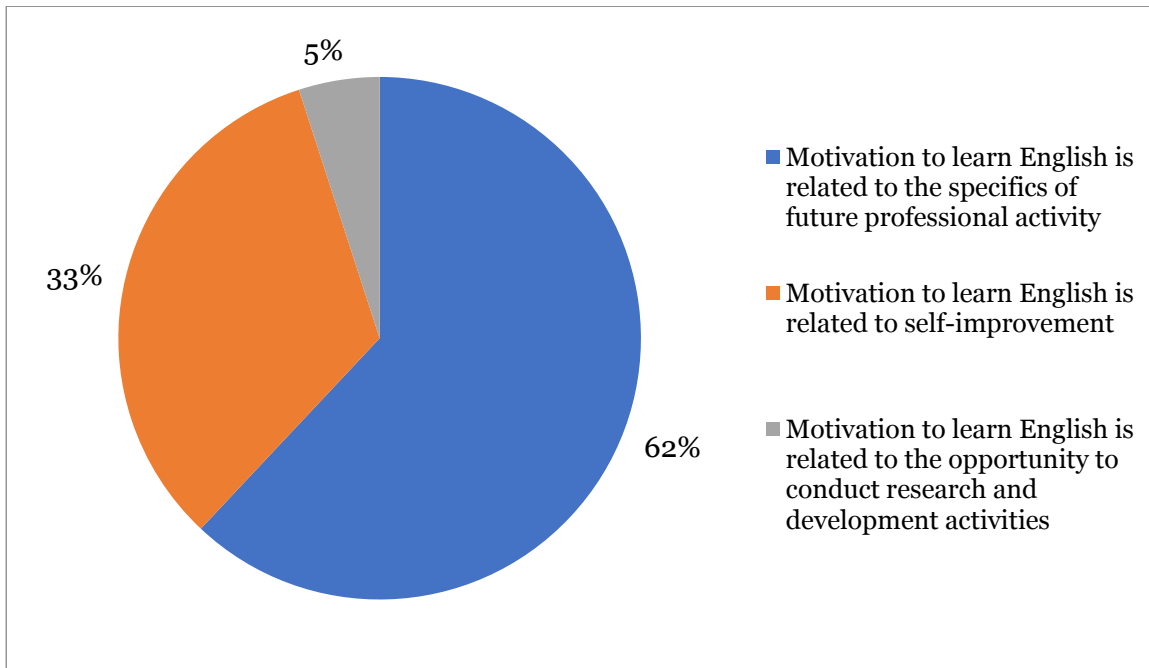


Fig. 1. The structure of different motivations for learning English

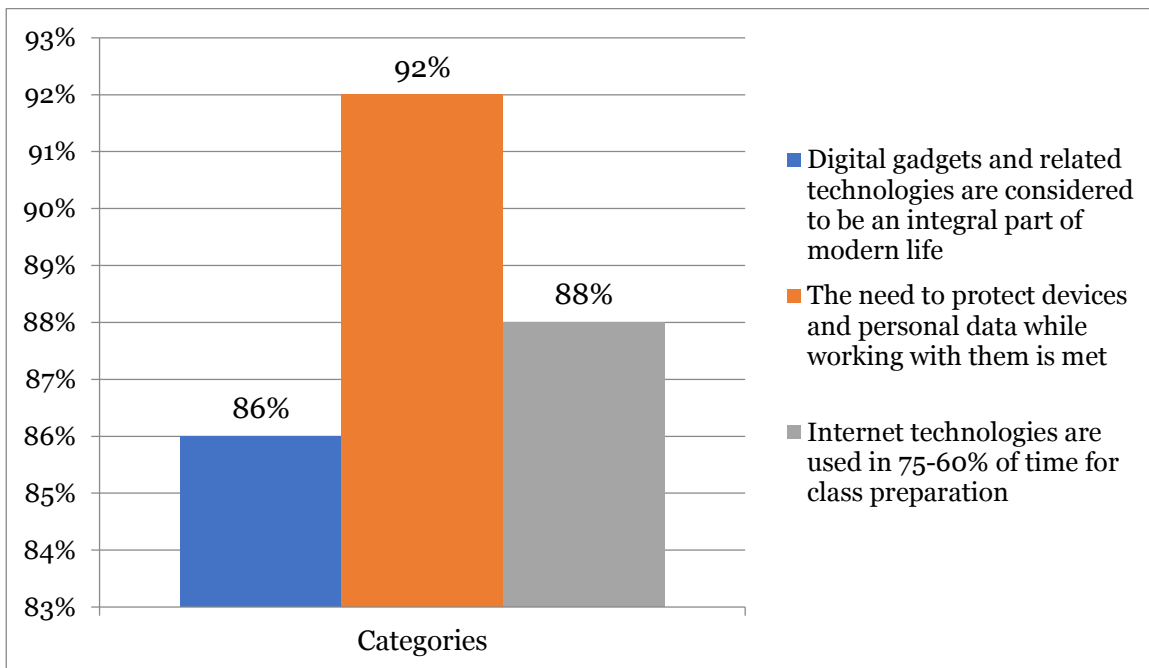


Fig. 2. Structure of different attitudes towards the use of information technology for learning English

