

Learning Motivation and WebQuest-Integrated Problem-Based Learning in Enhancing Conceptual Understanding and Problem-Solving Skills

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ABSTRACT:

The swift advancement of digital technology requires teaching methods that enhance understanding of concepts and improve problem-solving abilities. This research investigated how WebQuest-Problem Based Learning (WebQuest-PBL) and students' motivation to learn impact their understanding of concepts and ability to solve problems in a Pancasila Education course. This quantitative quasi-experimental research employed a 2×2 factorial structure involving undergraduate Pancasila students at a public university located in East Java. The experimental group participated in learning via LMS-based WebQuest-PBL, whereas the control group underwent traditional PBL. Data concerning learning motivation, conceptual comprehension, and problem-solving abilities were examined utilizing Two-Way ANOVA. The results indicated that students instructed using the WebQuest-PBL approach demonstrated notably greater understanding of concepts and improved problem-solving abilities compared to those educated through conventional PBL methods. Students who are highly motivated to learn achieved better results than those with lower motivation. Furthermore, an interaction effect suggested that the WebQuest-PBL method was especially beneficial for students who possess a strong motivation to learn. The research finds WebQuest-PBL is a useful teaching method for enhancing understanding of concepts and problem-solving abilities in higher education, particularly when accompanied by strong motivation to learn. The combination of organized digital research and practical problem situations provides significant learning opportunities in Pancasila education.

Keywords: WebQuest-PBL, Learning motivation, Problem-solving skills

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Introduction

Education in the 21st century is defined by quick

technological progress and the growing significance of advanced thinking abilities (HOTS). Students must cultivate digital literacy, problem-solving

skills, teamwork, and critical thinking to effectively manage the complexities of today's knowledge environments [1]. As colleges and universities broaden their reach and diversify their student bodies, the demand for adaptable, technology-based, and student-focused teaching methods has grown more pressing.

The extensive adoption of digital technologies and the consistent increase in internet access in Indonesia reaching 79.5% in 2024 APJII [2]. These advancements present fresh opportunities for institutions to reconsider their teaching approaches by utilizing online and blended learning platforms. However, even with these opportunities, numerous university courses continue to depend on conventional teaching methods. This leads to passive learning, minimal interaction, and inadequate growth of conceptual understanding and analytical reasoning abilities. These difficulties are especially noticeable in Pancasila courses, which are fundamental subjects aimed at enhancing civic skills and promoting responsible citizenship among university students. In this setting, highlights that digital inquiry-based learning allows students to engage in active exploration of information, critically assess various sources, and independently build knowledge, which in turn fosters a deeper understanding of concepts and enhances their problem-solving skills [3].

Initial observations suggest that instructors infrequently use the institution's Learning Management System (LMS) to enhance inquiry-based learning or problem-solving activities. As a result, students' grasp of fundamental ideas is limited, and their skills in methodical problem-solving are quite inadequate, which is evident in their low test scores. Furthermore, learning motivation an important factor that predicts academic involvement and success differs greatly among students, affecting their determination, engagement, and educational results [4] [5]. These circumstances underline the necessity for teaching methods that can encourage student involvement, promote self-directed learning, and foster advanced thinking skills.

One creative teaching method that tackles these issues is the combination of the WebQuest strategy

with Problem-Based Learning (PBL). WebQuest offers a well-organized online learning experience that helps students examine trustworthy digital resources, evaluate information, and integrate new insights. Recent research by Kenya, highlights that the integration of technology within PBL models enhances students' critical thinking skills, as online platforms, e-modules, and digital simulations provide richer opportunities for inquiry and deeper engagement with real-world problems [6]. At the same time, Project-Based Learning (PBL) places education in the context of genuine, real-world challenges, prompting students to participate in critical thinking, teamwork, and reflective thought [7]. When integrated, WebQuest-PBL creates a teaching environment that is focused on exploration, backed by technology, and aimed at profound learning. This Study a relevant response to need for equitable and personalized digital education for all learner [8].

In this research, the WebQuest-PBL method is incorporated within a uniquely developed LMS platform. The educational tasks consist of phases such as understanding concepts, recognizing real-world issues, searching for digital information, engaging in group discussions, and organized problem-solving. A local issue corruption involving village funds in Ponorogo, serves as the primary focus to improve contextual relevance and encourage moral involvement. This integration is anticipated to enhance students' understanding of concepts, reinforce their ability to solve problems, and boost their motivation to learn [9].

The primary aim of this study is to examine how the WebQuest-Problem Based Learning approach and student motivation influence their understanding of concepts and their skills in solving problems within a Pancasila course. Specifically, the research examines: (1) variations in educational results for students who are instructed through WebQuest-PBL compared to those who receive instruction via traditional PBL; (2) distinctions between students who exhibit high motivation levels and those who display low motivation levels; and Interaction impacts between learning approaches and levels of motivation [3].

