Comparative Analysis of Guided Discovery and Guided Inquiry Models: Their Impact on High School Students' Analytical Thinking Abilities

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ABSTRACT
The importance of analytical thinking skills is vital in 21st-century learning and is a high-level skill required in the 2013 geography curriculum. Therefore, this skill is necessary in geography education to prepare students for everyday life challenges. Efforts to influence it can be made through the guided discovery and guided inquiry models. Both models require students to actively participate in learning activities to acquire analytical thinking skills. The aim of this study is to compare these two models to determine which is superior in developing students' analytical thinking abilities. The researcher employed a quasi-experimental design with a posttest-only control group design. The research subjects were students of grade 11 IPS 1 as experimental class 1 and 11 IPS 2 as experimental class 2, with the research conducted at SMAN 8 Malang. Students' analytical thinking abilities were measured using 11 valid and reliable essay questions. Data analysis utilized an independent sample t-test. The t-test results showed a significance level of 0.034, which is less than 0.05, thus leading to the rejection of H0 and acceptance of H1. It is concluded that there is a difference in the analytical thinking abilities of experimental class 1 and experimental class 2 students. The results also indicate that the guided inquiry model is superior to the guided discovery model. This superiority is attributed to the hypothesis formulation stage in the guided inquiry model, which effectively enhances students' analytical thinking abilities.

KEYWORDS
Analytical Thinking Skills; Guided Discovery; Guided Inquiry

INTRODUCTION
Students are required to possess analytical skills as they are crucial aspects of the learning process in the 21st-century learning paradigm, particularly in the 2013 Indonesian curriculum (Itsnaini et al., 2024). This requirement aligns with the statement of the Ministry of Education and Culture, which emphasizes students'
abilities to search for information from various sources, formulate problems, think analytically, and collaborate to solve problems. Another reason is that analytical thinking is one of the higher-order thinking skills, as expressed by Krathwohl and Anderson (2010), who state that high-level thinking consists of analysis, evaluation, and creation. This opinion is supported by Suwarto (2013), who suggests that students' thinking abilities consist of six levels: remembering, understanding, applying, analyzing, evaluating, and creating. Furthermore, analytical thinking skills are essential for students in the 2013 geography curriculum (Putra et al., 2021). This curriculum includes Core Competencies (CC) which encompass Basic Competencies (BC) for analysis in grades 10, 11, and 12. According to Koswara (2015), the 2013 geography curriculum requires students to have the intelligence to analyze the environment, readings, and the problems they face.

Efforts to enhance students' analytical skills are applied in learning activities through various learning models. Recommended learning models in the 2013 curriculum include inquiry-based learning, guided discovery, Problem-Based Learning (PBL), and Project-Based Learning (PJBL) (Syawaludin et al., 2022; Saputro et al., 2023; Nurani et al., 2024). These models can influence students' analytical thinking skills by requiring active participation in learning activities from the beginning to the end of the learning process (Fitriani et al., 2020). For instance, in PBL, students tackle real-world problems, encouraging continuous engagement and application of analytical skills throughout the project.

This study focuses on two models: guided discovery and guided inquiry. Both models are consistent with constructivism theory, wherein students are required to be active and capable of learning independently during learning activities. According to Winaputra (2007), constructivism theory posits that students use their experiences to build their understanding independently regarding phenomena, cognitive structures, and beliefs. Both guided discovery and guided inquiry emphasize student-centered learning, where students play an active role in every activity within the learning model's syntax (Nissa & Hawa, 2024). For example, in guided discovery, students independently search for information under teacher guidance, while in guided inquiry, they systematically investigate, analyze, and seek information or knowledge (Asmoro & Prayitno, 2021; Kurniawati et al., 2024).

Comparative research on these models necessitates reviewing previous studies. Shofi Amaliyah Majid conducted a comparative study in 2017 on guided discovery and guided inquiry models in geography subjects, focusing on the critical thinking skills of grade 11 students at MAN 3 Malang. This current research modifies Majid's study by focusing on analytical thinking skills as the dependent variable instead of critical thinking skills.

Given the importance of analytical thinking skills in 21st-century geography education, these skills prepare students for complex thinking, decision-making, and solving spatial-related problems (Yulianti, 2024). Efforts to improve analytical thinking skills can be implemented through several recommended learning models of the 2013 curriculum, including guided discovery and guided inquiry (Maknun, 2020). Guided discovery involves students actively in independent information or knowledge searches under teacher guidance, developing analytical thinking during problem-solving activities (Suryanti et al., 2020). In contrast, the guided inquiry model involves students in systematically investigating, analyzing, and logically seeking information or knowledge, enhancing their analytical thinking skills through hypothesis formulation and inquiry stages (Novitira et al, 2021). This
research aims to determine whether guided discovery or guided inquiry more effectively enhances students' analytical thinking skills in geography.

