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# A Comparative Study of the Guided Inquiry Learning Method and the Problem-Based Learning Method on Students' Critical Thinking Skills

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## ABSTRACT

This research is motivated by the lack of critical thinking skills of students in secondary schools. The purpose of this study to analyze and find effective learning methods to improve students' critical thinking skills on economic subjects in High School. This research is a quasi-experimental. The study population was the students of class XI IPS in SMAN 1 Pariaman with a sample size of 2 (two) classes. Technique of data analysis: descriptive analysis and data analysis Independent Sample t - Test. The results showed that (1) there are differences on critical thinking skills of students before and after the learning in the classes using Guided Inquiry Learning, (2) there are differences on critical thinking skills of students before and after the learning in the classes using Problem Based Learning method (PBL) and (3) there are differences in the increase on critical thinking skills of students between classes using Guided Inquiry Learning with classes using Problem Based Learning (PBL) as well as the method of Problem Based Learning (PBL) is more effective than the method of Guided Inquiry Learning.

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## INTRODUCTION

One of the most pressing and persistent challenges in the field of education today is the low level of students' critical thinking abilities, a problem that not only impedes individual academic achievement but also hinders broader societal and national development. Critical thinking, defined as the capacity to analyze, evaluate, and synthesize information in a logical, structured, and reflective manner, is widely recognized as a cornerstone of lifelong learning, effective decision-making, and active citizenship in the 21st century. It is an essential competency for navigating a world characterized by rapid technological advancement, complex global issues, and an overwhelming flow of information. Despite its recognized importance, a substantial body of research has consistently shown that students across many educational systems, including in developing countries like Indonesia, struggle to attain adequate levels of critical thinking proficiency.

This concern is not merely theoretical but is strongly substantiated by empirical evidence from international educational assessments. For instance, the Programme for International Student Assessment (PISA) conducted by the OECD in 2012 revealed that Indonesian students ranked 64th out of 65 participating countries, a sobering indicator of the country's struggle to cultivate higher-order thinking skills among its youth (Suhirman et al., 2020). PISA assessments focus on students' ability to apply their knowledge in unfamiliar contexts, emphasizing real-life problem solving and reasoning, core components of critical thinking.

In a similar vein, the Trends in International Mathematics and Science Study (TIMSS) 2011 report, administered by the Global Institute, placed Indonesia at 40th out of 42 countries, with an average score of 406, significantly below the international benchmark of 500 (Teig et al., 2022). These figures reflect not just a lack of content mastery, but more crucially, a deficiency in the application of logical reasoning, the construction of evidence-based arguments, and the solving of complex problems.

Such findings are not isolated. National assessments and reports from Indonesian education bodies have similarly identified a systemic gap in teaching methodologies and curriculum design, which often emphasize rote memorization and teacher-centered instruction over inquiry-based, reflective, and student-centered approaches that nurture independent thought and critical analysis.

Consequently, many students graduate without the tools necessary to question assumptions, make informed decisions, or engage in meaningful discourse, skills that are vital not only in academic settings but also in democratic participation, workforce readiness, and social problem-solving.

The implications of this issue are far-reaching. At the individual level, students with underdeveloped critical thinking skills are less prepared for tertiary education, less competitive in the job market, and more vulnerable to misinformation and manipulation. At the societal level, the lack of a critically minded citizenry may hinder innovation, reduce the quality of public discourse, and weaken the democratic process. At the national level, a failure to develop human capital with high-level cognitive skills can impede economic development, widen inequality, and reduce a country's ability to compete in the global arena.

Given the urgency and gravity of this issue, it is imperative that educational stakeholders, teachers, school leaders, curriculum designers, policymakers, and researchers, work collaboratively to address the root causes of poor critical thinking outcomes. This includes rethinking curriculum goals, adopting pedagogical strategies that emphasize active learning and real-world problem solving (such as Problem-Based Learning and Guided Inquiry), and investing in teacher training that equips educators with the skills to facilitate higher-order thinking in their classrooms.