The importance of this research is highlighted by its

contribution to the development of technology-based, problem-centered teaching in higher education, particularly in areas concerning civic education and moral values. This study enhances both theoretical and practical knowledge of effective digital teaching methods in Indonesia by offering real evidence on how digital inquiry tools and problem-based learning influence student motivation. Furthermore, combining a well-organized Learning Management System (LMS) with WebQuest Project-Based Learning (PBL) offers a reproducible framework for educational institutions aiming to improve student involvement and the quality of learning [6].

The main findings of the research show that the WebQuest-PBL strategy greatly enhances students' understanding of concepts and their problem-solving skills when compared to traditional methods. Students who are more motivated tend to obtain better learning results, and this motivation enhances the effectiveness of instruction that uses technology to support problem-based learning. These results highlight the significance of combining digital research, teamwork in solving problems, and encouragement in online and blended learning settings [10].

In summary, this research emphasizes the importance of creative learning methods that blend online exploration with real-world problem solving to address the intellectual and motivational requirements of learners in the 21st century. The results offer a solid basis for creating more flexible, interesting, and successful teaching methods in higher education.

Literature Review

WebQuest is a systematic digital learning approach that directs students to investigate online materials, examine data, and develop new understanding through real-world activities. Initially created by Dodge and March in 1995 [9], WebQuest focuses on meaningful interaction with trustworthy online resources, structured support, and the incorporation of technology to enhance advanced thinking skills. A properly structured WebQuest usually consists of five elements. Introduction, task, process, resources, and evaluation, along with a conclusion each of which provides a framework

that guarantees students participate in organized investigation and analysis. This method promotes critical thinking by guiding students to questions that cannot be answered merely by remembering facts, thereby necessitating a more thorough analysis and interpretation.

Problem-Based Learning (PBL) establishes real-world issues as the basis for education. Students are encouraged to explore complicated problems, find important information, create hypotheses, and work together to formulate solutions. PBL enhances critical thinking, reasoning, and reflective abilities by changing the role of students from being passive recipients to engaged problem solvers [7]. Effective implementation of Project-Based Learning necessitates thoughtfully crafted problems, supportive instructor roles, and chances for cooperative investigation. In courses focused on concepts like Pancasila, Problem-Based Learning (PBL) helps students relate theoretical ideas to civic matters and ethical considerations.

The combination of WebQuest and PBL (WebQuest-PBL) improves the benefits of both methods by merging organized online exploration with teamwork in solving problems. Through WebQuest, students obtain carefully selected online information, whereas PBL offers a mental challenge that stimulates advanced thinking skills. The integration allows for self-directed exploration, supervised inquiry, and logical reasoning, enabling learners to build a stronger conceptual grasp. Previous research shows that WebQuest and Project-Based Learning (PBL) enhance students' involvement, critical thinking abilities, and overall academic performance, especially in settings rich in technology.

Pancasila, as a fundamental civic subject, necessitates teaching approaches that encourage interpretation, understanding of concepts, and their application to actual social and political situations. Conventional lecture-based approaches frequently restrict student involvement and do not effectively foster a profound comprehension of values, ethics, and national ideology. The implementation of WebQuest-PBL corresponds with the educational traits of Pancasila, as it motivates students to

explore real civic matters, participate in thoughtful discussions, and utilize principles to address problems within the community.

In the framework of the research, WebQuest-PBL was integrated into a Learning Management System (LMS) to facilitate organized online exploration and teamwork activities. Students were led through various steps that included exploring concepts, identifying problems, searching for information, engaging in discussions, and developing solutions. The issue of corruption involving village funds in Ponorogo served as the main subject to improve contextual significance and to encourage the internalization of values. By placing education within real civic matters, WebQuest-PBL enhances students' skills in understanding Pancasila principles and using them in problem-solving situations.

Learning motivation is an inner psychological force that influences students' determination, involvement, and success in educational activities. It acts as a factor influencing effort, concentration, and the eagerness to tackle learning difficulties [4]. Eager learners often show greater attention, curiosity, and perseverance, which leads to better learning results. Motivation also influences teaching methods: engaging learning models supported by technology can enhance motivation, whereas low motivation can diminish the effectiveness of even the best-planned teaching approaches.

Motivation in higher education is affected by internal factors, including curiosity, independence, and the importance of what is learned, as well as external factors like prizes, acknowledgment, or feedback from instructors. When instructional methods like WebQuest-PBL provide opportunities for independence, significant assignments, and relevant issues, students tend to show increased motivation. Therefore, comprehending the motivational profiles of students is crucial for creating teaching methods that enhance their engagement and academic performance [11].

Concept comprehension denotes the capacity of students to grasp, relate, and utilize theoretical ideas in new contexts. It pertains to creating conceptual frameworks and the capacity to describe, interpret, categorize, and combine information. As stated by

Gagné (1985), the development of conceptual understanding advances from basic differentiation to more intricate cognitive processes. Taba (1962) likewise highlights the importance of forming and understanding concepts as essential cognitive processes [12].

