# The Effects of an Instructional Model Using Constructivism and the Blended Learning Approach to Enhance the Problem-Solving Ability of Undergraduate Students in China

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## Abstract

This research consists purposes were 1. to compare the problem-solving ability within the experimental group before and after implementation 2. to compare the problem-solving ability between the experimental and control groups after implementing the instructional model and 3. to examine students' satisfaction with the instructional model using constructivism and the blended learning approach. Samples of the study comprised 180 first-year students from Hebei University of Fine Arts in the first semester of the 2024 academic year recruited by using cluster random sampling method (90 per class). The experimental group learned through an instructional model using the constructivism and blended learning approach, while the control group received traditional lecture-based instruction. A quasi-experimental design with pre-test and post-test measures was employed. Research instruments included lesson plans (expert appropriateness scores: 4.79 for constructivist, 4.43 for traditional), a problem-solving ability test, a self-assessment questionnaire (r = .982), and a satisfaction survey. All instruments were validated by five experts with IOC values of 0.60-1.00. The findings demonstrated improvements in student outcomes. Students in the experimental group showed substantial progress from pre-test to post-test measurements with statistically significant gains (p < .05). They also achieved significantly higher problem-solving scores than students in the traditional learning group (p < .05). Additionally, students reported high satisfaction levels with the blended approach, particularly appreciating the combination of online and face-to-face learning opportunities and the interactive classroom activities. The instructional model using the constructivism and blended learning approach proves effective for enhancing problem-solving abilities among Chinese undergraduate students. This model successfully integrates theoretical learning principles with practical educational technology, creating an engaging learning environment that enhances both student performance and satisfaction.

**Keywords:** Constructivism, Blended Learning Approach, Problem-Solving Ability

## Introduction

In China's national development strategy, education plays a vital role in developing high-quality human capital and competencies aligned with economic and social progress. The 14th Five-Year Plan (2021–2025) highlights the need to improve educational quality to support innovation and sustainable development (Wang et al., 2022). However, the higher education system continues to face major challenges particularly in enhancing the problem-solving ability of undergraduate students, which remains inadequate for meeting 21st-century skill demands (Wang et al., 2024). Studies show that Chinese undergraduates still rely heavily on lecture-based and rote learning methods, which hinder active engagement, real-world application, and the development of sustainable problem-solving skills (Wang et al., 2024). These approaches do not promote critical thinking, knowledge construction, or learner autonomy key components of modern education.

To address these limitations, many scholars advocate for instructional models grounded in constructivism, emphasizing active, contextualized, and collaborative learning (Nurhuda et al., 2023). A constructivist learning environment supports the development of critical thinking and integrated problem-solving through student-centered instructional design (Rusmin et al., 2024).

In parallel, the blended learning approach has gained traction in Chinese higher education as a strategy that combines face-to-face instruction with digital tools. It enhances learning flexibility, supports engagement, and improves outcomes by enabling students to access content and interact with tasks both in and out of class (Su et al., 2024; Liu et al., 2024). Key components such as mobile apps, Learning Management Systems (LMS), and collaborative learning have been shown to significantly boost student motivation and academic achievement (Su et al., 2024).

Despite the individual merits of constructivist and blended learning approaches, few studies have systematically integrated both methodologies within a quasi-experimental framework to examine their combined effectiveness in Chinese higher education contexts. This knowledge gap is particularly pronounced in fine arts education, where creative problem-solving, analytical thinking, and practical application skills are essential for professional development but often remain underdeveloped through conventional teaching methods.

This study addresses the identified gap by implementing and evaluating an integrated instructional model that combines constructivist learning principles with blended learning strategies to enhance problem-solving abilities among Chinese undergraduate students. The model is specifically designed to integrate theoretical

knowledge with practical application, foster critical thinking development, and cultivate students' competencies for solving real-world problems within a learner-centered and technologically enhanced learning environment. This research is particularly significant for Fine Arts students who require sophisticated analytical thinking, creativity, and practical application skills to contribute meaningfully to China's cultural and economic advancement.

## The Purposes

1. To compare the problem-solving ability within the experimental group before and after implementation.

2. To compare the problem-solving ability between the experimental and control groups after implementing the instructional model.

3. To examine students' satisfaction with the instructional model using constructivism and the blended learning approach.

