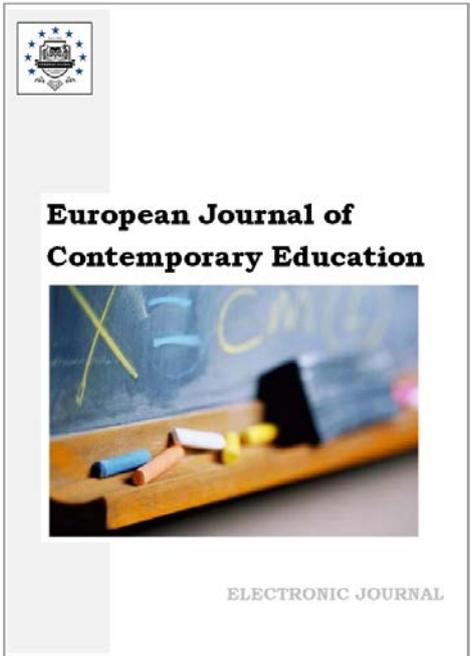




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## Using Online Quests in Blended Learning for the Development of Student Competencies in Professional Education

Maria Rakova <sup>a</sup>, Sergei Kolganov <sup>b</sup>, Renat Latypov <sup>c</sup>, Irina Polozhentseva <sup>d,\*</sup>

<sup>a</sup> Volga State University of Physical Education, Sports and Tourism, Kazan, Russian Federation

<sup>b</sup> Moscow Aviation Institute (National Research University), Moscow, Russian Federation

<sup>c</sup> Kazan (Volga region) Federal University, Kazan, Russian Federation

<sup>d</sup> K.G. Razumovsky Moscow State University of Technologies and Management (the First Cossack University), Moscow, Russian Federation

### Abstract

Although digital tools are increasingly integrated into professional education, their structured impact on the development of student competencies requires further empirical validation. Web quests offer a guided inquiry format in which students work with selected online resources to solve professionally oriented tasks. By organizing the search and processing of information, this approach supports the integration of theoretical knowledge with practical application. The aim of this study was to examine the effectiveness of web-quest technology in professional education, with a particular focus on its influence on the development of key student competencies. The experimental group (n = 40) completed learning tasks using the web-quest format, whereas the control group (n = 42) followed traditional instructional methods. Data was collected through structured classroom observations and a teachers' survey. The results were then analyzed statistically to determine whether there were any performance differences between the two groups. The study clarifies the fundamental concept of "web quest" and presents the results of an empirical study evaluating the usefulness of this method in professional education, utilizing survey methods and pedagogical observation. The results showed that using webquests during learning improves student performance. This includes not only student competencies but also problem-solving skills, teamwork, and also increases motivation and developing time management skills. The authors predict that webquests can be an effective technology for stimulating student engagement and improving educational outcomes.

**Keywords:** inquiry-based learning, instructional design, student engagement, collaborative learning, competency-based education.

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\* Corresponding author

E-mail addresses: [i.v.polozhentseva@mail.ru](mailto:i.v.polozhentseva@mail.ru) (I. Polozhentseva)

## **1. Introduction**

The importance of a resource-oriented approach to higher education has become increasingly evident in recent years, particularly in the context of lifelong learning, which is now recognized as a fundamental requirement of contemporary professional development (Poroshenko et al., 2024; Shichkin et al., 2024). The web quest technology is a crucial tool for implementing resource-oriented learning (Afanasyev et al., 2017; Kudashkina et al., 2022). It enables the creation of a holistic didactic model based on online information searches and provides an individualized educational trajectory for each student (Larionova, 2020).

