

### The influence of the guided inquiry method and critical thinking on the learning outcomes of culinary arts in class X high school students

Wawan Gunawan<sup>\*</sup>, Yunus Karyanto, Yoso Wiyarno<sup>®</sup>, Atiqoh<sup>®</sup>, Suharti, Harwanto Sekolah Pascasarjana Universitas PGRI Adi Buana Surabaya Jl. Dukuh Menanggal XII Kota Surabaya, 60234, indonesia \*Corresponding author, e-mail: wawan.gunawan@unipasby.ac.id

### **ARTICLE INFO**

ABSTRAK

*Article history: Received: 08-11-2023 Revised: 11-12-2023 Accepted: 08-01-2024* 

### Kata kunci:

metode guided inquiry; berpikir kritis; hasil belajar tata boga

### **Keywords**:

guided inquiry method; critical thinking; culinary learning outcomes



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Copyright ©2024 by Authors. Published by Universitas Negeri Malang. Pembelajaran yang memberikan pengalaman dan partisipasi siswa adalah pembelajaran inkuiri karena pembelajaran inkuiri menuntut siswa untuk melakukan aktivitas, mengamati, menganalisis, dan menarik kesimpulan dari aktivitas yang diamati. Artinya, metode inkuiri dapat mengembangkan kemampuan berpikir siswa sehingga menuntut siswa untuk mengambil inisiatif dalam memecahkan masalah. Tujuan dari penelitian ini adalah untuk mengetahui apakah adapengaruh hasil belajar tata boga antara yang menggunakan metode guided inquiry dan metode ekspositori pada siswa yang mempunyai kemampuan berpikir kritis berbeda. Penelitian ini menggunakan rancangan kuasi eksperimental faktorial 2X2. Hasil penelitian ini menghasilkan simpulan sebagai berikut: Ada perbedaan hasil belajar tata boga siswa yang memiliki kemampuan berpikir kritis tinggi dengan kemampuan berpikir kritis rendah dan ada interaksi antara penerapan metode guided inquiry dan kemampuan berpikir kritis terhadap hasil belajar tata boga siswa. Berdasarkan temuan penelitian, dapat disimpulkan bahwa penggunaan metode guided inquiry dan keterampilan berpikir kritis dapat meningkatkan hasil belajar tata boga siswa SMA Kelas X.

### ABSTRACT

Learning that provides student experience and participation is inquiry learning because inquiry learning requires students to carry out activities, observe, analyze, and draw conclusions from the activities observed. This means that the inquiry method can develop students' thinking abilities so that it requires students to take the initiative in solving problems. This research aims to determine whether there is an influence on culinary learning outcomes between those using the guided inquiry method and the expository method on students with dissimilar critical thinking abilities. This research uses a 2X2 factorial quasi-experimental design. The following conclusions are from the results of this research: There are differences in the culinary learning outcomes of students who have high critical thinking abilities and those with low critical thinking abilities, and there is an interaction between the application of the guided inquiry method and critical thinking abilities on students' culinary cooking learning outcomes. Based on research findings, it concluded that the use of guided inquiry methods and critical thinking skills can improve culinary learning outcomes in Class X high school students.

### **INTRODUCTION**

One of the problems that schools often face is weak learning processes. Children are not encouraged to develop critical thinking skills during the learning process. The classroom learning process is designed to develop children's ability to retain information. Even when students achieve good results in a few subjects, they often seem less able to apply the knowledge, skills, or creativity they have acquired. The success of the learning process is reflected in changes in attitudes and behaviors and an improvement in the level of knowledge from not knowing to knowing (Gesy et al., 2023; Hidayatullah et al., 2023).

The success of a learning goal depends on many factors. For example, teachers play an essential role in the teaching process because teachers can directly influence, develop, and improve students' intelligence and skills (Ibnu, 2020; Karmana et al., 2020; Muhammad et al., 2023). To overcome students' problems, the role of teachers is paramount, and we expect teachers to have good teaching methods/models and be able to choose the appropriate learning model consistent with the subject concepts presented. Studying a culinary arts subject is more than just teaching facts and concepts; it must also train students to discover those facts and concepts. Students not only understand facts, concepts, or principles but also can skillfully apply the knowledge they have learned to deal with problems in life and technology, thereby improving students' process capabilities (Alfiana et al., 2021; Fitriyah & Ramadani, 2021; Sitorus & Nazaruddin, 2021).