The same pattern is observable at the local level. A case in point is SMAN 1 Pariaman, a public senior high school in West Sumatra, Indonesia. Data collected from students of Class XI IPS2 illustrates a clear deficiency in critical thinking skills. The following table summarizes their performance:

**Table 1**. *Distribution of Critical Thinking Scores – Class XI IPS2, SMAN 1 Pariaman*

| No | Score Range | Number of Students | Percentage |
|---|---|---|---|
| 1 | 0–2 | 2 | 6.90% |
| 2 | 3–5 | 23 | 79.31% |
| 3 | 6–8 | 4 | 13.79% |
| 4 | 9–10 | 0 | 0.00% |
| | **Total** | **29** | **100%** |

From the data above, it becomes indisputably evident that the students' critical thinking skills are at a worryingly low level. A staggering 79.31% of the students scored between 3 and 5 out of 10, reflecting minimal mastery of the essential cognitive processes required for critical engagement. Only 4 students (13.79%) scored between 6 and 8, barely approaching acceptable competence. More alarmingly, no students reached the highest score bracket (9–10), and only a handful came close to meeting the Minimum Mastery Criteria (KKM), which is set at 75% in the Indonesian education system. This means that over 85% of students fell below the expected standard, signaling a systemic issue in the current teaching and learning approaches being employed in the classroom.

These findings mirror those found in national surveys and international comparisons, suggesting that conventional classroom practices have not succeeded

in cultivating deep learning or reflective thinking among students. Instead, rote memorization and passive reception of information still dominate the learning process in many Indonesian schools. There is thus a compelling and urgent need for a paradigm shift, one that emphasizes active learning, student engagement, and the nurturing of higher-order thinking skills.

Critical thinking is not merely a desirable educational outcome, it is an essential life skill. According to Dekker (2020), when students engage with content through a critical lens, they internalize knowledge more deeply and construct new understandings and belief systems that inform their intellectual growth. Their thinking becomes guided by reflective questions, enabling them to navigate complex information and make reasoned judgments. Such intellectual autonomy is indispensable in a rapidly changing world where information is abundant but discernment is rare (Carter, 2017).

In Indonesia, schools are the primary institutions through which educational transformation must occur. However, preliminary classroom observations at SMAN 1 Pariaman reveal that the current pedagogical model, especially in economics instruction for class XI IPS, is predominantly teacher-centered. Teachers largely control classroom discourse, relying heavily on direct instruction and lecture-based methods, which limit opportunities for students to ask questions, investigate problems, or develop independent thought. In this environment, students are passive recipients of information, with limited agency to engage critically with the material. This stagnates the development of critical thinking and reduces learning to a procedural, rather than transformative, process.

To address this issue, educators must adopt student-centered learning approaches, which shift the locus of control from the teacher to the student. In such environments, learners are encouraged to take initiative, explore multiple perspectives, and construct their own understanding of concepts. Two teaching methodologies that align with this educational philosophy are Guided Inquiry Learning and Problem-Based Learning (PBL), both of which are grounded in constructivist theories of learning and have demonstrated potential to significantly enhance critical thinking skills.

Guided Inquiry Learning is based on the principles of constructivism, which views learners as active participants in the construction of knowledge. According to Presser et al. (2023), this method encourages students to engage with real-world questions, formulate hypotheses, gather and analyze data, verify outcomes, and draw logical conclusions. Rather than being given answers, students are led through structured inquiry processes, which mirror the methods used by scientists and

researchers to develop new insights. This process not only strengthens their understanding of content but also promotes essential reasoning skills.

On the other hand, Problem-Based Learning (PBL) integrates theories from constructivism, meaningful learning (David Ausubel), social development (Vygotsky), and discovery learning, creating a robust framework for inquiry-driven education (Alt & Raichel, 2020). In PBL, students are presented with authentic problems that do not have predetermined solutions. Through group collaboration, critical discussion, and reflective inquiry, they develop both subject knowledge and analytical skills that are transferable across disciplines.

A substantial body of empirical evidence supports the effectiveness of these methods. For instance, Wale dan Bishaw (2020) found that inquiry-based learning significantly improved critical thinking performance among students. Wale dan Bishaw (2020) observed that the Guided Inquiry method produced a statistically significant improvement in students' inference and conclusion-making abilities. Likewise, Nkosi dan Motlhabane (2024) concluded that inquiry-based approaches promote critical engagement with content, especially in science education. Further validation comes from Stender et al. (2018) and Lazonder and Harmsen (2016), who reported that students exposed to inquiry-guided learning projects showed measurable improvements in analytical reasoning. Studies by Sari et al. (2021) and Verawati et al. (2020) echoed these findings, showing that students' critical thinking abilities significantly increased after being taught using guided inquiry models.

Parallel to this, Problem-Based Learning (PBL) has gained widespread recognition for its ability to foster deep thinking and academic engagement. Research conducted by Liu and Pásztor (2022) revealed that PBL not only enhances students' content understanding but also leads to substantial gains in critical thinking skills. Studies by Anggraeni et al. (2023) have likewise shown that PBL supports critical analysis and decision-making in realistic, context-driven scenarios. Aba-Oli et al., (2024) demonstrated that PBL leads to the development of higher-order reasoning skills, especially in technical fields. Meanwhile, Arici and Yılmaz (2022) confirmed that PBL cultivates reflective thinking by encouraging students to engage in discussion, argumentation, inquiry, and environmental problem-solving.