**METHOD**

A quasi-experimental design was utilized in this study, employing a posttest-only control group design. The researcher chose this design because it involved two variables: the teaching models (guided discovery and guided inquiry) and the students' analytical thinking abilities. The aim was to assess the influence of these teaching models on students' analytical thinking skills rather than to observe improvement over time.

Classes E1 and E2 were subjected to different treatments; in experimental class 1, students were exposed to guided discovery activities, whereas in experimental class 2, students experienced guided inquiry. Following these treatments, both classes were administered a posttest consisting of questions weighted equally related to analytical thinking skills. The posttests aimed to discern whether there were differences in students' analytical abilities taught using different models in grade 11 IPS at SMAN 8 Malang.

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>Measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1</td>
<td>X1</td>
<td>O</td>
</tr>
<tr>
<td>E2</td>
<td>X2</td>
<td>O</td>
</tr>
</tbody>
</table>

Explanation:
E1: Experimental Class 1
E2: Experimental Class 2
X1: Treatment in the Form of Guided Discovery Learning Model
X2: Treatment in the Form of Guided Inquiry Learning Model
O: Analytical Thinking Ability Test

The research targeted students in grade 11 IPS 1 and 2 at SMAN 8 Malang in the academic year 2019/2020. The subjects were selected based on nearly identical mid-term exam scores of 84.55 and 84.56, with a difference of 0.01. This research employed random sampling, with class 11 IPS 1 designated as experimental class 1 with 34 students and class 11 IPS 2 designated as experimental class 2 with 34 students.

The instrument used to measure analytical thinking skills consisted of essay questions. Essay questions were chosen because they allow students to demonstrate their ability to provide short answers or reasons regarding problems, utilize data to explain answers, draw conclusions based on research or investigation results, and propose appropriate solutions.

Instrument validation was conducted in class 12 IPS 1 at SMAN 8 Malang with a population of 25 students (N=25). The methods used for validation included item analysis to assess the correlation between individual items and the overall test score. Based on the validity test results, it was found that the calculated r value was greater than the tabulated r value (0.397), indicating the validity of the research instrument and its suitability for testing in classes E1 and E2. Additionally, the reliability test yielded a Cronbach's alpha value of 0.715, indicating the instrument's reliability.

Data analysis utilized an independent t-test with two hypotheses. The first hypothesis test was conducted using SPSS 22.0 software with a formulation of
the null hypothesis. Meanwhile, the second hypothesis test examined the mean scores of each class. The two hypotheses in this study are elaborated below.

1. Hypothesis One

H0: There is no difference in analytical thinking ability scores between students taught using guided discovery and those taught using guided inquiry.

H1: There is a difference in analytical thinking ability scores between students taught using guided discovery and those taught using guided inquiry.

The significance level for the t-test was set at 0.05, with the following criteria:

- If the significance level (2-tailed) ≤ (0.05), then H0 is rejected and H1 is accepted.
- If the significance level (2-tailed) > (0.05), then H1 is rejected and H0 is accepted.

2. Hypothesis Two

H0: The analytical thinking ability scores of students taught using guided inquiry are not higher than those taught using guided discovery.

H1: The analytical thinking ability scores of students taught using guided inquiry are higher than those taught using guided discovery.

The significance level for the second hypothesis test involved examining the mean scores of the two classes subjected to different treatments. This hypothesis test was conducted after assessing normality using the Kolmogorov-Smirnov test, with a significance level > 0.05, and homogeneity using the Levene test, with a significance level > 0.05. Both tests utilized data from the posttest responses.

RESULT AND DISCUSSION

Hypothesis One

After conducting prerequisite tests, hypothesis testing was carried out with two hypotheses. The first hypothesis utilized an independent sample t-test to determine whether H1 was accepted or rejected. The second hypothesis was examined by comparing the means of each class to identify which model was superior in influencing analytical thinking abilities. The following sections elaborate on both hypotheses in this study.

Table 2. Result of the First Hypothesis Independent Samples Test Calculation

<table>
<thead>
<tr>
<th>Levene’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Sig.</td>
<td>T</td>
</tr>
</tbody>
</table>

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Based on the t-test analysis results in Table 2, the significance value or probability yielded a result of $0.034 \leq 0.05$. Therefore, $H_0$ was rejected, and $H_1$ was accepted. This indicates a difference in analytical thinking abilities between students taught using guided discovery and guided inquiry in geography classes in grade 11 IPS at SMAN 8 Malang. The difference in analytical thinking abilities between the two experimental classes was influenced by the differing treatments they received. Specifically, experimental class 1 engaged in guided discovery learning activities, while experimental class 2 participated in guided inquiry.

The guided inquiry model emphasizes providing guidance to students in understanding knowledge or concepts through investigative activities. This is supported by Dewi's et al (2013) assertion that students' understanding of subject concepts using the guided inquiry model is superior due to the abundant guidance provided during the learning process. Similarly, the guided discovery model also provides guidance to students in their learning activities, consistent with Rinanto's (2015) statement that in the guided discovery model, students receive guidance from teachers to better understand a lesson.