One type of learning that provides student experience and involvement is inquiry learning because, in inquiry, students are required to carry out activities, observe, analyze, and draw conclusions from the activities observed (Guo et al., 2021; Ng et al., 2022; Raes et al., 2012). This means that the inquiry learning method provides opportunities for students to gain experience investigating problems themselves using skills that are by the scientific method. The inquiry method can develop students' thinking skills, so students are required to be active in solving problems (Gunawan & Cholid, 2023; Kaczkó & Ostendorf, 2023; Lee et al., 2021). In addition, the discussion method aims to actively involve students and provide meaningful experiences for students so that learning objectives are well achieved. In addition, students can implement the material learned in class into their daily activities.

By doing research methods, students are to discover concepts and develop scientific processing abilities independently. However, the typical problem is students' lack of interest in participating in the teaching process. Cooking subjects, in particular, tend to be monotonous as the learning uses only expository learning (Nurdin et al., 2021; Oktaviani et al., 2018; Siswondo & Agustina, 2021). Thus, students are less skilled in independently finding knowledge or information, and most students lack an active role during the lesson, so it is difficult to grasp the learning materials (Hardiyanto et al., 2018; Suharto, 2021; Togala, 2015). In addition, students gain the opportunity to improve their understanding of the material being taught through inquiry-based learning to gain additional critical thinking skills, ultimately leading to better student learning outcomes. This results in attitudes and actions that mobilize all students' abilities for systematic, critical, logical, and analytical exploration and investigation so they can confidently articulate their findings.

Previous studies show that no one has specifically studied the guided inquiry method to improve culinary learning outcomes in depth. Existing research on the guided inquiry method has emphasized partial learning outcomes in mathematics, Indonesian, and natural sciences (Gunawan & Cholid, 2023; Guo et al., 2021; Kaczkó & Ostendorf, 2023; Lee et al., 2021; Ng et al., 2022; Raes et al., 2012) which is slightly associated with critical thinking, culinary learning outcomes, and expository methods. Meanwhile, this research will contribute to a greater focus on the guided inquiry method and critical thinking on culinary learning outcomes for class X students, seen as one method for dealing with various problems in teaching and learning activities for the class.

### METHOD

This study adopted a quasi-experimental design method to treat the two sample groups differently to make them homogeneous. There were two groups: the control and the experimental (see Table 1). At the end of the study or after treatment, the control and experimental groups were tested to determine the students' learning success.

Critical Thinking Skills	Learning Methods			
Chucai Thinking Skins –	Guided inquiry learning	uiry learningExpository learningY1Y3		
High	Y1	Y3		
Low	Y2	Y4		

### Table 1. Research design

### **Description**:

- Y1 : Student learning outcomes in culinary arts subjects in classes taught using guided inquiry learning for students with high critical thinking abilities
- Y2 : Student learning outcomes in culinary arts subjects in classes taught using guided inquiry learning for students with low critical thinking abilities
- Y3 : Student learning outcomes in culinary arts subjects in classes taught using expository learning for students with high critical thinking abilities
- Y4 : Student learning outcomes in culinary arts subjects in classes taught using expository learning for students with low critical thinking abilities

The population in this study were class X high school students. The sample in this study were class X students selected by random sampling from 4 classes of class X high school students, a sampling technique that gives the population an equal opportunity to be chosen. The data collection methods used in this research were (1) questionnaire methods (Table 2); and (2) test methods (Table 3). The data measurement technique used by researchers was a Likert scale, and the data analysis used in this research was multiple regression analysis techniques.

No	Variable		Aspects	Indicators		No. Items	Number of Items
A	Inquiry Guide Learning	1.	Orientation	1) 2)	Presentatthe learning topics Observethe object of investigation	1, 2	2
		2.	Formulate problems	3) 4)	Identify the problem Ask and answer questions about the problems found	3, 4	2
		3.	Propose a hypothesis	5)	Make a hypothesis	5	1
		4.	Collect data	6) 7)	Direct the use of learning resources, tools, and research materials that have been provided. Conduct an investigation based	6, 7	2
		5.	Test hypotheses	8) 9)	on the LKS Discuss with the group Prove the hypothesis with the results of the investigation	8, 9	2
		6.	Formulate	10)	10) Present the results of the		4
			conclusions	11) 12) 13)	investigation. Present the results of the investigation in front of the class Conclude the results of the investigation Summarize the material with students	12, 13	
	Total Items						13

### Table 2. Observation sheet grid for application of inquiry guide learning

No	Variable		Indicators	No. Items	Number of Items
A	Critical Thinking Ability	1)	Provide a very simple explanation	1, 2, 3	3
		2)	Build in considering sources that can be trusted	4, 5	2
		3)	Conclude, such as considering the results of deductions, making and determining the results of considerations	6, 7, 8	3
		4)	Provide further explanation	9, 10, 11, 12	4
		5)	Arrange strategies and tactics in determining an action	13, 14, 15	4
			Total Items		15

#### Table 3. Test grid for critical thinking ability instruments

### RESULTS

The research was conducted on class X high school students, namely: (1) classes XA and XB in 2 classes, and 66 students in classes XC and XD in 2 classes. In this research, each class was subjected to the same experiment where both guided inquiry and expository methods were applied, as we can see in Table 4 and Figure 1.