## Literature Review

The researchers reviewed the relevant literature, which demonstrate the "knowledge gap" that has yet to be addressed as follows:

### 1. Constructivism

Constructivist Learning Theory emphasizes that learners actively construct knowledge through personal experience, social interaction, and reflective thinking. It shifts the focus from teacher-centered transmission to student-centered construction of meaning, where learners apply prior knowledge to new contexts and engage in problem-solving based on real-life situations. Allen (2022) explains that constructivism, rooted in the works of Piaget, Vygotsky, Dewey, and Freire, promotes transformative learning by encouraging inquiry, exploration, and knowledge construction through authentic experiences. Similarly, Nurhuda et al. (2023) highlight that constructivist learning supports individualized and meaningful learning through steps such as apperception, exploration, consolidation, and reflection, and is effectively implemented through models like Problem-Based Learning, Inquiry-Based Learning, Authentic Learning, and Cooperative Learning. These features make constructivism particularly relevant for enhancing students' problem-solving abilities and critical thinking in modern educational contexts.

### 2. Blended Learning Approach

The blended learning approach is an instructional strategy that combines traditional face-to-face teaching with digital and online learning environments to create flexible, engaging, and learner-centered experiences.

This approach incorporates both synchronous and asynchronous activities, allowing learners to interact with content at their own pace while benefiting from real-time instruction and peer collaboration. Rahim (2019) highlights that in the context of English as a Foreign Language (EFL), blended learning has transformed educational practices by integrating interactive technologies that promote autonomy, engagement, and authentic language use both inside and outside the classroom. Similarly, Zaraii Zavaraki and Schneider (2019) emphasize that blended learning supports differentiated instruction by providing personalized learning paths, especially beneficial for students with diverse needs. Their systematic review confirms that when well-designed, blended learning enhances access, learner motivation, and educational outcomes by merging the strengths of digital innovation with traditional pedagogical support.

### 3. Problem-Solving Ability

In this study, problem-solving ability refers to the cognitive and behavioral capacity of undergraduate students to address unfamiliar or complex real-world situations. It encompasses analyzing problems, identifying key issues, generating innovative solutions, and evaluating outcomes. Amran et al. (2019) described problem-solving as a creative process that integrates prior knowledge, alternative exploration, and reflective thinking. The Creative Problem-Solving (CPS) model emphasizes originality, appropriateness, and flexibility—skills essential for 21st-century learners. Coşkun et al. (2014) found a strong link between resiliency and problem-solving, indicating that emotional adaptability supports cognitive strategies. Likewise, Kim et al. (2018) confirmed that problem-solving ability predicts innovative behavior and opportunity recognition, especially in entrepreneurial contexts. These findings highlight the need for instructional models that enhance students' critical thinking, resilience, and innovation readiness.

### Methodology

The design of this study was quasi-experimental design The research method is as follows.

**1. Population and sample groups in the research include:** In this study, the population consisted of 260 first-year undergraduate students from Hebei University of Fine Arts in the 2024 academic year, drawn from three classrooms of approximately 80–90 students each. Using G*Power 3.1 for a priori power analysis, with an effect size of 0.85, alpha of .05, and power of .95, the minimum required sample size was calculated to be 74. To ensure sufficient representation and statistical power, Cluster Random Sampling was employed, treating each classroom as a sampling unit with intra-cluster heterogeneity and inter-cluster homogeneity. Two classrooms were randomly selected: one assigned as the experimental group (n1), taught using constructivism and the blended learning approach, and the other as the control group (n2), taught through traditional methods.

**2. Research tools include:** This study employed four categories of research instruments to assess the outcomes and effectiveness of the instructional model, as follows:

2.1 Lesson Plans: 1) Eight lesson plans were developed based on constructivism and the blended learning approach, covering a total of 16 instructional hours. These were evaluated twice by five experts. The first round received an average appropriateness score of 4.17. After revisions, the second evaluation yielded an improved average score of 4.79 and 2) Eight traditional lesson plans, also covering 16 instructional hours, were evaluated by the same experts and received an average appropriateness score of 4.43.

2.2 The problem-solving ability test carries a total score of 100 points and is divided into six key dimensions: adherence to report requirements, understanding of the problem, identification of the problem, explanation of the problem, proposal of solutions, and reflection and communication of the problem. The score allocation for each dimension is as follows: report requirements 15 points, understanding of the problem 15 points, problem identification 15 points, explanation of the problem 15 points, proposed solutions 20 points, and reflection and communication 20 points, totaling 100 points.