In the study of Pancasila, understanding concepts is essential for helping students absorb normative values and use them in civic matters. In the absence of sufficient conceptual understanding, students find it challenging to comprehend ideological values or to examine sociopolitical issues. Effective teaching methods, such as WebQuest-PBL, can enhance understanding of concepts by offering organized exploration, real-world activities, and chances for teamwork in constructing meaning.

Problem solving consists of recognizing an issue, examining related information, creating and assessing potential solutions, and carrying out suitable actions. It signifies one of the top levels of thinking skills and is crucial for students functioning in intricate academic or real-life settings. As per Gagné's hierarchy, problem-solving relies on learners' understanding of basic concepts, rules, and cognitive abilities [10].

In civic education, solving problems necessitates the use of analytical thinking, judgment based on values, and careful examination of actual scenarios. WebQuest-PBL enhances the ability to solve problems by involving students in directed online research and organized teamwork for exploration. Students acquire skills to seek information from digital sources, combine their findings, and support their solutions with evidence and theoretical principles.

Research indicates a significant interaction among teaching methods, motivation, comprehension of concepts, and abilities in problem-solving. Strategies that use technology and focus on problem-solving, like WebQuest-PBL, have been demonstrated to enhance learners' engagement and mental participation. At the same time, strong motivation increases students' readiness to investigate, examine, and endure challenging assignments. The relationship between motivation and learning techniques can thus enhance

understanding of concepts and improve problem-solving abilities [13].

Previous research consistently highlights that students who learn using WebQuest, Project-Based Learning (PBL), or blended digital inquiry methods generally achieve better results than those who are taught through traditional lecture methods. These techniques improve independence, teamwork, analytical thinking, and practical significance, all of which lead to more profound learning. Drawing from these theoretical perspectives, the research identifies WebQuest-PBL and motivation as essential factors that affect students' understanding of concepts and their ability to solve problems.

Materials and Methods

This research utilized a quantitative quasi-experimental approach to examine the impact of the WebQuest-Problem Based Learning (WebQuest-PBL) strategy and students' motivation on their understanding of concepts and their ability to solve problems. The application of a quasi-experimental method was suitable since the participants were already formed into existing classroom groups, and it was not practical to assign individuals [14]. The approach of this research adheres to the typical framework of experimental investigation frequently applied in educational technology studies. In this context, causal conclusions are made by evaluating learning results among different instructional conditions that are systematically altered) [15].

Research Design

This research utilizes a quasi-experimental 2×2 factorial design to methodically investigate the impact of teaching methods and student motivation on their understanding of concepts and problem-solving abilities. Two teaching methods WebQuest-PBL as the experimental approach and traditional PBL as the control group, were used to assess how technology-enhanced inquiry learning differs from standard problem-based learning activities. The motivation levels of students were assessed before the intervention and categorized as high or low based on a standardized motivation scale. This factorial design enabled an examination of the main effects of each independent variable at the same time, as well as their interaction. This

offered a complete understanding of how teaching methods and motivation together affect student learning results[15].

The execution of the design occurred in three organized stages. (1) Preparation: Two matching lesson plans were created, both aligned with the same learning goals but differing in how they were taught, one utilized WebQuest-based inquiry within the Learning Management System (LMS), while the other relied on printed resources and teacher-led discussion. Data on motivation were gathered and utilized to classify the participants. (2) Treatment: Across more than six sessions lasting 90 minutes each, the experimental group participated in digital research, organized examination of online materials, and teamwork to solve problems, whereas the control group adhered to conventional project-based learning activities. The consistency of implementation was ensured by conducting classroom observations and keeping records [16]. (3) Assessment: Following the intervention, students took tests that assessed their understanding of concepts and their ability to solve problems. The data were subsequently examined utilizing Two-Way ANOVA to determine both main effects and interaction effects.

A clear example of the factorial design is shown in Figure 1 to enhance understanding and ensure it can be repeated. This framework guarantees systematic comparisons and a thorough analysis of how WebQuest-PBL and motivation influence learning results.

Research Subject

The participants in this study included 66 undergraduate students who were taking a Pancasila Education course at a public university located in East Java, Indonesia. Cluster sampling was employed by choosing complete classroom groups. One class was designated as the experimental group, which received instruction through WebQuest-PBL, whereas the other class acted as the control group, which received traditional PBL instruction. The motivation levels of students for learning were assessed prior to the intervention, and the participants were divided into groups of high and low motivation according to their scores.

Research Location and Time

The study was conducted at a state university in East Java during the term when the Pancasila Education course was offered. The educational program was carried out through six teaching sessions, which included exploring concepts, engaging in digital research activities, working together to solve problems, and having reflective discussions.