In addition, web quests can increase students' interest in learning by assigning clearly defined tasks and expected outcomes. They contribute to the development of teamwork, creative problem-solving, independent decision-making, and critical thinking, while also encouraging initiative and responsibility. The web quest method was developed in the mid-1990s by T. March and B. Dodge from the University of California, San Diego (Maddux, Cummings, 2007). The founders of this technology define it as an inquiry-based, reference-oriented activity, in which students conduct information searches using internet resources and video conferencing (Dodge, 1995). This method is often associated with project-based learning since it encourages students to work on a problem posed by the teacher, ultimately leading to an original student-developed solution (Vavulina, Nikolaenko, 2017). Web quests are most commonly used as group assignments, though they can also be adapted for independent work (Stetter, Hughes, 2017). Additionally, they are well-suited for distance learning (Babina, Utusikov, 2024).

Research literature conceptualizes web quests as structured interactive learning activities that require students to independently acquire and analyze information from online resources (Khlopina, 2016). Some authors emphasize their problem-based nature and the inclusion of role-playing components (Bezrodnykh, 2016), while others describe them as mini-project formats centered on guided internet research (Pryadilynikova, 2015). This constructive learning approach helps students select and organize online information, while directing their efforts toward tasks related to their future profession.

The primary purpose of web quests, as noted in the literature, is to engage students in independent search and processing of information (Yefanova, Lavrishchev, 2022). Researchers emphasize their potential to strengthen motivation and contribute to the development of key competencies, including research skills, creativity, and the ability to present results effectively (Skylar et al., 2007; Kicherova, Efimova, 2016). Web quests are also described as a form of internet-based project work that enables purposeful use of online resources (Klimova, 2016). Although this format is often implemented in small groups, it can also be adapted for individual learning tasks (Petrova, 2014).

The primary reason for web quests integration into education is their positive effect on the ability of students to structure student activities and acquire key competencies (Petukhova, 2011). Students using this method develop solutions based on pre-selected sources while also independently filtering and evaluating information. This process enhances their cognitive abilities and logical thinking (Gazizova et al., 2025).

K. Subramaniam (2012) identified the most critical competencies that web quests help to develop, such as critical thinking, opinion formulation, and the creation and application of knowledge. According to researchers, web quests offer a range of educational benefits: they support personal development by increasing motivation to learn, encouraging self-improvement and self-realization, and fostering self-awareness through exploring creative potential and overcoming internal barriers (Miller, 2015); they build cross-disciplinary skills by developing cognitive functions, enhancing communication, strengthening information-processing abilities, and improving self-organization, problem-solving, and adaptation to social roles (Goltsova, Protsenko, 2020); and they contribute to subject-specific learning by promoting the acquisition of new knowledge and its practical application (Goltsova, Protsenko, 2021). Based on these considerations, this article aims to analyze the use of the web quest method in professional education.

## **2. Research methodology**

To achieve the aim of the study, authors conducted quantitative and qualitative study. The main methods included a pedagogical experiment and a survey.

The fundamental concept of the study: web quest, which was discovered with the literature review of psychological, pedagogical and scientific-methodological sources.

The testing of the developed web quests and the accompanying research led to the achievement of two key strategic goals. The first was focused on gathering feedback to facilitate improvements, including appropriate modifications to the developed materials, according to the project assumptions.

The primary objective of the empirical study was to assess the effectiveness of web quests in professional education, and the additional objectives were:

- Investigate whether and to what extent the web quest method supports the development of students' cognitive and social competencies.
- Gather students' and teachers' opinions on working with web quests.
- Diagnose the limitations and challenges students face when working with the web quest method.

The research sample consisted of 82 students total, 40 students in experimental group (EG), participating in the web quest and 42 students in the control group (CG) receiving traditional instruction during practical lessons. EG and CG were formed based on existing academic groups enrolled in the same professional education program, to ensure comparability in terms of educational background and workload.

The study also included 16 teachers who delivered both web quests and traditional lessons in their subject areas. Each teacher had more than five years of relevant teaching experience. Although they were not participants in the experiment, they acted as collaborators by supporting data collection. To ensure consistency, the teachers attended briefing sessions on how to implement the web quest approach and apply the observation criteria. They were instructed in advance on conducting web quests and completing observation sheets so that the method and the recording of results were standardized.