The scoring in each dimension follows the same rubric: 1) Excellent (13–15 points for components worth 15 points or 18–20 points for components worth 20 points): Strong relevance to the topic, deep understanding, complete structure, clear explanation, practical solutions, creative thinking, thorough reflection, and highly effective language use 2) Good (11–12 points for 15-point items or 16–17 points for 20-point items): Generally relevant, good overall understanding, complete structure, fairly clear explanation, applicable solutions, adequate reflection, and fluent language 3) Average (9–10 points for 15-point items or 13–15 points for 20-point items): Partially relevant, fair understanding, incomplete structure, weak logic in explanation, vague or generalized solutions, shallow reflection, and moderately understandable language 4) Needs Improvement (7–8 points for 15-point items or 10–12 points for 20-point items): Unclear topic, poor understanding, incomplete structure, ambiguous explanation, impractical solutions, superficial reflection, and unclear language 5) Failing (0–6 points for 15-point items or 0–9 points for 20-point items): Off-topic, misunderstanding of the problem, disorganized structure, incorrect or missing explanation, no viable solutions, no reflection and incomprehensible language. The test was validated for content accuracy by five experts using the Index of Item–Objective Congruence (IOC), with values ranging from 0.60 to 1.00, indicating an acceptable to high level of content validity.

2.3 Self-Assessment Questionnaire on problem-solving ability: Designed to measure students' perceived problem-solving abilities after learning through constructivism and the blended learning approach, this instrument was tailored to the context of the "Situation and Policy" course and based on the PISA evaluation

framework. It consisted of two parts: Part I gathered background information (Items 1–3), and Part II assessed problem-solving ability (Items 4–26) using a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The questionnaire demonstrated strong content validity, with IOC values ranging from 0.60 to 1.00 as evaluated by five experts, and high reliability, indicated by a Pearson's correlation coefficient of .982.

2.4 Student Satisfaction Survey Questionnaire Using constructivism Theory and blended learning approach: This tool was developed to assess students' perceptions of the instructional model's quality and effectiveness. The questionnaire measured key constructs such as interaction, learner adaptability, clarity, real-world relevance, cognitive engagement, and alignment with learning objectives. It contained 17 items covering background information, content clarity, skill development, and assessment systems, all rated on a 5-point Likert scale. Expert validation by five reviewers yielded IOC values between 0.60 and 1.00 for all items.

**3. Data collection:** Data were collected from both the experimental and control groups between December and April. The experimental group received instruction based on the developed instructional model (constructivist theory and the blended learning approach) for a total of 16 hours (1 hour per week). Core activities included pre- and post-tests using a problem-solving ability Test (maximum score: 100 points) and a Self-Assessment Questionnaire. Additionally, data were gathered from student satisfaction questionnaires, conducted in collaboration with two research assistants. Meanwhile, the control group received traditional instruction during the same period and completed only the pre- and post-tests and the self-assessment questionnaire.

**4. Data analysis:** The collected data were analyzed using inferential statistics, including the Dependent Sample t-test to compare pre-test and post-test scores within the experimental group, and the Independent Sample t-test to compare post-test scores between the experimental and control groups. These tests were employed to evaluate the effects of the developed instructional model. In addition, descriptive statistics such as mean, standard deviation, and percentage were used to describe the general characteristics of the data obtained from the student satisfaction questionnaire.

**5. Statistical Procedures:** The researcher used SPSS version 27.0 to analyze the data with both inferential and descriptive statistics. The Shapiro–Wilk test assessed the normality of pre- and post-test scores. A dependent samples t-test compared pre- and post-test scores within the experimental group, while an independent samples t-test compared post-test scores between the experimental and control groups to evaluate the model's effectiveness. Descriptive statistics mean, standard deviation, and percentage were used to summarize student satisfaction with the instructional model.

## Results

This study classified the results as follows the research results as follows:

**1. Results of the Comparison of problem-solving ability Within the Experimental Group Before and After Instruction**

The researcher collected data from the experimental group (taught using constructivist theory and the blended learning approach) and the control group (taught using traditional methods) through pre-tests, post-tests, and a self-assessment questionnaire on problem-solving ability in the "Situation and Policy" course. The Shapiro–Wilk test confirmed normal distribution (p > .05). Pre- and post-test scores of the experimental group were then analyzed using both the problem-solving ability Test and the Self-Assessment Questionnaire, with results shown in Table 1.