The differences in students' analytical abilities in experimental classes 1 and 2 stem from variations in the stages of guided discovery learning and guided inquiry learning activities. The discrepancies in the learning stages between experimental classes 1 and 2 are a trigger for the differences in students' analytical thinking abilities. In the guided inquiry model, students are required to gather various information from various sources before conducting field investigations. This is supported by Marlina's (2019) assertion. Marlina notes that in the guided inquiry model, students collect information before conducting investigations, whereas in guided discovery, this step is not included before the discovery activity.

**Hypothesis Two**

**Table 3. Results of the Second Hypothesis Testing Calculation**

<table>
<thead>
<tr>
<th>Kelas</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students' Analytical Thinking Ability Results</td>
<td>Guided discovery</td>
<td>34</td>
<td>80,2053</td>
<td>9,18516</td>
</tr>
<tr>
<td></td>
<td>Guided inquiry</td>
<td>34</td>
<td>84,7076</td>
<td>9,58223</td>
</tr>
</tbody>
</table>

Table 3 displays the mean results for experimental class 1 at 80.20, while the mean for experimental class 2 is 84.70. This indicates that the mean score of students receiving guided inquiry treatment is higher than that of students in guided discovery classes. Thus, the second finding of this research concludes that the guided inquiry teaching model is superior to guided discovery in influencing students' analytical thinking abilities (Adnan et al., 2021).

The guided inquiry model is more effective in influencing analytical thinking abilities because it includes a stage where students formulate hypotheses. Formulating hypotheses enables students to construct their initial knowledge, as supported by Rahmaniar (2016), who asserts that hypothesis formulation can be a valuable tool in developing students' analytical thinking skills.
stimulate students' critical and analytical thinking abilities. This is also supported by Gulo in Trianto (2011), stating that the inquiry model is a series of learning activities that maximize each student's ability to systematically, logically, critically, and analytically search and investigate. This allows students to independently and confidently formulate their findings.

The stages in the guided inquiry learning model lead to the emergence of numerous ideas during the hypothesis formulation stage. Ideas emerge because during hypothesis formulation, students have more opportunities to exchange ideas, express temporary assumptions about problems, gather various ideas, and even combine ideas from all group members to produce comprehensive information. Therefore, the more ideas gathered, the easier it is for students to solve a given problem. This aligns with Abidin's (2014) statement that inquiry is a learning model designed to encourage students to discover and use various sources of information and ideas to develop their understanding of specific problems or issues.

Guided inquiry's stage-based learning process is effective for students, while guided discovery is only effective at the end of the discovery process. For example, in guided inquiry, students are engaged in activities that involve forming hypotheses, conducting investigations, and drawing conclusions throughout the process (Wen et al., 2020). In contrast, guided discovery typically involves students receiving information and understanding only at the end of the learning activity. This is in line with Sanjaya (2007), who states that this learning model emphasizes students acquiring information or knowledge through investigation using both critical and analytical thinking skills to independently find answers to problems. Similarly, Buterm et al. (2012) suggest that inquiry-based learning involving investigation makes students enthusiastic and eager to engage in investigative learning activities. Students understand that conducting investigative experiments is a way to obtain answers based on formulated problems, thereby motivating them to engage in learning activities through investigation. Moreover, students are enthusiastic because they can solve problems in their environment. This is also supported by research conducted by Amabarwati (2015), indicating that inquiry-based learning models significantly increase students' learning motivation, as students are given the opportunity to learn something real.

This research is supported by previous studies that explored the relationship between inquiry-based learning models and guided discovery models. For example, Nurul Laila found that guided inquiry had an impact on analytical thinking abilities concerning students' geography learning interests in one of the MA schools in Singosari (Laila, 2019). Another study by Roby Kurniawan concluded that the guided inquiry learning model influenced students' analytical thinking abilities at MAN Kota Batu (Kurniawan, 2019). Based on the aforementioned statements, it is evident that this research is relevant to previous theories and research findings. In this study, the guided inquiry model excelled over the guided discovery model in the “Population Quality and Human Development Index” core competency.

CONCLUSION

Based on the research findings, two main conclusions were drawn. The first finding indicates a significant difference in students' analytical thinking abilities when taught using the guided discovery and guided inquiry learning models, with
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guided inquiry being more effective. The discrepancy in analytical thinking abilities between experimental classes 1 and 2 leads to the conclusion that guided inquiry is superior to guided discovery in influencing students' analytical thinking abilities in grade XI IPS at SMAN 8 Malang. There is a suggestion for further research: it is advisable to innovate within the guidelines of the stages of learning models, especially discovery and inquiry, when conducting research using online methods. This consideration is particularly relevant given that this study was conducted during the early stages of the COVID-19 pandemic.

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