Observation was the main research method. Teachers completed an observation sheet for every student – both those in the experimental group (EG) who took part in the web quest and those in the control group (CG) who did not – evaluating student behavior while working on a particular topic. Each category was rated quantitatively on a 1–5 scale.

The observation data were then analyzed using mathematical statistical techniques to determine whether the distributions of students' average category scores differed between the two groups. For this purpose, the Pearson's chi-squared ( $\chi^2$ ) test was used. The measurement scale used consisted of two categories ("above 5 points" and "below 5 points"), meaning the degrees of freedom ( $\nu$ ) = 1. From the  $\chi^2$  table, for a significance level of  $\alpha = 0.05$  and 1 degree of freedom, the critical value was determined as  $\chi^2_{crit} = 3.841$ .

#### **Statistical hypotheses of the study**

- $H_0$ : The empirical distributions of students' average performance scores in the EG and CG across different categories do not differ after the implementation of the web quest.
- $H_1$ : The empirical distributions of students' average performance scores in the EG and CG across different categories differ after the implementation of the web quest.

As a supplementary research method, a survey was conducted among students and the 16 teachers who supervised the implementation of the web quests after their completion. Responses were assessed using a Likert scale (Definitely yes; Probably yes; Neutral; Probably no; Definitely no).

### **3. Results**

An important aspect of the study was the observation of students during their work with the web quest method. Teachers evaluated student performance across several dimensions, including understanding of the topic, level of activity, teamwork, use of information search strategies, and work pace, measured by the time required to complete tasks. As part of the study, teachers filled out 82 observation sheets for students working with the web quest method (EG) and those following traditional teaching methods (CG). To achieve the study's objectives more fully, arithmetic averages were calculated for specific categories assessed by teachers on a scale from 1 to 5 (the list of average scores is presented in [Table 1](#)).

The calculation of the  $\chi^2$  criterion for CG and EG showed that  $\chi^2 > \chi^2_{crit}$  for most of the observation indicators, showing differences between experimental and control groups. These results allow the null hypothesis to be rejected in favor of the alternative hypothesis. Overall, the findings support the initial assumption that the web-quest intervention influenced the measured parameters.

**Table 1.** Arithmetic mean scores for students' performance in specific areas based on observations (N = 82), and results of statistical analysis

Research Area	Observation Object	Average Score		$\chi^2$
		EG (40)	CG (42)	
Student Activity	Student Independence	3,97	3,22	6,45*
	Work Organization	4,14	3,32	12,21*
	Ability to Use Teacher's Help	3,95	3,78	1,15
	Student Creativity	4,05	3,19	10,43*
	Problem-Solving Skills	4,04	3,41	8,65*
	Task Management	3,92	3,23	4,39*
Team Communication	Information Sharing Opportunities	4,18	3,65	8,32*
	Quality (Effectiveness) of Communication	4,24	3,85	5,88*
Information Search	Ability to Use Internet Information	4,26	3,61	7,41*
	Use of Links Provided by the Teacher	4,49	4,29	2,33
Work Pace – Time Needed to Complete the Task	Work Pace	4,17	3,46	9,24*
	Use of Teacher's Help at the Right Moment	4,11	3,64	8,93*
	Ability to Use Help from Other Students	3,80	3,68	1,03
	Time Management	4,15	3,55	5,74*

Source: Own research.

Notes: \*  $p \leq 0.05$

The collected empirical material suggests the diversification of student competencies and skills. The easiest task for students working with the web quest method was information search. They easily used the links provided by the teacher, and their average score for this competency was the highest – 4.49. While completing their assigned tasks, they also freely utilized internet resources, effectively processing the information they gathered.

Teachers also gave positive evaluations of teamwork in the experimental group, noting that students effectively exchanged information and coordinated their efforts within teams. Other competencies of EG students were also rated highly (average score above 4.0), such as work organization (4.14) and timely use of teacher help (4.11); student creativity (4.05) and problem-solving skills (4.04). Competencies in time management and work pace were also rated highly.