Taken together, these studies underscore the effectiveness of both Guided Inquiry Learning and Problem-Based Learning in promoting critical thinking among students. Nevertheless, few studies have directly compared the relative effectiveness of these two methods within a specific subject area and student demographic. Therefore, there is a need for comparative research that can identify which method yields more significant learning gains in particular contexts, especially in Indonesian senior high school settings where critical thinking development is still lagging.

To that end, this study employs a quantitative research approach using a quasi-experimental design to systematically compare the impact of the Guided Inquiry Learning method and the Problem-Based Learning method on students' critical thinking abilities. The research is focused on the topic "Economic Actors in the Economic System", as taught in the economics curriculum for Class XI Social Studies students at SMAN 1 Pariaman. Accordingly, this study is entitled "**A Comparative Study of the Guided Inquiry Learning Method and the Problem-Based Learning Method on Students' Critical Thinking Skills (A Quasi-Experimental Study on the Topic of Economic Actors in the Economic System in Class XI Social Studies at SMAN 1 Pariaman)**"

## METHODS

This study was carried out at SMAN 1 Pariaman, a senior high school located in West Sumatra, Indonesia. The focus of the study was on students enrolled in Grade XI of the Social Sciences stream (IPS), with a specific emphasis on the economics topic entitled "Economic Actors in the Economic System." This particular topic was chosen because it encompasses essential economic concepts that require not only content knowledge but also the application of analytical and evaluative thinking, which are core elements of critical thinking.

To assess the effectiveness of two different instructional strategies in enhancing students' critical thinking abilities, the research employed an experimental approach involving two separate classes, each receiving a different pedagogical treatment. The study utilized Class XI IPS2 as Experimental Group I, which was instructed using the Guided Inquiry Learning (GIL) method, and Class XI IPS3 as Experimental Group II, which received instruction through the Problem-Based Learning (PBL) method. These two methods were selected due to their strong foundations in constructivist learning theory and their proven potential in fostering higher-order thinking skills, particularly critical thinking.

### Research Design and Justification

The research followed a quantitative research approach, employing a quasi-experimental design. Quasi-experimental research is considered highly suitable in educational contexts where randomized controlled trials (RCTs) are impractical due to the existence of pre-formed class groupings. In this case, students had already been assigned to their respective classes by the school administration, thus random allocation to control or treatment groups was not possible. As a result, a quasi-experimental model was selected to preserve the natural educational environment while still allowing for robust comparative analysis.

Specifically, the design used in this study was the Pretest-Posttest Non-Equivalent Control Group Design, as outlined by (Kohan et al., 2024). This design enables researchers to measure learning outcomes before and after the intervention within each group, as well as compare the degree of improvement between groups. It is particularly effective in determining the causality and efficacy of educational treatments under real-world classroom conditions.

The structure of the research design is presented in the following table:

**Table 2.** *Research Design*

| Group | Pretest | Treatment | Posttest |
|---|---|---|---|
| KEI | T1 | X1 (Guided Inquiry Learning) | T2 |
| KEII | T1 | X2 (Problem-Based Learning - PBL) | T2 |

Source: Sugiyono (2012, p.116)

**Explanation of Terms:**

1. **T1 (Pretest):** A critical thinking assessment administered prior to the intervention to establish baseline ability levels in both groups.
2. **T2 (Posttest):** A similar assessment conducted after the instructional treatment to measure improvements.
3. **X1 (Guided Inquiry Learning):** A student-centered instructional approach emphasizing exploration, questioning, hypothesis testing, data collection, and conclusion drawing.
4. **X2 (Problem-Based Learning):** A pedagogical method that engages students in solving real-world problems through collaborative discussion, research, and critical reflection.

**Instrumentation**

To evaluate students' critical thinking abilities, the researchers developed an instrument consisting of 29 multiple-choice items, each carefully constructed to measure specific facets of critical thinking. The test items were validated based on indicators aligned with Song and Cai (2024), six core critical thinking skills: interpretation, analysis, inference, evaluation, explanation, and self-regulation. The multiple-choice format was chosen for its objective scoring criteria and ability to cover a wide range of cognitive domains within a limited testing period.

Each correct answer was awarded a score of 1, while incorrect responses received a score of 0. The total raw score for each student was obtained by summing all correct answers, providing a quantitative measure of individual critical thinking ability. In designing the instrument, careful attention was given to item clarity, content relevance, and the avoidance of ambiguity to ensure validity and reliability of the results.