Data Collection Procedures and Instrument

Data were gathered using various methods to guarantee precise measurements and the validity of the methodology:

(a) Evaluation of Learning Motivation: Students filled out a standardized Learning Motivation Measurement adapted from the MSLQ, which included 30 statements rated on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The tool assessed intrinsic motivation (such as interest in educational tasks) and extrinsic motivation (like the desire for success), and then grouped participants into high and low motivation categories according to their overall scores.

(b) Concept Comprehension Test: After the instructional treatment, a cognitive assessment consisting of 25 items was given. This assessment included multiple-choice questions and brief analytical items that corresponded with higher-order cognitive skills. The examination assessed students' comprehension of the principles of Pancasila, their conceptual interpretation, and their application in civic circumstances. The items were reviewed by experts in the field and were proven to be reliable through documentation.

(c) Problem-Solving Performance Assessment: Students undertook a performance assessment based on a real civic issue (corruption involving village funds). The tool comprised four analytical tasks that required students to recognize key issues, assess pertinent evidence, develop alternative solutions, and defend their choices. Responses were evaluated based on a four-dimensional rubric (issue analysis, reasoning, evidence utilization, decision quality), guaranteeing uniformity among participants.

(d) Observation and Documentation: While carrying out the treatment, organized observations were performed utilizing an Implementation Fidelity Checklist to verify the consistency between the intended and actual instruction for both the WebQuest-PBL and traditional PBL groups. The documentation contained images of WebQuest activities, logs of interactions with the LMS, student worksheets, and class notes, all organized using a Documentation Record Sheet to classify the significance and thoroughness of the materials.

Data Analysis Technique

Data obtained from motivation scales, tests for understanding concepts, tasks measuring problem-solving skills, observation checklists, and documentation records were examined using quantitative methods to assess both the separate and joint impacts of the variables [14][15]. The examination utilized a systematic factorial-experimental method: (1) Data Review: Each test answer was assessed for completeness, scoring precision, and normal distribution using SPSS, confirming that significant outliers and absent data did not compromise the validity. Assumption evaluations involved checking for equal variance and the normal distribution of the residuals. (2) Factorial ANOVA: A Two-Way ANOVA was performed to analyze the primary effects of the teaching methods (WebQuest-PBL versus. conventional project-based learning (PBL) and levels of learning motivation (high versus low) the interaction effect of concept understanding and problem-solving performance, as well as their relationship.

This method is suggested for evaluating interactive effects in experimental studies [17]. Effect Size Interpretation: After obtaining significant results, calculations for effect size (η^2) were performed to assess the strength of the differences and establish practical importance beyond mere statistical findings. Post-hoc comparisons were applied when necessary to explain differences between groups. The combination of various data sources and organized statistical methods guaranteed careful analysis and offered a complete view of how teaching methods and motivation influence learning results.

Result and Discussion

The research data includes scores from both pre-tests and post-tests that assess students' understanding of concepts and their problem-solving abilities. Participants were separated into two groups: one group received the WebQuest–PBL method, while the other group was

instructed using traditional PBL techniques. Furthermore, students' motivation for learning was divided into two groups: high and low. This section provides the outcomes of the statistical analyses, accompanied by a complete discussion that thoroughly explains the findings.

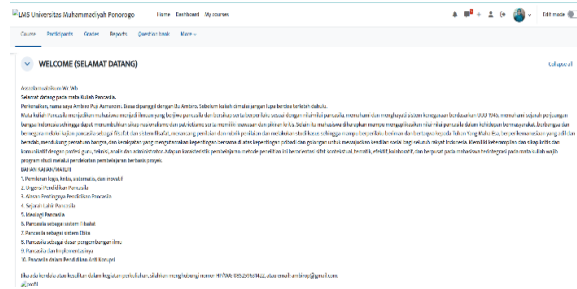
Participants and Learning Implementation

Category	Description	Number of Students	Percentage (%)
Learning Strategy & Study Program			
Experimental (WebQuest–PBL)	Informatics Engineering – Class A	20	16.1
	Informatics Engineering – Class B	24	19.4
	Informatics Engineering – Class C	18	14.5
Total Experimental Group		62	50.0
Control (PBL)	Mechanical Engineering – Class A	21	16.9
	Mechanical Engineering – Class B	20	16.1
	Mechanical Engineering – Class C	21	16.9
Total Control Group		62	50.0
Learning Motivation Level			
High Motivation		56	46.0
Low Motivation		68	54.0
Total Participants		124	100.0

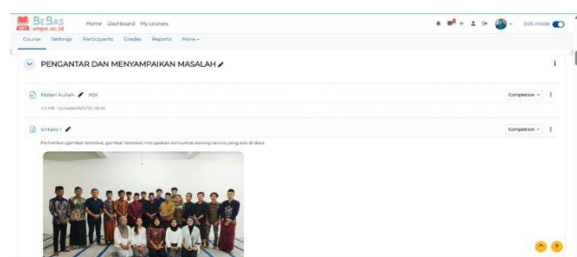
The allocation of participants regarding their learning methods and motivation levels is shown in