**Table 1** Within-Group Comparison of Students' problem-solving ability Before and After the Experiment in the "Situation and Policy" Course

| Topics | Prescriptive Statistics | | Within-Subject Analysis | | | | |
|---|---|---|---|---|---|---|---|
| | Pretest Mean (SD) | Posttest Mean (SD) | Mean Difference (SD) | SE Difference | t-value (p-value) | $r_{xy}$ | Effect Sizes |
| Experimental Group (n = 90) | | | | | | | |
| Problem-Solving Ability Test | 57.52 (4.73) | 75.72 (5.95) | 18.20 (3.913) | .412 | 44.130 (<.001) | .755 | 4.656 |
| Test on Self-Assessment Questionnaire on Problem-Solving Ability | 88.79 (5.53) | 101.49 (5.12) | 12.70 (2.400) | .745 | 17.049 (<.001) | .121 | 1.797 |
| Control Group (n = 90) | | | | | | | |
| Problem-Solving Ability Test | 56.98 (5.37) | 62.16 (5.75) | 5.18 (2.400) | .253 | 20.497 (<.001) | .909 | 2.158 |
| Test on Self-Assessment Questionnaire on Problem-Solving Ability | 87.84 (5.12) | 95.38 (4.46) | 7.53 (5.948) | .627 | 12.016 (<.001) | .235 | 1.268 |

\* Statistically significant at the .05 level

The within-group comparison revealed that the experimental group showed a significant improvement in problem-solving ability after instruction. Their test scores increased from a mean of 57.52 to 75.72 (t = 44.130, p < .001), with a large effect size (4.656). Similarly, their self-assessment scores rose from 88.79 to 101.49 (t = 17.049, p < .001), also with a strong effect size (1.797). While the control group also showed statistically significant gains, the experimental group's improvements were much greater, indicating the instructional model's strong effectiveness in enhancing problem-solving ability.

**2. Results of the Comparison of problem-solving ability Between the Experimental and Control Groups After Instruction**

Therefore, it was appropriate to use the t-test to analyze score differences. These comparisons were conducted to evaluate the effectiveness of the instructional model, and the results are presented in the following Table 2.

**Table 2** Comparison of Teaching Competence Test Scores Between the Experimental and Control Groups After the Experiment

| Topics | Prescriptive Statistics | | Between-Subject Analysis | | | |
|---|---|---|---|---|---|---|
| | Pretest Mean (SD) | Posttest Mean (SD) | Mean Difference (SD) | SE Difference | t-value (p-value) | Effect Sizes |
| Problem-Solving Ability Test | | | | | | |
| Experimental Group (n = 90) | 57.52 (4.73) | 75.72 (5.95) | 13.57 | .873 | 15.549 (<.001) | 2.318 |
| Control Group (n = 90) | 56.98 (5.37) | 62.16 (5.75) | | | | |
| Test on Self-Assessment Questionnaire on Problem-Solving Ability | | | | | | |
| Experimental Group (n = 90) | 88.79 (5.53) | 101.49 (5.12) | 6.11 | .715 | 8.544 (<.001) | 1.272 |
| Control Group (n = 90) | 87.84 (5.12) | 95.38 (4.46) | | | | |

* Statistically significant at the .05 level

17.049, $p < .001$), also with a strong effect size (1.797). While the control group also showed statistically significant gains, the experimental group's improvements were much greater, indicating the instructional model's strong effectiveness in enhancing problem-solving ability.

**3. Results of the Study on Students' Satisfaction with the Instructional Model using constructivism and the blended learning approach**

The researcher examined the satisfaction of students in the experimental group who participated in learning activities based on an instructional model integrating constructivist theory with the Blended Learning approach. A questionnaire was used as the data collection tool to analyze students' opinions across four aspects: course content, learning process, participation, and learning outcomes. The results of the analysis are presented in Table 3.