## Data Collection and Analysis Procedures

After administering both the pretest and posttest, data were collected and processed using SPSS Version 22.0 (Statistical Package for the Social Sciences). SPSS is a powerful tool that offers a wide range of statistical techniques and is widely accepted in educational and social science research for its accuracy, efficiency, and reproducibility in data analysis.

Two primary statistical tests were conducted:

1. **Paired Samples t-Test**
   This test was applied within each experimental group to evaluate whether there was a statistically significant improvement in students' critical thinking skills before and after the intervention. It is particularly useful in identifying learning gains attributable to a specific instructional method.

2. **Independent Samples t-Test**
   This test was used to compare the mean score differences (gain scores) between the two experimental groups. The aim was to determine which instructional method, Guided Inquiry Learning or Problem-Based Learning, had a greater effect on enhancing critical thinking.

By combining both within-group and between-group analyses, the study aimed to provide a comprehensive understanding of the effectiveness of each method, and whether one significantly outperformed the other in developing critical thinking skills among students.

## Research Hypotheses

In alignment with the study objectives and analytical framework, three hypotheses were formulated:

1. **H1:** There is a statistically significant difference in students' critical thinking abilities before and after instruction using the Guided Inquiry Learning method.

2. **H2:** There is a statistically significant difference in students' critical thinking abilities before and after instruction using the Problem-Based Learning (PBL) method.

3. **H3:** There is a statistically significant difference in the magnitude of improvement in students' critical thinking skills between the Guided Inquiry Learning group and the Problem-Based Learning group.

These hypotheses were constructed not only to examine the individual effectiveness of each teaching strategy but also to enable a direct comparison between the two. The ultimate aim is to identify which instructional method produces more significant learning gains in terms of critical thinking development, thereby contributing to both theoretical understanding and practical implementation of effective pedagogy in the Indonesian high school context.

### Significance of Methodological Approach

The methodological rigor of this study lies in its careful selection of validated instruments, application of appropriate statistical analyses, and use of a real-world educational setting. By conducting this research within the natural classroom environment, the study increases its ecological validity, making its findings more relevant and applicable to everyday teaching practices. Furthermore, by comparing two constructivist learning approaches, the study provides empirical insights into which method better supports cognitive growth, especially in relation to critical thinking, one of the most vital 21st-century skills.

## RESULT

In this section, the author systematically and descriptively presents the core findings derived from the research process. The presentation of data is conducted in an objective manner, free from subjective interpretation or evaluative commentary. Any further analysis or theoretical elaboration will be thoroughly discussed in the subsequent Discussion section. The purpose of this section is to provide a clear, concise, and transparent overview of the empirical outcomes obtained from the study, thereby allowing readers to understand what was discovered through the research process.

The presentation of results includes detailed information in the form of numerical data, statistical test outputs, descriptive figures, trends observed across variables, and comparative analyses between experimental groups. This structured format ensures that the data stands independently as evidence, enabling the reader to follow the logical progression of the study without ambiguity or bias.

The research aimed to assess the effectiveness of two well-established student-centered instructional methods, Guided Inquiry Learning and Problem-Based Learning (PBL), in fostering students' critical thinking abilities. Recognizing the importance of critical thinking as a core 21st-century competency, the study was designed to test the impact of these two instructional models using quantitative methods.

Specifically, the study tested three hypotheses that explored the changes in students' critical thinking skills before and after instructional interventions, as well as the comparative effectiveness of the two methods. Each hypothesis was evaluated using appropriate inferential statistical techniques. Data were analyzed using SPSS version 22.0, a widely used statistical software package that provides accurate and reliable tools for hypothesis testing.

The first two hypotheses focused on within-group comparisons, examining whether there was a statistically significant difference between students' pretest and posttest scores after receiving instruction via either Guided Inquiry Learning (for Experimental Group I) or Problem-Based Learning (for Experimental Group II). These comparisons were conducted using the paired samples t-test, which is suitable for measuring the mean differences in related samples.

The third hypothesis examined the between-group differences in learning gains by comparing the effectiveness of the two instructional methods. This was analyzed using an independent samples t-test, comparing the gain scores of both experimental groups to determine which instructional strategy led to a more significant improvement in critical thinking skills.

The results of each hypothesis test are presented in tabular form for clarity and transparency, including values such as mean differences, standard deviations, t-values, degrees of freedom, and significance levels (p-values). Additionally, the gain scores and normalized gain (N-Gain) values are reported to provide a clearer understanding of the magnitude of improvement in each group.

Through this results section, readers are presented with a factual and comprehensive account of what was empirically observed during the course of the study. These findings form the basis for the interpretations and theoretical implications that will be explored in the following discussion section.