Table 4. 1. The two groups were similar in terms of size and attributes. The WebQuest-PBL method

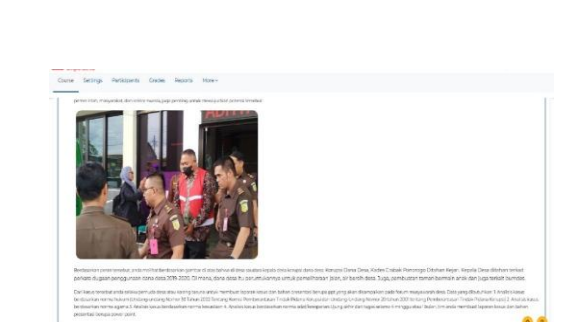
was carried out through a combined learning framework, using the institution's Learning Management System (LMS) as support [9]. The phases of learning included an introduction, presentation of the problem, identification of tasks, searching for information, collaborative problem-solving, and a conclusion. The teaching process utilized in the LMS is depicted in Figure.



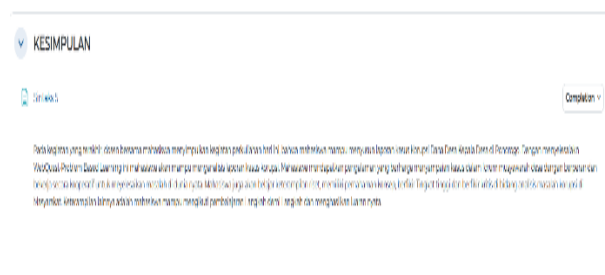
4.1 Welcome



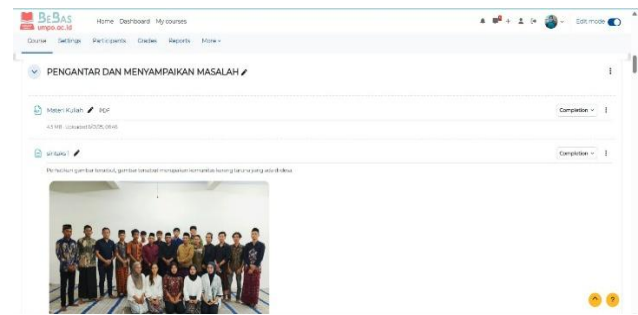
4.2 Introduction and Problem Presentation



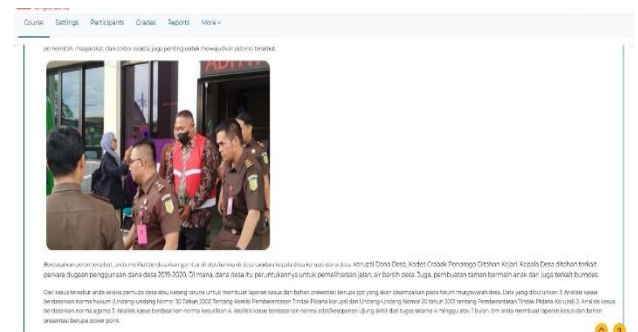
4.3 Task Assignment and Problem Identification



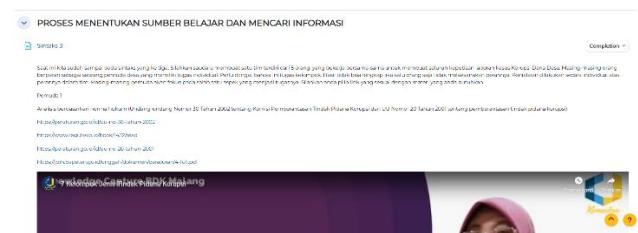
4.4 Conclusion



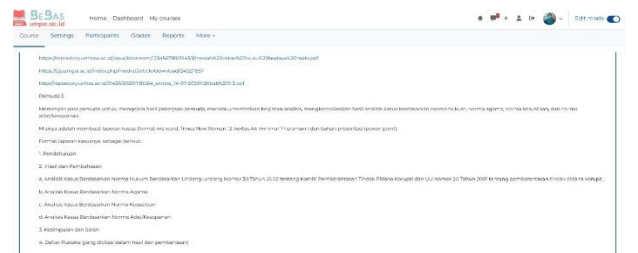
4.5 Introduction and Problem Presentation



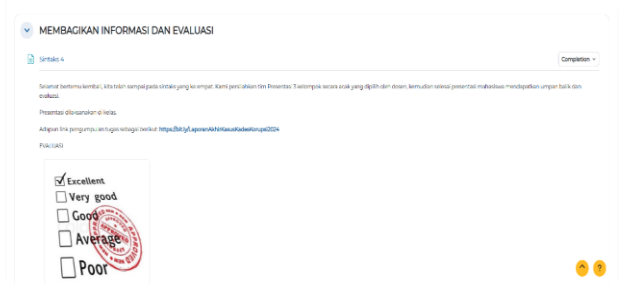
4.6 Task Assignment and Problem Identification



4.7 Process of Determining Learning Resources and Information Searching



4.8 Problem-Solving Process



4.9 Information Sharing and Evaluation

The educational process for both groups commenced with an initial test designed to assess the students' understanding of concepts and their abilities in problem-solving. The instructor subsequently outlined the learning goals and presented case studies related to Pancasila and education on preventing corruption [18].