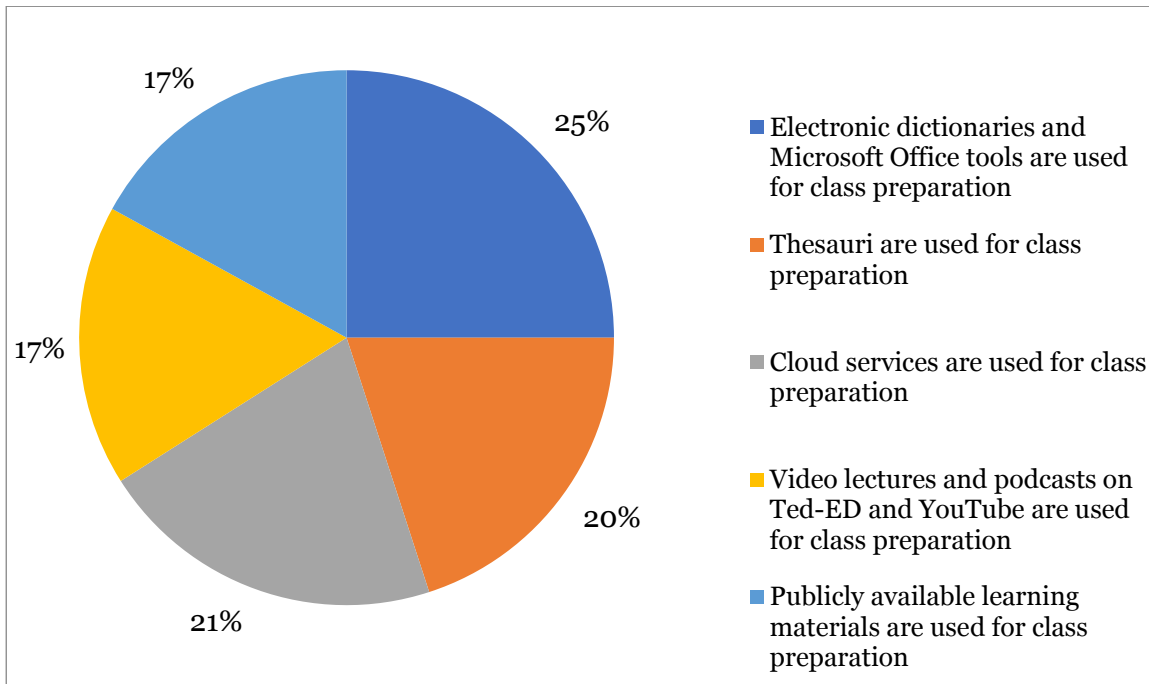


Fig. 3. The structure of the sources of training materials used

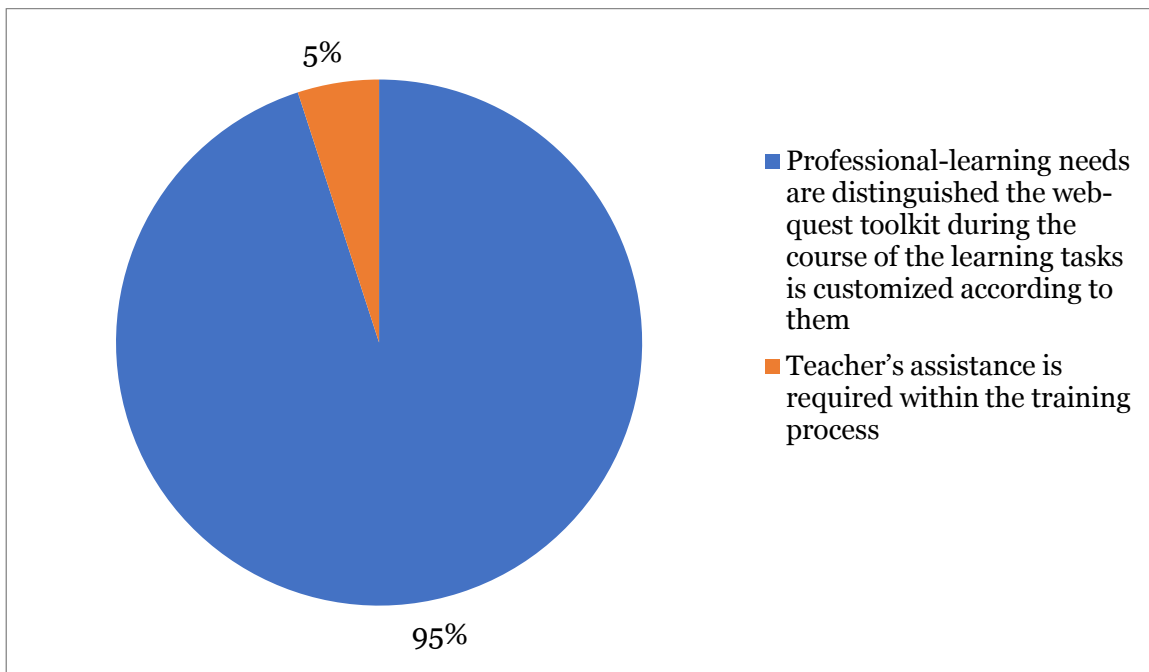


Fig. 4. Structure of ways of evaluating one's own English language learning outcomes

In addition to the questions concerning students' general motivation and personal experience of using Internet technologies, the questionnaire form also included points devoted to the most difficult grammatical and lexical topics, according to the students' opinion. These included the use of passive voice, infinitive and the infinitive constructions, participle and conditional sentences (second and third types) in oral and written speech.

The most difficult lexical topics for learning were "Power Engineering", "Electric fields", "Capacitors", "Nuclear Energy", "Cogeneration", "Solar cells", which proves to us the need for extra materials for revising this topic. Thus, the obtained questionnaire data confirmed the relevance and perspectivity of the problem discussed in this study. The students' answers also allowed us to approach consciously the planning and implementation of experimental training.

As part of the preparatory stage, students got familiar with the goals and objectives of the experiment and the principles of working with the Google Sites platform. The total number of participants involved at this stage is 80.

The first, input diagnostics involves a test consisting of 50 questions for the participants of both groups. The first 40 questions reflect the grammar course of the discipline "English language", the remaining 10 deal with the vocabulary course. Each answer is valued 1 point. This format of entrance control is necessary not only to assess the level of foreign language proficiency necessary for our experimental training (Intermediate or "B1" according to CEFR), but also to identify some of problematic topics that require studying or extra revision during the exam preparation course. As a result, all of the students who proved the intermediate level of foreign language proficiency were divided into two groups: control group (CG) and experimental group (EG). . The total number of remaining participants is 40.

The formative stage of the experimental work involved English language training in the CG and EG according to the planned pedagogical experiment. In the EG training was based on thematic WebQuests created with the help of Google Sites. In the CG training was carried out in the traditional form, using the teaching materials. The timing of the pedagogical experiment was determined in accordance with the thematic distribution of academic hours specified in the "English language" syllabus.