**Hypothesis 1 (H1):** There is a significant difference in students' critical thinking skills before and after learning using the Guided Inquiry Learning method.

To assess the validity of this hypothesis, a paired samples t-test was conducted to evaluate the statistical difference between students' pretest and posttest scores in

Experimental Group I (Class XI IPS2). This group was exposed to the Guided Inquiry Learning (GIL) method during the instructional intervention. The Guided Inquiry Learning approach is known for encouraging students to actively explore, question, and construct their understanding through guided activities and structured inquiry steps. It promotes student engagement in the learning process and supports the development of critical thinking by requiring learners to formulate questions, analyze data, interpret evidence, and draw conclusions under the guidance of a teacher or facilitator.

The statistical analysis was carried out using SPSS Version 22.0, and the results are presented in the following table:

**Table 3.** *Results of Hypothesis Testing I*

| Paired Differences | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Pretest - Posttest | -4.828 | 0.928 | 0.172 | -28.000 | 28 | 0.000 |

Source: SPSS Data Analysis (Version 22.0)

The results indicate a mean difference of -4.828 between pretest and posttest scores. The negative value suggests that the posttest scores were significantly higher than the pretest scores. The standard deviation of 0.928 shows that the score differences among students were relatively consistent, while the standard error mean of 0.172 reflects the precision of the sample mean estimate.

The t-value of -28.000 is considerably high in magnitude, signifying a strong effect size, and the degrees of freedom (df) for the analysis is 28, corresponding to the sample size (n = 29). Most importantly, the p-value (Sig. 2-tailed) is 0.000, which is well below the significance threshold of 0.05. This strongly supports the rejection of the null hypothesis (Ho), which posited no difference between pretest and posttest scores.

Hence, it can be statistically concluded that there is a significant improvement in students' critical thinking abilities after participating in Guided Inquiry Learning-based instruction. This finding supports the theoretical framework that guided inquiry can facilitate deeper cognitive engagement, as students are not passive recipients of information but are instead active investigators and co-constructors of knowledge.

In practical terms, these results suggest that Guided Inquiry Learning is effective in helping students enhance their ability to think critically, an essential skill in processing information, solving problems, and making decisions based on evidence. While it may require more planning and facilitation from the teacher, the

positive outcomes shown in this study validate its implementation as a pedagogical strategy in economics and other subjects that demand analytical reasoning.

Moreover, these findings align with previous research indicating that inquiry-based learning can significantly improve students' cognitive and metacognitive skills. When students are given opportunities to explore real-life questions and actively construct their own understanding, they are more likely to engage in higher-order thinking processes, including analysis, evaluation, and synthesis.

In conclusion, the application of the Guided Inquiry Learning method in this experimental group has been proven statistically effective in increasing students' critical thinking skills, reinforcing the importance of adopting interactive and inquiry-driven instructional approaches in modern education.

**Table 4.** *Gain Score in Experimental Group I (Guided Inquiry Learning)*

| Data | Average Score | Improvement | N-Gain | Interpretation |
|---|---|---|---|---|
| Pretest | 13.79 | 4.83 | 0.3321 | Low |
| Posttest | 18.62 | | | |

*Source: SPSS Data Analysis (Version 22.0)*

The average score improved by 4.83 points, from 13.79 to 18.62, with an N-Gain of 0.3321, which falls within the low category according to the gain score interpretation criteria.

**Hypothesis 2 (H2):** There is a significant difference in students' critical thinking skills before and after learning using the Problem-Based Learning (PBL) method.

To test the second hypothesis, the study investigated the impact of the Problem-Based Learning (PBL) method on students' critical thinking abilities by analyzing the performance of Experimental Group II, which consisted of students from Class XI IPS3. This group underwent a learning intervention where instructional delivery was conducted using the PBL approach. To examine the effect of this intervention, a paired samples t-test was conducted using SPSS version 22.0, comparing the mean scores of students on the pretest and posttest.

The results are presented in Table 5, which includes key statistical values such as the mean difference, standard deviation, standard error, t-value, degrees of freedom (df), and significance (p-value). The mean difference between the pretest and posttest scores was -6.900, with a standard deviation of 0.845 and a standard error of 0.154. The t-value was recorded at -44.733, with 29 degrees of freedom, and the p-value (Sig. 2-tailed) was 0.000.