In the WebQuest–Problem Based Learning (WebQuest-PBL) course, students collaborated on projects by utilizing selected digital materials available through the Learning Management System (LMS). They conducted their own research, assessed, and combined information from multiple reliable sources. In comparison, students in the traditional PBL class mainly participated in

in-person group discussions to examine issues, while the instructor assisted in clarifying concepts [19].

Academic texts, instructional videos, and discussion forums supported the learning activities. The learning cycle ended with group presentations and a follow-up test to assess the results of the learning.

Learning Motivation

Analysis of the data revealed that students participating in the WebQuest-PBL group exhibited greater learning motivation than their counterparts in the PBL group. The details of the motivation levels can be found in

No	Learning Level	Motivation Experimental (Webquest-PBL)	Group	Control (PBL)	Group
		Number of Students	%	Number of Students	%
1	High Motivation	29	47	28	45
2	Low Motivation	33	53	34	55
Total		62	100	62	100

This outcome indicates that integrating online research with problem-solving activities enhances student engagement and motivation during the educational journey. Students are motivated to actively search for information, assess the credibility

of sources, and work together to develop solutions to real-life challenges. Such educational environments encourage increased independence and ongoing involvement, which consequently lead to heightened degrees of learning motivation.

Pre- Test Equivalence

Variable	Group	N	Mean	Std. Deviation
Concept Comprehension	Experimental	62	57.4	24.13
	Control	62	60.77	15.53
Problem-Solving Skills	Experimental	62	7.15	0.7
	Control	62	6.85	0.87

Table 3. Pre-Test Descriptive Statistics for Concept Comprehension and Problem-Solving Skills

Before the intervention, we analyzed pre-test data to assess whether the experimental and control groups were similar. Table 3 contains the

descriptive statistics for the pre-test scores related to understanding concepts and problem-solving abilities.

Variable	Levene's Sig.	t	df	Sig. (2-tailed)
Concept Comprehension	0.639	-1.211	122	0.228
Problem-Solving Skills	0.313	1.372	122	0.173

Table 4. Independent Samples t-Test Results for Pre-Test Scores

The findings show similar average scores between the two groups. The tests for normality showed that the data from the pre-test followed a normal distribution ($p > .05$), and Levene's test demonstrated that the variances are consistent across groups. The results of the independent samples t-test (Table 4) showed that there were no

significant differences in concept comprehension ($t = -1.211, p = .228$) or in problem-solving skills ($t = 1.372, p = .173$) between the experimental group and the control group. These results indicate that both groups were statistically similar before the learning intervention was put into place.

Pos - Test Descriptive Results

Variable	Group	N	Mean	Std. Deviation
Concept Comprehension	Experimental (WebQuest-PBL)	62	72.65	14.3
	Control (PBL)	62	66.4	10.32
Problem-Solving Skills	Experimental (WebQuest-PBL)	62	70.06	10.92
	Control (PBL)	62	59.44	13.04

Variable	Motivation Level	N	Mean	Std. Deviation
Concept Comprehension	High	56	70.88	12.61
	Low	68	68.41	12.95

Problem-Solving Skills	High	56	67.05	13.52
	Low	68	62.85	12.55

Table 5. Post-Test Descriptive Statistics for Concept Comprehension and Problem-Solving Skills

a. Based on Learning Strategy

b. Based on Learning Motivation

Experimental group = WebQuest–Problem Based Learning; Control group = Problem Based Learning.

Table 5 displays the summary statistics of post-test scores related to understanding concepts and problem-solving abilities, categorized by learning strategy and motivation to learn. Students in the experimental group (WebQuest–PBL) obtained higher average scores in both understanding concepts and solving problems when compared to students in the control group (PBL).

Regarding learning motivation, students who exhibited high motivation achieved better post-test scores compared to those with low motivation for both outcome variables. These findings suggest that

the WebQuest–PBL strategy, along with increased learning motivation, correlates with enhanced educational results [20].

Tests for normality conducted through the Kolmogorov–Smirnov and Shapiro–Wilk methods showed that the data from the post-test were normally distributed ($p > .05$). Levene's test also demonstrated that the variance among the groups is consistent ($p > .05$), suggesting that the data satisfied the criteria for further inferential analyses.