**Table 3** Results of the Student Satisfaction Survey After Instruction Using constructivist theory and the blended learning approach

| 1. Basic Information | | |
|---|---|---|
| 1. Your Gender: There were 34 male students, accounting for 37.78% and there were 56 female students, accounting for 62.22%. | | |
| 2. Your Grade Level: All 90 students were freshmen, representing 100%. | | |
| 3. Your Major: All 90 students majored in Chinese Painting and Oil Painting from the Faculty of Fine Arts, accounting for 100%. | | |
| **2. Satisfaction with Constructivist and Blended Learning Teaching Models** | | |
| Item | Mean | S.D. |
| 4. The overall design of the teaching model meets my learning needs | 4.39 | 0.09 |
| 5. The design of the teaching model is clear and easy to understand | 4.31 | 0.10 |
| 6. The teaching model provides adequate interaction and participation | 4.60 | 0.11 |
| 7. The online and offline components of the teaching model satisfy my personalized learning needs | 4.61 | 0.08 |
| 8. The course content aligns with the learning objectives | 4.31 | 0.11 |
| 9. The depth and breadth of the course content are suitable for my learning level | 4.48 | 0.10 |
| 10. The practicality and relevance of the course content meet my needs | 4.41 | 0.10 |
| 11. The organization and logic of the course content are reasonable | 4.49 | 0.10 |
| 12. The teaching model effectively improves my problem-solving ability | 4.30 | 0.09 |

| | | |
|---|---|---|
| 13. Through the teaching model, I can apply theoretical knowledge to solve real-world problems | 4.43 | 0.10 |
| 14. The teaching model helps improve my problem-solving ability in group work | 4.35 | 0.10 |
| 15. The assessment methods of the teaching model effectively measure my learning outcomes | 4.31 | 0.10 |
| 16. Feedback and improvement suggestions on the learning effects of the teaching model are handled in a timely manner | 4.32 | 0.11 |
| 17. I am overall satisfied with the learning outcomes of the teaching model | 4.40 | 0.10 |
| Total Average | 4.41 | 0.10 |

A satisfaction survey of 90 students showed a high level of satisfaction with the instructional model based on constructivist theory and the blended learning approach, with an average score of 4.41 (SD = 0.10). The highest-rated aspects were the integration of online and offline learning tailored to individual needs (M = 4.61) and active participation in class (M = 4.60). All items scored above 4.30, indicating the model effectively enhanced content understanding, problem-solving skills, and engagement. Students also suggested improving personalized support, deepening group-based learning, and increasing individual feedback opportunities.

## Conclusion

This study summarized the results as follows the results of the research study according to the following objectives

**1. Comparison of problem-solving ability Within the Experimental Group Before and After Instruction**

comparison of pre- and post-instruction scores within the experimental group revealed a statistically significant improvement. The mean score on the problem-solving ability Test increased from 57.52 to 75.72 (t = 44.130, p < .001, effect size = 4.656), and the Self-Assessment Questionnaire score rose from 88.79 to 101.49 (t = 17.049, p < .001, effect size = 1.797). These results demonstrate that the instructional model effectively enhanced students' cognitive development and problem-solving ability within the same group.

**2. Comparison of problem-solving ability Between the Experimental and Control Groups After Instruction**

The research revealed that the experimental group (n = 90), which received instruction based on constructivist theory and the blended learning approach, had significantly higher post-test mean scores than the control group on both instruments: the problem-solving ability Test (t = 15.549, p < .001, effect size = 2.318) and the Self-Assessment Questionnaire (t = 8.544, p < .001, effect size = 1.272). These findings indicate that the

developed instructional model was more effective in enhancing students' problem-solving abilities compared to traditional teaching methods.

**3. Students' Satisfaction with the Instructional Model using constructivism and the blended learning approach**

Students in the experimental group expressed a high level of satisfaction with the instructional model that integrated constructivist theory and the blended learning approach, with an overall mean score of 4.41. This indicates strong satisfaction across various aspects, particularly the personalized integration of online and offline learning and the opportunity for active classroom participation. Students also perceived that the model effectively enhanced their content understanding, problem-solving skills, and ability to apply knowledge in practical contexts.

**Discussion**

This study discussed the findings as follows the research results as follows.

1. Improvement in problem-solving ability Within the Experimental Group

The within-group comparison revealed that the experimental group showed a statistically significant improvement in problem-solving ability, with post-test scores rising markedly from pre-test levels (t = 44.130, p < .001; effect size = 4.656). This improvement was significantly greater than that of the control group, indicating the effectiveness of the developed instructional model. It is likely that the integration of constructivist theory with the blended learning approach contributed to the development of deep thinking and problem-solving skills. This result aligns with the findings of Nurhuda et al. (2023), who indicated that constructivist learning environments foster meaningful understanding through processes such as real-world problem setting, knowledge application, and reflective thinking. Similarly, the blended learning component may have enhanced deep learning by promoting learner autonomy. Liu, Chai, and Wei (2024) found that blended learning environments increase student engagement and the depth of learning.

