The Problems of Contemporary Education

Pedagogical Scaffolding Through Online Quests and Its Influence on Students' Learning Motivation in the Context of Educational Digitalization

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Abstract

The goal of modern education is to create conditions for the personal growth of each learner, enabling them to acquire and improve professional competencies and skills. In this context, quest-based (online quest-based) teaching technology deserves special attention as a form of pedagogical scaffolding within the higher education system. The aim of this study was to evaluate the applicability of online quests as a pedagogical scaffolding technology for enhancing achievement motivation among students within a single university setting. The study explores the essence of two core concepts: "online quest" and "pedagogical scaffolding." The primary method employed was a comprehensive pedagogical experiment conducted during the second semester of the 2023–2024 academic year. The experiment included two experimental groups of 62 and two control groups of 58 students, accounting 120 participants in total. The experiment unfolded through several well-structured phases, including preparatory activities, baseline assessments, the implementation of a long-term online quest via the Moodle system, and follow-up data analysis using methods of mathematical statistics. The results revealed a significant increase in student engagement, critical thinking, and independent learning among participants in the experimental groups, as well as confirming the research hypothesis that the use of online quests as a scaffolding technology effectively enhances students' achievement motivational levels.

Keywords: online quest, educational quest, pedagogical scaffolding, higher education, teaching technology, achievement motivation.

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1. Introduction

The integration of innovative technologies, methodologies, formats, and tools for teaching, upbringing, and youth development is a necessary condition for modern educational environments. Diversifying educational processes in higher education institutions fosters active cognitive engagement, enhances students' motivation to learn, and develops creativity, communication, and information-search skills. University graduates today must not only possess certain knowledge and skills but also demonstrate imagination, critical thinking, independence, and the ability to engage in lifelong learning (Kicherova, Efimova, 2016).

New standards emphasizing competency-based and learner-centered approaches require the adoption of novel educational technologies. Effective educational technologies should meet the following criteria: high cognitive activity and effectiveness, interactivity and collaboration, integrativeness, reliance on self-analysis (reflection), and active use of Internet resources and educational platforms. Among these, quest-based (online quest-based) learning technologies stand out, especially as online education grows as a proportion of the overall educational process.

To explore the issue outlined in the article's title, it is essential to clarify the essence of the two key concepts: "online quest" and "pedagogical scaffolding".

Scientists view online quests as a distinct category of educational projects, or online projects (Kaivola et al., 2012; Larionova, 2020; Pryadilnikova, 2015; Klimova, 2016). These are conceptualized as problem-solving tasks with elements of role-playing, utilizing Internet resources for their completion (Goltsova, Protsenko, 2021), or as student-centered technologies designed to immerse learners in an educational process that fosters critical thinking (Petrova, 2014). Researchers have found that online quests are among the most complex information and communication technologies, as they allow for solving comprehensive learning tasks while developing various linguistic, research skills, and professional qualities (Miller, 2015; Khupina, 2016; Bezrodnykh, 2016, Matveeva, 2014).

Researchers emphasize that online quests are structured learning frameworks that incorporate references to critical Internet resources and authentic tasks. These tasks motivate students to engage with research problems that have ambiguous outcomes, enhancing their ability to work both individually and collaboratively in searching for information and transforming it into more complex solutions at the final stages (Maddux, Cummings, 2007).

An online quest is essentially a type of web page, which can be created using traditional web editors or software such as Microsoft Office, often with the assistance of video tutorials on free educational websites (Ostapovich, Miller, 2016). The essence of pedagogical scaffolding technology lies in educators guiding students toward discovering new knowledge by employing cognitive or exploratory tasks and instructions that build on their prior experiences. This support can take various forms, such as flowcharts, guiding questions, or recommendations (Mirontseva et al., 2023).

Modern scholars regard scaffolding as a distinct form of instruction that fosters collaboration between educators and students in solving academic tasks (Hmelo-Silver et al., 2007). A hallmark of scaffolding strategies is "fading help," where the level of assistance from the educator is high at the start of learning but diminishes significantly or disappears entirely as learners progress (Panadero et al., 2016).

Researchers define scaffolding as a learning process that enables students to acquire specific knowledge and skills with the educator's help (Kuryan, Voronina, 2020). It is a specialized form of guidance during problem-solving tasks, characterized by two key principles: assisting students with tasks they cannot yet handle independently and allowing them to perform tasks that align with their current capabilities (Nguyen, 2022).

Complex topics in this approach are typically divided into smaller subtopics or concepts, with support provided at each stage to facilitate understanding and mastery. New knowledge is built upon prior learning (Van de Pol et al., 2010), creating a psychologically safe environment in which students achieve a higher level of comprehension and skill development than they would without external assistance. Educator support is gradually reduced as it becomes unnecessary (Reiser, 2004).