Hypothesis Testing

Factorial ANOVA was utilized to perform hypothesis testing in order to investigate the influence of learning strategy, learning motivation, and their interaction on students' understanding of concepts and their skills in solving problems. The results of the ANOVA are summarized in Table 6.

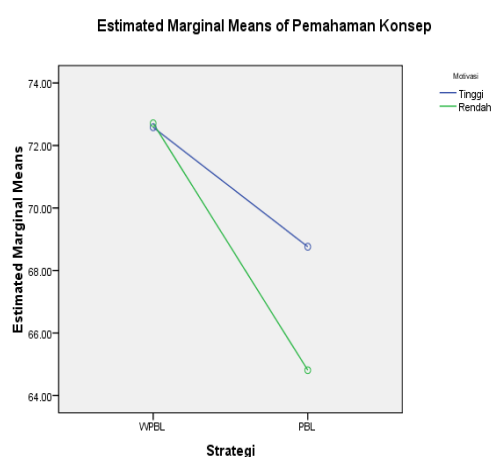
Dependent Variable	Source	df	F	Sig.
Concept Comprehension	Learning Strategy	1	6.688	.011*
	Learning Motivation	1	0.711	0.401
	Strategy × Motivation	1	0.81	0.37
Problem-Solving Skills	Learning Strategy	1	22.405	.000*
	Learning Motivation	1	2.146	0.146
	Strategy × Motivation	1	0	0.988

Table 6. Summary of Factorial ANOVA Results

The findings show that the learning approach notably influenced understanding of concepts ($F = 6.688$, $p = .011$), with students in the WebQuest–PBL group earning better scores compared to those in the PBL group. The learning strategy notably influenced problem-solving abilities ($F = 22.405$, $p < .001$).

The motivation to learn did not demonstrate a noticeable overall impact on understanding concepts or solving problems. Additionally, no notable interaction effect was observed between learning strategy and learning motivation concerning both dependent variables. These results indicate that the WebQuest–PBL approach is more effective in enhancing learning results than motivation for learning by itself [21].

A notable interaction effect between the learning strategy and motivation regarding understanding concepts was observed. This interaction shows that WebQuest-PBL was most beneficial for students who have a strong desire to learn. The pattern of interaction is depicted in Figure 4.10



As illustrated, students who demonstrated strong learning motivation within the WebQuest-PBL group attained greater levels of understanding of concepts than those in the PBL group. In contrast, the variation in understanding of concepts between different learning strategies was less noticeable among students who had low motivation. This trend indicates that the success of WebQuest-PBL is enhanced when students have greater intrinsic motivation.

In summary, the findings indicate that WebQuest-PBL is superior to traditional PBL in

enhancing students' understanding of concepts and their problem-solving abilities. Motivation for learning is vital for improving learning results, and its relationship with learning strategies further boosts the effectiveness of technology-assisted problem-based learning.

Discussion

Impact of WebQuest and Problem-Based Learning on Understanding Concepts

This research offers clear evidence that students who learn through the WebQuest–Problem Based Learning (WebQuest–PBL) approach show a notably greater grasp of concepts compared to those who are taught using traditional PBL methods. This discovery shows that combining structured online inquiry with problem-based learning improves students' skills in organizing, understanding, and absorbing abstract ideas, especially within the framework of Pancasila education. WebQuest serves as a supportive framework that guides students to selected online materials while allowing them to explore independently. This organized approach helps facilitate significant learning by decreasing confusion in online settings and encouraging advanced thinking skills like analysis, synthesis, and evaluation [9] [22]. When used alongside PBL, WebQuest allows students to link theoretical ideas with real-world social problems, thus enhancing the clarity of concepts. These results are consistent with constructivist learning theory, which highlights that the best way for learners to develop a deep understanding of concepts is by actively engaging in knowledge creation through meaningful tasks and contexts [23][24]. Previous studies have also indicated that inquiry-based learning supported by technology greatly enhances understanding of concepts when compared to conventional problem-based methods alone [7] [11].

Influence of Learning Motivation on Conceptual Understanding

The findings also show a notable difference in conceptual comprehension between students who have high learning motivation and those who have low learning motivation. Students who are more motivated consistently demonstrated better understanding of concepts, irrespective of the

teaching method used. This discovery shows that motivation acts as an essential internal force that maintains cognitive involvement and persistence in challenging learning activities [25].

Students who are motivated generally invest more mental effort, exhibit better self-control, and actively pursue a deeper comprehension, allowing them to gain more from inquiry-based learning settings. This aligns with motivational learning theory, which suggests that motivation is strongly connected to how deeply information is processed and to success in academics [4].