Additionally, Amran, Kutty, and Surat (2019) demonstrated that structured instruction emphasizing creative problem-solving can enhance university students' ability to manage novel tasks effectively, supporting the application of this instructional model in skill-oriented courses such as "Situation and Policy."

2. Effectiveness of the Instructional Model in Enhancing problem-solving ability Compared to Traditional Instruction

The research findings indicated that students in the experimental group, who received instruction based on constructivist theory integrated with the blended learning approach, scored significantly higher on both the

problem-solving ability Test and the Self-Assessment Questionnaire than those in the control group. It is likely that learner-centered instruction, combined with interactive learning both in class and through online platforms, helped stimulate students' analytical thinking and enabled them to solve problems more effectively. This reflects the superior effectiveness of the developed instructional model in enhancing students' problem-solving skills. These results align with the study by Allen (2022), who stated that constructivist approaches promote knowledge construction through active participation and reflection both essential components in developing problem-solving ability. Moreover, the integration of blended learning expanded learning opportunities by combining the flexibility of online platforms with face-to-face interaction. This is supported by Su, Sazalli, and Miskam (2024), who found that blended learning strategies improve learning effectiveness and better accommodate individual differences among learners.

Additionally, the statistically significant improvement and large effect sizes (2.318 and 1.272) are consistent with the findings of Kim et al. (2018), who identified a direct relationship between problem-solving ability and university students' innovative behavior and real-world application. Thus, the developed instructional model not only promotes theoretical understanding but also fosters essential competencies for practical implementation.

3. Students' Satisfaction with the Constructivist and Blended Learning Model

The student satisfaction survey indicated an overall high level of satisfaction (M = 4.41), with the highest-rated items being the integration of online and offline learning (M = 4.61) and interactive participation (M = 4.60). These findings are consistent with Zaraii Zavaraki and Schneider (2019), who noted that blended learning enhances accessibility and supports individualized learning, leading to greater learner satisfaction. It is likely that the flexible and learner-centered approach, along with the variety of learning channels, effectively addressed students' diverse learning styles, thereby contributing to the high satisfaction levels. Moreover, the effectiveness of the model in designing instructional activities that meet students' needs for both content mastery and collaborative engagement aligns with Rahim (2019), who argued that blended learning enhances learning quality by integrating structured feedback, active participation, and learner autonomy.

Students' suggestions for more personalized learning experiences, clearly structured group activities, and more one-on-one feedback reflect the ongoing challenges of implementing constructivist-based models on a large scale. Nonetheless, these suggestions also point to the model's potential for continuous development, which echoes Wang et al. (2022), who emphasized the importance of adaptive curriculum design strategies to foster creative and innovative talent.

### Discoveries or new knowledge

From the findings of this research, valuable knowledge was obtained regarding the development of an instructional model that integrates constructivist theory with the blended learning approach to enhance students' problem-solving ability. The developed model consists of key components from constructivist theory, including setting the context, active learning, collaborative learning, communication, and meaning construction, alongside elements of blended learning such as online and offline instruction, student engagement, teacher guidance, and ongoing assessment. The instructional process is divided into three phases: pre-course, classroom, and after-class sessions, with an emphasis on interactive learning, reflection, and peer communication. Furthermore, the model promotes the development of students' problem-solving abilities in five dimensions: critical thinking skills, issue identification, policy evaluation, interdisciplinary application, and the feasibility and creativity of solutions. This demonstrates that the instructional model is both appropriate and effective for fostering 21st-century learner competencies

### Suggestion

#### 1. Suggestions for use

1.1 Promote the implementation of the instructional model in other subjects and diverse learning contexts: The instructional model that integrates constructivist theory with the blended learning approach has proven effective in enhancing problem-solving skills. Therefore, it is recommended that educators apply this model in other subjects, particularly those aiming to develop analytical thinking, and adapt it appropriately to suit learners at different levels.

1.2 Provide professional development for teachers to design learner-centered instructional activities: To ensure successful implementation, professional training or learning communities should be established to help teachers understand constructivist principles, blended learning design, and the effective use of technology. This will enable them to create learning experiences that respond to individual differences and foster meaningful learning.

#### 2. Suggestions for next research

Future studies should investigate the long-term effects of using the Constructivist and Blended Learning instructional model on students' problem-solving ability and academic performance across different academic disciplines and educational levels, in order to evaluate its sustainability and adaptability in diverse learning environments.

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