For the WebQuest development, the following structure was chosen:

1. The Welcome Page;
2. The Plan of Activities;
3. List of Resources;
4. Algorithms;
5. The Assessment Criteria;
6. Questionnaire.

Following the scenario, the participants try on the role of authors-developers of the exam variants, who have to make two test variants in order to practice the topics that cause the greatest difficulties.

The *Welcome* page is supposed to introduce the participants to key information about the exam, namely, the assessment criteria, structure, and preparation techniques, so it contains all the necessary details. *The Plan of activities* section sets the tasks to be done in order to complete the quest. At this stage, the teacher also splits the students into two teams. Having known the team they belong to, the participants receive detailed instructions regarding the tasks completion in the WebQuest.

The *List of resources* represents the contents of the WebQuest, namely, the links to the rules for using Quizlet, to the cloud service where the results are to be uploaded, and to the videoconferencing room. This part suggests general introduction to resources for the participants who can do it from home, spending 5 to 7 minutes of their time. Afterwards the participants can see the evaluation principles for the activities they perform in *Assessment criteria* section. It contains a detailed description of how to estimate every piece of their work and a table for the scores gained by each of the two teams. According to the rules, the scores gained by every participant are summed up and added to the scores gained by their team for developing a sample examination task. After that, the overall score of each team is calculated, and the winner is determined.

When the 1st stage is completed, a video conference is scheduled to be held on any online platform suitable for the participants and organizers (e.g. Zoom). The conference is attended by all the participants and the instructor and is dedicated to discussing any possible issues and clarification or updating the details.

Following the discussion, the participants start the task, which means going on to Stage two, the key stage of the WebQuest. This includes a number of tasks for the participants to achieve:

1. To study the detailed instructions explaining how to do each of the tasks placed in the *Strategies*.

2. To develop a version of an English language test. In order to do that, the participants must take up one of the functions listed below and, in accordance with the function chosen, find the applicable tasks using online sources. This way, at the end of the stage each team is supposed to produce a ready-to-use version of the specified test, where all assignments cover one and the same vocabulary topic (one group has "Solar energy," the other has "Nuclear power"). In their teams, each participant performs some personal functions, being one of the following three:

- *Translators* are supposed to choose assignments for the "Translation" section;
- *Grammarians* look for the grammar and vocabulary use assignments;
- "*Orators*" – select tasks from the oral speech section.

The members of each team contribute to achieving the common goal, so in the process they master the skills of working in a team, sharing and delegating tasks, exchanging their experience, learning to present their opinions and considering the opinions of others, and using creative approaches.

3. To develop a series of flashcards containing the new relevant topical vocabulary on Quizlet, which afterwards can be studied by the team two members in preparation to taking the English language test created by one of the teams.

After the instructor checked and approved the test versions prepared by the teams, they started preparing for 3rd stage of the WebQuest. The teams exchange the links to the sets of flashcards they created, and are given two days to study the vocabulary. Then within the period of three days at the specified time the WebQuest participants are given tasks from the test version developed by the other team. On the first day they receive the translation, grammar and vocabulary tasks, all of which must be completed within 30 minutes (the interval includes a specified time frame to complete each of the tasks and 10 minutes to send the completed tasks to the facilitator). On the second day they receive the writing tasks, with 30 minutes given to complete them and send them to the facilitator. On the third day they are given the speaking tasks, this time on an individual basis, and then contact the facilitator by video.

So at this stage we can see the participants acquire the vocabulary and use it in their speech. The participants master the new vocabulary on the most complicated topics and consolidate its knowledge by going through the English language test version designed specifically for the revision of the material. A WebQuest also allows the students to adapt to the time frames and learn the strategies pertaining to the English language test.

To check whether the goals set for the practical part of the work were achieved, a survey was carried out among the students of a number of groups who were to take the English language test at the end of the current term. The results of the survey showed that most students need a considerable amount of time and effort to prepare for the test, with many having difficulty in studying specific areas of grammar and vocabulary, which justifies online search for additional materials.