The data collected during the subsequent student survey indicated that the majority of students liked the assignments they completed as part of testing the developed instructional tools (Table 2).

**Table 2.** Students' opinions on the assignments completed while testing the web quest method (N = 82)

Question	Responses		
	Yes	No	Can't answer
Did you like the assignments you completed while working on the web quest?	69	0	13

Source: Own research

When evaluating the topics of the lessons conducted using the web quest method, students were allowed but not required to express their opinions across several aspects. The largest group of 55 students stated that the topics of the developed web quests were interesting. Forty-two students described them as engaging, and 37 students found them understandable. Only a few students expressed views that contradicted these statements. A detailed distribution of student responses is presented in Table 3. Some students also commented on the level of difficulty of the topics discussed during testing. Eighteen of them considered the topics easy, while 24 students indicated they were difficult.

**Table 3.** Evaluation of lesson topics delivered using the web quest method (according to students, N = 82)

No.	Statement: "In your opinion, the topics of the web quests you worked on were..."	Number of responses
1	interesting	55
2	not very interesting	3
3	engaging	42
4	boring	2
5	understandable	37
6	not understandable	1
7	easy	18
8	difficult	24

Source: Own research

An additional source of information on the usefulness of the web quest method in professional education was the teacher survey.

Teachers also confirmed the students' opinions regarding their satisfaction with the tested method (see Table 2). Half of the surveyed teachers stated that the web quest method was definitely accepted by students and was more popular among them compared to traditional teaching methods, while the rest considered this highly likely. Respondents also noted that the web quest method increases student interest in the lesson topic (see Table 4).

**Table 4.** Evaluation of the acceptance of the web quest method and student satisfaction in lessons (as reported by surveyed teachers, N = 16)

No.	Statement: "The web quest method..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Is accepted by students	8	8	0	0	0
2	Is more popular among students than traditional teaching methods	8	8	0	0	0
3	Helps engage students with the lesson topic	6	6	4	0	0
4	Engages students more effectively than traditional methods	5	7	4	0	0
5	Enhances student satisfaction with lesson participation	10	6	0	0	0
6	Increases student satisfaction with lessons more than other teaching methods	6	5	4	0	0
7	Motivates students to work independently on homework	11	5	0	0	0
8	Encourages independent work on homework more than traditional methods	9	6	1	0	0

Source: Own research

However, when comparing web quests with more traditional teaching methods, only five teachers were fully convinced that web quests are more effective in generating interest in the discussed topic.

Nonetheless, the majority of respondents (10 teachers) were certain that the web quest method enhances student satisfaction with participation in lessons. When comparing this method with other approaches used in the learning process, teachers displayed slightly less enthusiasm – six teachers believed that web quests contributed to greater student satisfaction compared to other methods, five teachers found this statement likely, while four teachers saw no significant difference between the compared methods.

All surveyed teachers agreed that web quests encourage students to engage more actively in independent homework, with 11 respondents expressing strong confidence in this effect. Compared with traditional methods, the web-quest format was generally viewed as more effective in sustaining students' interest beyond classroom activities.

While evaluating its broader educational impact, most teachers reported that students were willing to work within the web-quest framework, although some noted that engagement depended on the specific topic. The method was also associated with a more favorable classroom atmosphere and higher motivation during lessons. Several teachers attributed this to the structured organization of tasks and more efficient use of instructional time (Table 5).

**Table 5.** The impact of the web quest method on lesson organization and student motivation (as reported by surveyed teachers, N = 16)

No.	Statement: "The web quest method..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Is associated with a friendly classroom atmosphere	10	5	1	0	0
2	Stimulates student motivation to participate in lessons and learn	9	7	0	0	0
3	Positively influences lesson organization	8	5	3	0	0
4	Improves time management during lessons	8	4	4	0	0

Source: Own research

The surveyed teachers also considered the role of web quests in assessing students' knowledge and skills. Most respondents (n = 12) indicated that the method supports more effective ongoing assessment during lessons. Several teachers additionally noted its usefulness in evaluating students' understanding after class, particularly through homework tasks.