**Table 5.** *Results of Hypothesis Testing II*

| Paired Differences | Mean | Std. Deviation | Std. Error Mean | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|---|
| Pretest - Posttest | -6.900 | 0.845 | 0.154 | -44.733 | 29 | 0.000 |

Source: SPSS Data Analysis (Version 22.0)

These results clearly indicate a statistically significant difference between students' pretest and posttest scores after receiving instruction through the PBL method. Since the p-value is smaller than the significance level of 0.05, the null hypothesis is rejected, and the alternative hypothesis is accepted. This confirms that Problem-Based Learning had a significant positive effect on enhancing students' critical thinking abilities.

To provide a more nuanced understanding of the extent of improvement, Table 6 presents the gain score analysis, including the pretest and posttest average scores, the raw improvement (gain), and the normalized gain (N-Gain), which allows for standardized comparisons. The average pretest score was 18.37, and the average posttest score was 25.27, resulting in a mean gain of 6.90 points. The N-Gain value was calculated at 0.6780, which falls into the "medium" category according to Hake's (1998) criteria for measuring instructional effectiveness.

**Table 6.** *Gain Score in Experimental Group II (Problem-Based Learning)*

| Data | Average Score | Improvement | N-Gain | Interpretation |
|---|---|---|---|---|
| Pretest | 18.37 | 6.90 | 0.6780 | Medium |
| Posttest | 25.27 | | | |

Source: SPSS Data Analysis (Version 22.0)

These findings underscore the effectiveness of the PBL method in promoting critical thinking. The considerable gain in scores suggests that the problem-centered, collaborative, and inquiry-driven characteristics of PBL successfully engaged students in higher-order cognitive processes such as analysis, synthesis, and evaluation. PBL situates students in authentic problem-solving scenarios that simulate real-life contexts, thereby requiring them to not only absorb knowledge but also to actively construct understanding, justify their reasoning, and engage in reflective thinking.

Moreover, the medium-level N-Gain indicates that while there is still room for improvement, the intervention achieved notable educational impact within the limited instructional period. Given the complexity of critical thinking as a skill, these results are significant and point to the pedagogical value of PBL in enhancing

cognitive development, particularly among senior high school students who are developmentally ready for autonomous and collaborative learning experiences.

Therefore, Hypothesis 2 is empirically supported, confirming that students who engage in learning through the Problem-Based Learning model show statistically and educationally significant improvements in their critical thinking skills.

**Hypothesis 3 (H3):** There is a significant difference in the improvement of critical thinking skills between the class taught using Guided Inquiry Learning and the class taught using Problem-Based Learning.

To assess the third hypothesis, the study aimed to determine whether the observed differences in students' critical thinking skill improvements between the two instructional methods, Guided Inquiry Learning and Problem-Based Learning (PBL), were statistically significant. For this purpose, the Independent Samples T-Test was employed using SPSS version 22.0. This statistical technique is appropriate for comparing the means of two independent groups, in this case, the gain scores (posttest minus pretest scores) from each experimental group.

The test was conducted under the assumption of equal variances. As seen in Table 7, the Levene's Test for Equality of Variances yielded an F value of 1.620 and a significance (Sig.) value of 0.208, which is greater than 0.05, indicating that the assumption of equal variances was not violated. Consequently, the t-test result under the equal variances assumed condition is used for interpretation. The t value was -10.413, with 57 degrees of freedom, and the two-tailed significance level was 0.000, which is far below the threshold of 0.025 (adjusted alpha level for multiple comparisons if needed). This result indicates a highly significant difference in the mean gain scores between the two instructional methods.

**Table 7.** *Results of Hypothesis Testing III*

| Test | F | Sig. | t | df | Sig. (2-tailed) |
|---|---|---|---|---|---|
| Equal variances assumed | 1.620 | 0.208 | -10.413 | 57 | 0.000 |
| Equal variances not assumed | | | -10.460 | 54.238 | 0.000 |

Source: SPSS Data Analysis (Version 22.0)

This statistical significance is further clarified through the gain score analysis, which is presented in Table 8. Students in the Guided Inquiry Learning group showed an average improvement of 4.83 points, with an N-Gain value of 0.3321, classified as low. In contrast, students in the Problem-Based Learning group showed a greater average improvement of 6.90 points, with an N-Gain value of 0.6780, falling into the moderate category. These results not only confirm the quantitative difference but

also emphasize the qualitative impact of PBL in enhancing students' critical thinking more substantially than the Guided Inquiry approach.

**Table 8.** Comparison of Critical Thinking Gains Between Methods

| Method | Improvement | N-Gain | Interpretation |
|---|---|---|---|
| Guided Inquiry Learning | 4.83 | 0.3321 | Low |
| Problem-Based Learning | 6.90 | 0.6780 | Moderate |

Source: SPSS Data Analysis (Version 22.0)

These findings suggest that Problem-Based Learning is not only statistically superior in improving critical thinking but also more effective from a pedagogical perspective. The method's emphasis on real-life problem solving, collaborative exploration, and active engagement likely contributes to its greater impact. Meanwhile, Guided Inquiry Learning, although beneficial, may require more structured facilitation and longer instructional time, which can limit its effectiveness in comparison to PBL.