Scaffolding also helps alleviate negative emotions associated with a lack of confidence, disappointment, or fear of failure (Gašević et al., 2015). Rooted in constructivist philosophy, this approach considers the learner's perception, experience, and active engagement in the educational process. The educator's role is to foster the student's autonomy in constructing their learning experiences (Doo et al., 2020; Puntambekar, Hubscher, 2005; Walqui, 2006).

Researchers emphasize the importance of creating a psychologically safe environment to enhance students' confidence in achieving success (Bykovskikh, 2022). Tasks are initially designed to be manageable with minimal or no assistance, helping students achieve quick success, reducing frustration, and fostering long-term motivation (Pea, 2004).

T. March was among the first to define online quests as a form of pedagogical scaffolding that uses Internet resources for specific tasks, encourages curiosity, and motivates students to explore key problems, acquire new knowledge, and engage in group work (March, 2007). This approach aids in structuring information, understanding complex concepts, and developing skills to apply knowledge in practice. Well-designed online quests inspire students to expand their knowledge and use it creatively in more advanced tasks.

Thus, we have reached the following conclusions: the primary goal of an educational online quest is learning, which includes acquiring new knowledge, consolidating existing knowledge, and developing Internet literacy and other subject-specific skills. Scaffolding technology, in turn, involves the methodological support of students during the learning process, particularly when studying new concepts. It creates conditions to improve student performance on complex tasks. Once students have familiarized themselves with new information and show signs of understanding, the teacher gradually reduces the use of scaffolding, minimizing its influence to foster further independent and self-regulated learning.

Online quests, as a form of pedagogical scaffolding, involve using links to key Internet resources required to complete specific tasks, encouraging curiosity, and motivating learners to explore key problems, acquire new knowledge, and participate in group work.

Based on the above, the purpose of this article was to analyze the potential of online quests as a scaffolding technology for enhancing achievement motivation.

Research Hypothesis: The use of online quests as a scaffolding technology significantly increases the level of achievement motivation.

2. Methods

To achieve the stated goal, the authors employed several methods, including an analysis of psychological-pedagogical and scientific-methodological literature, as well as a pedagogical experiment.

The analysis of psychological-pedagogical and scientific-methodological literature helped clarify the essence of two core concepts: "online quest" and "pedagogical scaffolding."

The primary research method was a pedagogical experiment conducted during the second semester of the 2023-2024 academic year. The study involved students enrolled in humanities disciplines, including education, philology, and social sciences. These students were selected from pre-existing academic groups from the Peoples' Friendship University of Russia (RUDN University). Participants were randomly assigned to either the experimental group (EG) or the control group (CG) to minimize selection bias. This random allocation was performed within each academic cohort to ensure comparable baseline characteristics across the groups.

Two experimental groups (EG) comprising 62 students in total participated in the experiment to test the effectiveness of online quests as a scaffolding technology for enhancing achievement motivation. Additionally, two control groups (CG) with a total of 58 students were included to assess motivation for achievement.

The experiment was conducted in stages (Table 1).

Table 1. Stages of the Pedagogical Experiment

Stage	Participants	Description of Procedures
Preparatory	Authors	Determining the relevance, goal, objectives, object, and subject of the experiment; developing a long-term educational online quest using Google Sites for experimental verification; selecting participants.
Baseline Experiment 1	62 students of Experimental Group, 58 students of Control Group	Assessing the empirical indicators of achievement motivation among CG and EG students at the start of the experiment.

Formative	62 students of Experimental Group	Conducting the long-term educational online quest with EG students during the period of studying the topic.
Baseline Experiment 2	62 students of Experimental Group, 58 students of Control Group	Collecting empirical indicators of achievement motivation among CG and EG students after the educational online quest in the EG.

The formative experiment was conducted during the teaching of specialized disciplines under natural learning conditions using the Moodle system. Moodle's ability to support a large number of users simultaneously enabled the seamless participation of all 62 EG students from different academic groups in the research.

The assessment of empirical indicators of achievement motivation was carried out using specially selected testing methods, including:

– V.K. Gerbachevsky's questionnaire "Assessment of Ambition Levels" (Nguyen, 2022), which identified the place of cognitive motivation in the overall motivational structure of students. It contains 10 closed-ended items designed to identify the student's leading motivational drivers (e.g., cognitive interest, career focus, or social approval). Respondents rated their agreement on a 5-point Likert scale.

– A. Rean's questionnaire "Motivation for Success and Fear of Failure" (Van de Pol et al., 2010). It consists of 20 items divided into two subscales: 10 questions assess motivation for success, and 10 measure fear of failure. Each item is rated on a 4-point Likert scale, ranging from "strongly disagree" to "strongly agree." The tool identifies whether a student is primarily driven by the pursuit of success or by the avoidance of failure.