At the same time, opinions were more reserved when web quests were compared directly with traditional instructional methods in terms of overall assessment effectiveness (Table 6).

**Table 6.** The usefulness of the web quest method in assessing students' knowledge and skills (as reported by surveyed teachers, N = 16)

No.	Statement: "The web quest method allows the teacher to..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Conduct ongoing assessment of students' knowledge and skills during lessons	4	8	2	2	0
2	Assess students' knowledge and skills after the lesson	5	6	3	2	0
3	Recognize students' knowledge and skills more effectively than traditional methods	2	5	6	3	0

Source: Own research

The surveyed teachers expressed their views on the web-quest method as a tool for developing students' key competencies and skills. In particular, they highlighted its role in fostering purposeful information search, information processing, and problem-solving. Teachers

also associated the method with the development of critical and creative thinking, teamwork, and higher-order cognitive skills such as analysis, synthesis, and evaluation of information. All respondents agreed that the web quest method definitely or probably contributes to the development of these competencies.

Another confirmation of the method's usefulness in developing students' key competencies is the opinion of most teachers, who stated that working with the web quest method focuses students' efforts on information processing. A detailed breakdown of the respondents' answers is presented in [Table 7](#).

**Table 7.** Teachers' evaluation of the web quest method as a tool for developing key competencies and skills in students (N = 16)

No.	Question: "Do you think that the web quest method teaches students to..."	Definitely Yes	Probably Yes	Neutral	Probably No	Definitely No
1	Purposeful information search?	10	6	0	0	0
2	Information processing?	14	2	0	0	0
3	Problem-solving?	9	7	0	0	0
4	Critical and creative thinking?	7	9	0	0	0
5	Teamwork?	12	4	0	0	0
6	Support mental processes at the level of analysis, synthesis, and evaluation?	11	5	0	0	0

Source: Own research.

#### 4. Discussion

The testing of web-quest tools and the conducted research confirmed the usefulness of the method in student learning. The study determined the extent to which the web-quest method contributes to the development of cognitive and social competencies among students. This finding aligns with the results of Abdullayev et al. (2024), who demonstrated that digital learning platforms significantly enhance student motivation and competence development in language acquisition. Previous studies have shown that targeted digital instructional methods can promote deeper engagement and more sustained skill development, which aligns with the patterns observed in the present study ([Akhtarieva et al., 2025](#)).

The results indicated that the web-quest method contributed to the development of several key competencies, including purposeful information search, information processing, problem-solving, and collaborative work. It also supported higher-order thinking skills such as analysis, synthesis, and evaluation. The empirical findings further suggested that web-quest activities helped students consolidate and structure learning material, thereby supporting the achievement of instructional objectives. Their use also appears to improve the classroom climate and encourages students to engage more actively. In addition, teachers reported that web quests contribute to better structuring of instruction and more efficient use of lesson time. These findings are consistent with the results reported by Bozhkova et al. (2025), who showed that smartphone-supported interactive activities can enhance students' cognitive engagement and organizational behavior. In this study, students who used digital tools demonstrated more effective time management and greater initiative.

In parallel, the study aimed to capture teachers' perspectives on web-quest-based instruction. Survey responses and observation sheets show a high level of agreement among teachers about the method's overall usefulness. They consistently highlighted benefits related to competency development, such as strengthening collaboration, encouraging creativity, stimulating intellectual curiosity, and increasing motivation to work through the assigned problem. This interpretation is consistent with earlier research ([Kaivola et al., 2012](#); [Klimova, 2016](#); [Miller, 2015](#)) reporting that web quests can enhance students' practical abilities. It also aligns with findings that students tend to respond positively to web quests when working with computers ([Petrova, 2014](#); [Subramaniam,](#)

2012). Akhmetshin et al. (2024) presented a broader approach that reflects a competency-based approach to teachers' personal and professional development. Meanwhile, Pashkurov's (2022) article explores structured digital strategies for developing students' soft skills. These findings support the use of webquests in developing professional qualities and competencies.