Interaction between Learning Strategy and Motivation on Conceptual Understanding

A major contribution of this research is the important interaction effect between the learning strategy used and the level of learning motivation on understanding concepts. The WebQuest-PBL method proved to be most beneficial for students who are highly motivated to learn, indicating that merely introducing new teaching techniques is not enough [26]. This interaction suggests that WebQuest-PBL enhances the educational benefits for motivated students by offering chances for independence, discovery, and thoughtful investigation [27]. On the other hand, students who lack motivation may need extra support or motivational activities to take full advantage of challenging teaching methods. This result supports instructional design theory, which highlights the importance of matching learner traits with teaching methods to improve learning results [7].

Effect of WebQuest-Problem Based Learning on Problem-Solving Skills

Along with enhancing conceptual understanding, the WebQuest-PBL approach greatly improved students' problem-solving abilities in comparison to traditional PBL methods. Students engaged with WebQuest-PBL exhibited an enhanced capacity to systematically analyze problems, assess pertinent information, and suggest well-reasoned solutions based on conceptual comprehension [19]. Utilizing genuine, context-driven problems like actual cases connected to civic values and social matters, motivated students to implement theoretical ideas in real-life situations. This aligns with Gagné's (1985) ranking of intellectual abilities, which places

problem-solving at the peak of cognitive achievements, developed upon earlier conceptual knowledge and the application of rules [28].

These results support earlier studies that show inquiry-based digital learning settings enhance advanced problem-solving skills by involving students in complicated, real-life activities [29] [7].

Influence of Learning Motivation on Problem-Solving Skills

The study also shows that students who are highly motivated to learn performed much better in problem-solving activities than those with low motivation. Driven learners demonstrated increased perseverance, adaptability in thinking, and openness to considering different solutions.

This outcome strengthens the importance of motivation as a factor influencing problem-solving abilities, especially in educational settings that demand ongoing mental effort and self-directed exploration. Motivation affects not only how actively individuals participate in tasks but also how strongly learners can withstand challenges when dealing with complicated and unclear problems [4].

Interaction between Learning Strategy and Motivation on Problem-Solving Skills

An important interaction effect was also found between the learning strategy and motivation regarding problem-solving abilities. WebQuest-PBL has shown to be most beneficial for students who are highly motivated, suggesting that motivated learners are more capable of utilizing the cognitive opportunities presented by web-based inquiry and problem-based learning [30].

This result underscores the significance of incorporating motivational enhancement strategies, such as making the content relevant, supporting autonomy, and fostering collaborative learning into creative teaching designs. In the absence of this support, the advantages of enhanced learning methods may not be fairly shared among different groups of students [31].

Implications for 21st-Century Learning and Pancasila Education

In summary, the results confirm that the WebQuest-PBL approach, especially when applied

in a blended learning setting, significantly improves both understanding of concepts and problem-solving abilities. These results are consistent with 21st-century educational frameworks that stress the importance of critical thinking, digital literacy, and problem-solving in real-world contexts [1]. In the realm of higher education Pancasila courses, WebQuest-PBL presents a meaningful teaching method that transitions learning from merely receiving information to engaging in active civic exploration. By integrating real-world social issues into organized digital exploration, this approach fosters both intellectual growth and the adoption of civic principles.

Conclusion

This research shows that using WebQuest with Problem-Based Learning (WebQuest-PBL) greatly improves students' understanding of concepts and their ability to solve problems more effectively than traditional PBL methods. The results indicate that learning environments that use technology and focus on inquiry offer more significant educational experiences, especially in subjects that prioritize deep understanding and value-oriented reasoning, like Pancasila education. Additionally, it was discovered that motivation for learning significantly influences the results of the learning process. Students who possess strong learning motivation consistently attain greater levels of understanding and problem-solving skills compared to their peers with lower motivation. Importantly, the findings showed a noteworthy interaction effect between the learning strategy and learning motivation. This indicates that WebQuest-PBL is most effective when used with students who have high intrinsic motivation. This exchange highlights the importance of matching teaching methods with students' motivational traits to enhance the

effectiveness of learning.

The research also demonstrates that WebQuest-PBL promotes active knowledge creation by enabling organized online investigation, relevant problem assessment, and teamwork in the learning process. By involving students in genuine, real-world challenges backed by digital tools, this approach encourages advanced thinking abilities and allows learners to utilize their understanding of concepts more successfully in solving problems.

In summary, this study offers concrete proof that WebQuest-PBL is a successful teaching innovation for higher education settings, especially in blended learning systems. The results add to the expanding research on technology-supported problem-based learning and emphasize the significance of combining instructional design, student motivation, and online learning settings. It is advised that future studies investigate wider disciplinary uses, long-term effects on learning, and the inclusion of more learner factors to enhance the overall applicability of this teaching model.

Appendix

Conflict of Interest

The authors declare no conflict of interest.

Author Contributions

Ambiro Puji Asmaroini conducted the research, wrote the paper, and analyzed the data; Yerry Soepriyanto proofread and finalized the article. All authors had agreed and approved the final version.

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