As a result of the research, an original WebQuest was developed using GoogleSites. The students who developed and solved the tasks gained knowledge about the strategies of dealing with all aspects of an English language test. They also searched for and found specific tasks related to these aspects and based on them developed fully valid versions of the test (complete with vocabulary lists for preparation) aimed at revision of specific topics that appear to be the most difficult. Finally, the WebQuest participants mastered the target vocabulary and solved the tasks they had developed as a part of preparation for the end-of-semester English language test.

Using educational WebQuests in preparation for foreign language tests has proven to be an effective tool, because this technique provides tailoring the preparation to the specific exam requirements and allows for individualized approach. In addition, the gamification of foreign language test preparation makes it more appealing for the learners, this enhancing their motivation.

The results of the surveys and questionnaires confirm the relevance and effectiveness of the developed WebQuest which covered the most challenging aspects and topics included in the English language test.

The practical value of the work is in the practical applicability of the methodological developments. The prospects of their further use may lie in developing similar quest techniques for a wide range of topics and aspects of language learning and foreign language test preparation.

The questionnaire identified two topical vocabulary sets, "Environmental issues" and "Technological development, its prospects and implications" as the ones causing the greatest difficulties for the learners. Writing and speaking were also recognized as the skills most difficult to master. The analysis of the findings allowed for the development of a WebQuest aimed at overcoming the challenges mentioned above.

The final stage of the experiment involved both groups and was in fact a final discussion where every student was given an opportunity to speak on the topic and evaluate the text they had studied, to evaluate the quality of understanding and interpretation of the extract read and the soundness of the arguments put forward by other participants to the experiment, and to review and

finalize the definitions of terms. It is worth to note that the students of the experimental group were more creative in the process of discussion and had a better knowledge of specific terminology. The end stage of the educational experiment was a final test taken by both experimental and control groups. The students were offered an English language test, similar to the initial test, and a set of questions related to the topic covered in the experimental study module. The test results for each of the two groups are given in Tables 1 and 2 below as percentages of the tasks completed correctly to the overall number of tasks (100 %).

Table 2. Results of comparative analysis of input and final diagnostics in control (CG) and experimental groups (EG)

Students Groups	Test results for the course "Foreign language" Me (Q1; Q3)		Statistical significance of the differences between the entry and final test by the Wilcoxon test, P
	Entry	Final	
Control (n = 20)	75 (72; 78)	77 (74; 80)	0,649
Experimental (n = 20)	73 (71; 75)	86 (83; 89)	0,001
Statistical significance of differences between groups by Mann-Whitney test, P	0,592	0,046	–

Statistical analysis of the data showed that at the entrance testing stage there were no statistically significant differences between the control and experimental groups ($P = 0.592$).

At the final testing stage, the median value of scores in the experimental group was statistically significantly ($P = 0.046$) higher by 12 % than in the control group.

After training in the control group, the median value of scores at the final testing stage was not statistically significantly changed ($P = 0.649$) compared to the entrance testing stage.

After training in the experimental group the median value of scores at the stage of final testing statistically significantly ($P = 0.001$) increased by 18 % in comparison with the stage of entrance testing.

Consequently, training in the experimental group was more effective than in the control group.

4. Conclusion

A WebQuest was created and tested on the Google Sites platform, during which the students got familiar with the algorithms of each of the exam tasks, found exercises devoted to the most problematic topics. Afterwards these topics ("Power Engineering", "Electric fields", "Capacitors", "Nuclear Energy", "Cogeneration", "Solar cells") were used to create full-fledged test variants, as well as lists of vocabulary. Then the participants memorized the vocabulary selected for them by the rival team and solved the created exam variants.

The use of educational WebQuests in preparation for the English language exam is effective, as this technology allows organizing the preparation taking into account the specifics of the exam and uses an individual approach. Besides, with the help of this technology it is possible to gamify the process itself, which will make it more attractive and interesting for examinees and, therefore, worth of their motivation.

The practical value of this work is manifested in the possibility of using the obtained methodology in the process of language disciplines training. The prospects for further research may be related to the development of similar quest-technologies devoted to a more comprehensive preparation for the English language exam. The results of the conducted surveys and questionnaires confirmed the relevance and effectiveness of the created WebQuest dedicated to practicing the most difficult grammar and oral topics declared for preparation for the English language exam.

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