However, there are a number of difficulties that students may face in the course of webquests. Teachers most frequently mentioned challenges with team communication, low self-confidence among some learners, and differences in working speed across students. Based on the teachers' feedback, the effectiveness of web quests also depends on students' cognitive readiness and ability to process information. Related work supports this view: Pivneva et al. (2023) observed that blended-learning environments such as MyEnglishLab can raise motivation and engagement, and that students who are active in digital settings are more likely to take responsibility and contribute productively to group tasks – an argument that supports the value of role-based collaboration embedded in web-quest formats. In addition, Gazizova et al. (2025) emphasized that digital tools are most effective when implemented in line with Education 4.0 principles, including flexibility, personalization, and active learner participation.

Teachers' open-ended responses further illustrate these points. For example, Andrey V. described web quests as a method that pushes students to analyze and synthesize online information, noting that learners gain satisfaction from resolving scenario-based problems independently or in groups and that the approach can prepare them for future remote work. During the survey, teachers noted that participation in web-quest activities increased student confidence, stronger social skills, and developed more coordinated teamwork. Sergey K. likewise emphasized that the method promotes independence by requiring learners to interpret texts, identify key ideas, and extract what matters most. Several additional teachers linked web quests to outcomes they believed would help students better remember and reinforce what they learned throughout the educational process. For example, practical application of information, arguing that group-based tasks improve cooperation, support weaker students, encourage constructive communication. Also, during such activities students can exchange, and promote independent problem-solving skills. Vladimir G., for instance, stressed that group work can cultivate creativity and strengthen students' sense of responsibility for assigned roles.

Despite the predominantly positive evaluations, teachers also pointed to clear constraints. Valentin T. argued that web-quest materials must be adapted to students' cognitive level to remain accessible and meaningful. Anatoly R. highlighted barriers such as difficulties coordinating teamwork and the occasional lack of access to certain online resources. Dmitry N. added that low motivation can undermine success, emphasizing that outcomes depend heavily on students' willingness to cooperate and invest effort in the task. A well-structured web-quest with good student motivation and clear goals guarantees success in solving the task. The teacher-coordinator plays an important role here, as they can explain anything unclear at any moment and boost motivation, preventing interruptions in the work." In addition to the limitations already mentioned, teachers also pointed to the following challenges when working with students:

- "Difficulties using the computer";
- "Problems with group integration";
- "Problems with student independence";
- "Difficulties translating theoretical knowledge into practical solutions for various problems."

A limitation of the study is the size of the sample of teachers who participated in the survey.

Future research may focus on analyzing students' perceptions of the usefulness of the web-quest method.

## **5. Conclusion**

In our opinion, the empirical data positively confirms the research hypothesis, which suggests that the web-quest method contributes to the development of students' competencies and is beneficial in professional education. The conducted study also highlights the most significant advantages and drawbacks of using the web-quest method in working with students. The main advantages of the diagnosed method in student work are:

- Positive perception by the majority of both teachers and students;
- Structured and targeted stimulation of students' activity and academic curiosity aimed at achieving the intended learning goals;

- Beneficial impact on the development of key competencies and skills of students;
- Universality of understanding due to the ability to use the web-quest method when introducing new content or reviewing previously learned material;
- Positive effect on student motivation, classroom atmosphere, and the organization and proper use of time during lessons;
- Possibility of application for various topics;
- Reliance on internet resources, which are a medium favored by young people;
- High accessibility of mobile devices and computers, as well as the availability of computer equipment in classrooms.

Weaknesses and limitations of using the web-quest method in working with students include:

- Difficulties some students face in communication and teamwork;
- Necessary to ensure flexible and individualized use of the web quest by the teacher, including the correct development, preparation, and explanation of available Internet resources to the students of the course, as well as to provide flexibility in the time and volume of work performed for both individual students and working groups;
- The necessity of constant monitoring of students' work and providing them with motivational support;
- The need to translate and explain the concepts and issues students encounter on the internet.

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