Subsequent data analysis from the pedagogical experiment was performed using methods of mathematical statistics. The aim was to identify differences in the distribution of a specific trait (achievement motivation) when comparing two empirical distributions. For this purpose, Pearson's chi-squared test (χ^2) was employed. The measurement scale consisted of two categories ("high level" and "not high level"), resulting in one degree of freedom ($v = 1$).

Statistical Hypotheses:

– H_0: The empirical distributions of EG and CG students by levels of achievement motivation do not differ after the experiment.

– H_1: The empirical distributions of EG and CG students by levels of achievement motivation differ after the experiment.

3. Results

The results of our study (see Table 2) indicate that conducting a long-term educational online quest positively impacted the achievement motivation of students in the experimental group (EG).

Table 2. Dynamics of Changes in Achievement Motivation Indicators in CG and EG (% with a high level)

Testing Method	CG (58)			EG (62)		
	Start of Exp.	End of Exp.	Change	Start of Exp.	End of Exp.	Change
Place of cognitive motivation in the system (V. Gerbachevsky's method)	12.1	17.2	+5.1	14.5	46.8	+32.3
Success motivation and avoidance of failure (A. Rean's questionnaire)	17.2	20.7	+3.5	17.7	51.6	+33.9

Prior to the formative experiment, an analysis of achievement motivation levels in the EG and CG was conducted, revealing that the groups had nearly identical baseline indicators. Specifically, cognitive motivation was a leading factor for 12.1 % (7 students) of the CG and 14.5 %

(9 students) of the EG. Similarly, a high level of success motivation was observed in 17.2 % (10 students) of the CG and 17.7 % (11 students) of the EG.

A comparison of achievement motivation indicators before and after the experiment demonstrates that while the cognitive motivation of CG students increased slightly, the change was not significant, as was the case with their success-oriented motivation.

In contrast, after the online quest, cognitive motivation became a leading factor for 46.8 % (29 students) of the EG, and 58.1 % of EG students showed a success-oriented motivational framework.

Thus, as shown in Table 2, the pedagogical effect of the online quest is 32.3 % and 33.9 % in the EG, compared to 5.1 % and 3.5 % in the CG, proving the pedagogical effectiveness of the online quest. This difference occurred because of the fact that the structure of the online quest emphasized goal-oriented progression, frequent achievement feedback, and completion of visible milestones, which naturally aligns with success-driven motives. In contrast, cognitive motivation, which is often linked to intrinsic interest and curiosity, may require longer-term exposure or more open-ended learning scenarios to develop more fully.

Results of the statistical analysis are demonstrated in Table 3.

Table 3. Calculations of the χ^2 Criterion for CG and EG

Testing Method	Start of Exp.			End of Exp.		
	CG (58)	EG (62)	χ2	CG (58)	EG (62)	χ2
Place of cognitive motivation in the system (V. Gerbachevsky's method)	12,1	14,5	1,108	17,2	46,8	42,23
Success motivation and avoidance of failure (A. Rean's questionnaire)	17,2	17,7	0,214	20,7	51,6	56,67

Based on the χ^2 distribution table for a significance level of $\alpha = 0.05$ and degree of freedom $v = 1$, the critical value is $\chi^2 = 3.841$.

Before the pedagogical experiment, the calculated χ^2 values were less than the critical value (1.108 < 3.841; 0.214 < 3.8411.108 < 3.841; 0.214 < 3.8411.108 < 3.841; 0.214 < 3.841), meaning they did not fall within the critical region. This indicates that at the start of the experiment, the CG and EG did not differ significantly in their achievement motivation levels.

The χ^2 calculations for CG and EG after the pedagogical experiment revealed that χ2 > χ2crit (42.23 > 3.841; 56.67 > 3.841). This provides a basis to reject hypothesis H_0 and accept H_1, confirming that these samples exhibit statistically significant differences.

Thus, it can be concluded that the hypothesis proposed at the start of the experiment was confirmed.

4. Discussion

The authors emphasize that integrating online quest technology into the professional training process offers several advantages: increasing student engagement with the subject, enhancing learning motivation, utilizing various types of information (textual, graphical, audio, video, etc.), clearly presenting diverse situational tasks, fostering creative thinking and problem-solving skills, and developing students' information literacy (Wagner et al., 2024; Babina, Utusikov, 2024).

Conducting online quests at universities prepares students for a comfortable life in an information society. By incorporating online quest technologies into the educational process, students developed qualities such as enhanced thinking skills (creative, intuitive, theoretical, etc.), improved communication abilities, aesthetic sensibilities, the ability to make optimal decisions or propose solutions in complex situations, and proficiency in processing information (Akhmetov et al., 2024; Rybakova et al., 2024).