In summary, the data supports the third hypothesis by showing that the improvement in critical thinking skills significantly differs between the two methods, with Problem-Based Learning producing a more substantial educational effect. This reinforces the conclusion that instructional design grounded in problem-solving and learner autonomy, hallmarks of PBL, has a stronger potential to develop students' higher-order thinking skills in senior high school settings.

## DISCUSSION

The discussion section should focus on the interpretation of the findings and link them to existing literature. The author should explain why the findings are significant and how they contribute to enhancing theoretical understanding in the researched field. Additionally, the discussion should include an analysis of any contradictions or differences with previous studies, as well as provide practical and theoretical implications.

The findings across all three hypotheses strongly affirm the effectiveness of student-centered instructional methods, particularly Guided Inquiry Learning and Problem-Based Learning (PBL), in fostering students' critical thinking skills. The data shows that both methods yielded statistically significant improvements in pretest-posttest scores, indicating that learning experiences grounded in exploration, inquiry, and active engagement are instrumental in developing higher-order cognitive abilities. These outcomes are aligned with the growing body of educational

research that emphasizes the transformative potential of constructivist learning approaches in the 21st-century classroom.

However, a closer examination of the gain scores and N-Gain values reveals a noteworthy distinction in effectiveness between the two methods. Problem-Based Learning (PBL) not only resulted in a higher average gain (6.90) compared to Guided Inquiry Learning (4.83), but also achieved an N-Gain of 0.6780, categorized as moderate, compared to 0.3321, which falls under the low category. This finding suggests that while both approaches are pedagogically sound, PBL has a greater capacity to elevate students' critical thinking in a more meaningful and measurable way.

One of the defining characteristics that likely contributes to PBL's superior impact is its authentic, problem-oriented learning context. In PBL, students are presented with real-world problems that are often complex and open-ended, requiring them to analyze information, generate hypotheses, engage in discussion, synthesize data, and evaluate possible solutions collaboratively. This type of learning environment encourages deep learning, as it mirrors real-life cognitive tasks and encourages students to engage in the core components of critical thinking, namely, analysis, evaluation, inference, and reflection (Yeung & Wang, 2016). These findings are consistent with earlier studies by Yu (2024), Arici dan Yılmaz (2022), and Matsuda et al. (2024), who found that PBL significantly enhances students' cognitive processing and decision-making abilities across a range of academic disciplines.

Conversely, Guided Inquiry Learning, while still impactful, exhibited less pronounced results in terms of learning gains. The relatively lower N-Gain can be attributed to several factors, including the time-intensive nature of the inquiry process and the need for extensive scaffolding by the teacher. Unlike PBL, which allows for greater learner autonomy once the problem is introduced, Guided Inquiry requires structured phases of questioning, investigation, and teacher facilitation at nearly every step (Raker et al., 2020). In practice, this may reduce the amount of time students spend engaging independently in deeper thinking processes, especially in contexts with rigid curricular schedules or time constraints. As such, while Guided Inquiry is a powerful method when implemented with adequate time and resources, its full potential may be curtailed under typical classroom limitations.

Another key factor influencing the efficacy of each method is the cognitive maturity of the learners. The participants in this study were Grade XI students, who are generally more cognitively developed and better able to manage abstract reasoning, independent learning, and collaborative problem-solving. Research by Harris et al. (2022) supports the idea that Guided Inquiry Learning is better suited for early learners, as it provides the necessary structure and support for younger students

still developing metacognitive awareness. In contrast, PBL aligns well with older students who are transitioning into more self-regulated forms of learning. The constructivist foundations of both methods underscore the importance of matching pedagogical strategies with the learner's developmental stage, which this study confirms.

From a broader pedagogical and policy-oriented lens, the study's results emphasize the urgent need for educators and curriculum designers to adopt learning models that prioritize student agency, inquiry, and real-world relevance. In the context of economics education, particularly in topics such as the roles of economic actors in various systems, PBL offers a dynamic and applicable strategy. Students must not only comprehend economic concepts but also apply them to analyze cause-effect relationships, predict outcomes, and critique policy, activities that demand critical thinking. By grounding instruction in real-life problems, teachers can foster deeper conceptual understanding while simultaneously preparing students for future challenges that require sound reasoning and decision-making.