The implementation of online quest technologies in education deepens interdisciplinary connections through the use of modern information processing tools (Andreeva, Pronina, 2024). It boosts students' motivation through computer visualization of educational materials, the inclusion of game-like scenarios, and flexible modes of learning activity. Additionally,

it improves the efficiency and quality of education by leveraging Internet services. Online access tools have added entirely new dimensions to e-learning (Matveeva, 2014).

It is worth noting that preparing an online quest requires a high level of informational competence from educators. Developing an informational online quest is a labor-intensive process; however, it allows educators to refine their professional skills (Ginzburg et al., 2024). The resulting online quest becomes a highly specialized and effective visual trainer for professional development across a wide range of fields (Miller, 2015). Furthermore, online quests integrate seamlessly with distance learning systems, particularly Moodle, and are compatible with mobile devices (Bezrodnykh, 2016). It is also worth noting that while both types of motivation improved significantly, the baseline levels of success motivation were slightly higher than those of cognitive motivation, which may have made them more responsive to structured interventions like the quest format.

The study results highlight that the core idea of using online quests as a pedagogical scaffolding technology is to create a situation of success during lessons, which scaffolding technology supports most effectively. A situation of success helps students overcome learning difficulties, such as shyness, insecurity, or fear of making mistakes and being ridiculed by peers (Medeshova et al., 2024; Mukhametkairov et al., 2024). Researchers note that from a pedagogical perspective, a situation of success involves purposeful and organized efforts by educators and families to create conditions enabling individuals or groups to achieve significant results (Ostapovich, Miller, 2016). Success is realized when the student perceives their outcome as a personal achievement.

According to our observations, a situation of success during a lesson is fostered by the following factors: a friendly atmosphere throughout the session (using the "emotional reinforcement" technique), "preempting" a successful outcome (employing the "personal exceptionalism" method), strong motivation for proposed activities, subtle assistance (hints, suggestions, guidance), brief expressive interventions (the "pedagogical suggestion" method), and a focused approach (using motivational phrases such as "Let's get started!" or "On to the task!"). Additionally, formative assessment – evaluating students' achievements continuously throughout the learning process rather than just at the end – plays a significant role.

Researchers also highlight that the most effective educational technologies for creating a situation of success, when applying scaffolding, include:

– Interactive learning technologies (such as online quests),
– Cooperative learning (e.g., pair or group work involving dialogue and synthesis of opinions),
– Collective-group learning (e.g., techniques like "microphone," sentence completion, circle discussions, brainstorming, and mosaic activities),
– Situational modeling technologies (e.g., role-playing, simulations, and imitation games),
– Case method (e.g., situation analysis),
– Discussion processing technologies (e.g., continuous opinion scales or chains) (Mirontseva et al., 2023).

While the findings of this study support the effectiveness of online quests as a pedagogical scaffolding method, it is important to consider several limitations of this approach. Online quest-based learning may not be equally effective for all students, particularly for those with low digital literacy, limited self-regulation skills, or high levels of anxiety in open-ended tasks. The method also relies heavily on well-developed infrastructure, instructor digital competence, and time-consuming preparation, which may not be feasible in all educational settings. Furthermore, some students may respond better to other scaffolding formats, such as face-to-face guided discussions, project-based learning, or cooperative assignments with stronger social support elements. Therefore, while online quests offer significant advantages, they should be used as part of a broader toolkit of scaffolding strategies, adapted to individual student needs and learning environments.

This study has several limitations that should be acknowledged. First, the research was conducted within a single university, which limits the generalizability of the findings to broader higher education contexts. Second, the sampling was non-probabilistic, based on pre-existing academic groups rather than random selection, which may introduce selection bias. Third, although standardized instruments were used to assess achievement motivation, the validity of these tools was not independently tested within the context of this specific study, which may affect the reliability of the conclusions.

A promising area for future research is the analysis of the potential of online quests as a scaffolding technology to improve learning outcomes.

5. Conclusion

Information technologies in the educational process of preparing future specialists serve as a powerful stimulus that enhances students' cognitive activity, improves the quality of knowledge, and fosters the development of independent learning skills. The use of online quests increases the informational competence of both educators and students, introduces them to modern Internet services, cultivates informational literacy, promotes critical thinking, and develops the ability to find holistic solutions to problems.

Online quests integrate various didactic techniques into a single, cohesive learning activity. They enhance students' cognitive skills, contribute to the development of communicative competence in a foreign language within a professional context, and foster critical thinking. Pedagogical scaffolding, as a means of guiding cognitive activity, plays a crucial role in this process since knowledge cannot simply be transferred in a ready-made form. The learning process creates a favorable environment for students to build and expand their knowledge independently. Students improve their skills in interpreting information, analyzing, and evaluating different perspectives on specific issues.

As a type of pedagogical scaffolding, online quests also help establish conditions for the development and self-realization of students, enabling them to achieve their full potential.

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