Furthermore, these findings advocate for the integration of blended approaches in which PBL is complemented by inquiry-based tasks, allowing educators to leverage the strengths of both strategies while mitigating their limitations. For instance, a unit might begin with structured inquiry to build foundational knowledge, followed by a PBL cycle to apply that knowledge to novel, authentic contexts. This hybridization could enhance engagement, deepen learning, and cultivate both independence and collaboration.

Finally, the outcomes of this research contribute to the broader discourse on 21st-century skills, particularly in fostering critical thinking, creativity, communication, and collaboration (4Cs), as emphasized in global educational frameworks such as UNESCO's Education 2030 Agenda and OECD's Learning Compass 2030. As critical thinking becomes a non-negotiable skill in the modern knowledge economy, the implementation of PBL and Guided Inquiry Learning takes on renewed urgency and importance.

## CONCLUSION

Based on the comprehensive analysis of quantitative data and the critical discussion of findings, it can be concluded that the implementation of Guided Inquiry Learning and Problem-Based Learning (PBL) both contribute significantly to the enhancement of students' critical thinking abilities. The two methods, grounded in constructivist learning theory, promote active student participation, intellectual engagement, and the construction of knowledge through exploration and problem-solving, elements that are essential for fostering higher-order thinking skills.

The findings revealed a statistically significant improvement in students' critical thinking scores in both experimental groups. The measurable progress from pretest to posttest validates that student-centered instructional approaches are not only effective but also necessary in modern classrooms, especially as educators shift away from traditional, teacher-centered methods. These results align with a growing body of international literature emphasizing the benefits of active learning in promoting deep cognitive engagement and long-term retention.

Despite both methods being beneficial, the Problem-Based Learning (PBL) model emerged as the more effective strategy in this study. Students taught using the PBL method exhibited higher mean gains and greater normalized gain scores (N-Gain), suggesting a more substantial improvement in critical thinking skills. The strength of PBL lies in its design, which places students at the center of learning as problem solvers, decision-makers, and knowledge constructors. By confronting real-world and often complex problems, students are required to apply analytical reasoning, collaborate with peers, seek information independently, and reflect critically on their learning processes. This immersive approach equips students not only with academic competencies but also with essential life skills such as adaptability, resilience, and strategic thinking.

In contrast, Guided Inquiry Learning, while still producing positive outcomes, showed a comparatively lower effectiveness in this study. This can be attributed to the method's higher dependence on teacher scaffolding and structured guidance, which, although beneficial in helping students gradually build understanding, may limit opportunities for students to take initiative and exercise autonomy. Additionally, Guided Inquiry requires more instructional time and careful classroom management, which can be challenging to implement consistently in time-constrained or rigidly scheduled school environments.

The results also highlight the importance of learner readiness and developmental stage in determining the success of an instructional method. Senior high school students, such as those in Grade XI, are generally more cognitively mature and capable of engaging in independent inquiry and abstract thinking. Therefore, they may respond more positively to the autonomy and complexity embedded in PBL compared to younger learners. This supports theoretical assertions by scholars such as Ünver & Arabacıoğlu (2011), who argue that Guided Inquiry is more suitable for earlier educational levels, while PBL aligns better with the needs of more advanced learners.

From an educational practice and policy standpoint, the findings of this research imply that teachers, curriculum planners, and educational stakeholders should consider adopting PBL as a core instructional strategy, particularly in subjects

like economics, science, and social studies that require critical analysis, problem-solving, and interdisciplinary understanding. Embedding PBL frameworks into the curriculum can empower students to become active, lifelong learners who are equipped to navigate the complexities of the modern world. Moreover, integrating PBL into teacher training and continuous professional development is essential to ensure that educators possess the skills and pedagogical confidence to facilitate this form of learning effectively.

At a broader level, this study underscores the critical need to align instructional strategies with 21st-century educational goals, which emphasize creativity, critical thinking, collaboration, and communication. As global education systems aim to prepare students for unpredictable futures, methods like PBL offer a transformative pathway toward achieving this vision. While Guided Inquiry Learning should not be dismissed, its implementation must be strategic and responsive to classroom realities and student profiles.

In conclusion, the research affirms that both Guided Inquiry Learning and Problem-Based Learning contribute to developing students' critical thinking skills. However, Problem-Based Learning demonstrates superior effectiveness, particularly when applied in cognitively demanding subjects and among students who are developmentally ready for independent learning. Educators are therefore encouraged to adopt PBL not just as a teaching technique, but as a philosophy of learning, one that prioritizes student agency, real-world relevance, and intellectual curiosity. Through thoughtful implementation of these strategies, schools can nurture a generation of thinkers who are not only academically capable but also prepared to engage meaningfully with the challenges of the 21st century.

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