### Table 4. Research sample

Between-Subjects Factors						
		Value Label	Ν			
Learning methods	1.00	Guided inquiry learning	66			
	2.00	Expository learning	66			
Critical thinking skills	1.00	High	115			
	2.00	Low	17			



Figure 1. Differences in critical thinking ability levels between students in the experimental class and the control class

After each class experienced the learning process, they achieved treatments or experiments using guided inquiry and explanation methods. From the learning process of each class, it was evident that whether it is guided inquiry or interpretive method, students' critical thinking ability is higher, while students' critical thinking ability is low. The descriptive results of this experimental class are in Table 5 and Figure 2. The 2-factor variance analysis carried out is in Table 6.

Descriptive statistics   Dependent variable: results of learning of culinary arts					
Guided inquiry	High	76.5789	4.24242	57	
learning	Low	80.0000	.00000	9	
	Total	77.0455	4.11164	66	
Expository learning	High	61.3276	2.08072	58	
	Low	52.3750	2.61520	8	
	Total	60.2424	3.63344	66	
Total	High	68.8870	8.34641	115	
	Low	67.0000	14.31782	17	
	Total	68.6439	9.27702	132	



Figure 2. Differences in average student learning outcomes

Table 6. Output of multiple linear regression							
Tests of between-subjects' effects Dependent variable: results of learning of culinary arts							
Source	squares	Df	Mean square	F	Sig.		
Corrected model	9971.720ª	3	3323.907	326.637	.000		
Intercept	269668.112	1	269668.112	26500.046	.000		
Method	6786.294	1	6786.294	666.883	.000		
Critical thinking	112.950	1	112.950	11.100	.001		
Method * Critical thinking	565.186	1	565.186	55.540	.000		
Error	1302.546	128	10.176				
Total	633257.000	132					
Corrected total	11274.265	131					
A. R squared = .884 (adjusted r squared = .882)							

# Table 5 indicates that when there are more students with expository teaching and more students with higher critical thinking skills, guided inquiry and expository teaching methods can improve students' learning outcomes, but better results are achieved with guided inquiry. Based on the inquiry-based class, there were 66 students with high critical thinking skills, and the Total Test Score was 77.0455. Meanwhile, the illustrative method yields a value of 60. 2424. However, in general, the ratio of

students with high critical thinking skills dominates in these two lessons, namely 115 out of 132 students, while those with low critical thinking skills are 17 out of 132 students.

Table 6 explains factor A (guided inquiry and explanation method), factor B (critical thinking), and factor A and factor B. These three factors explain the relationship between the learning methods and critical thinking, influences, and interactions. The thinking ability shows the following results: (1) In the learning method, Sig value = 0.000, significance level  $\alpha$  = 0.05, and Sig value < 0.05, so H0 is rejected. This means that better culinary learning outcomes can be achieved using guided inquiry methods compared to prescriptive methods; (2) In the learning method, the significance value = 0.001, the significance level  $\alpha$  = 0.05, and the significance value < 0.05, so H0 is rejected. This means that better was an impact that students with high critical thinking skills achieve better learning outcomes in culinary arts subjects compared to students with low critical thinking skills; and (3) for learning method, the significance value = 0.000, The significance level is  $\alpha$  = 0.05, and the Sig value is < 0.05, so H0 is rejected. This means that the interaction between critical thinking skills and classroom culinary learning outcomes was better for students taught using a prescriptive approach than for students with high or low critical thinking skills.

### DISCUSSION

### Application of guided inquiry learning and expository learning

The research conducted at one research location, namely class X high school students, was an effort to improve the planning, process, and implementation of the learning in the classroom. In addition, it explores students' potential in teaching and learning activities in the classroom. Next, the guided inquiry and expository methods were implemented in each school. This was because we wanted to examine the effectiveness of the learning, not the school as the research location.

At the beginning of the study, students' learning outcomes in the class were compared with the content to be studied, that is, students' learning outcomes in the culinary arts subject. After the experiments in each class per the research phase, the findings show improvement in the student's learning outcomes in the culinary subject. This was evident from the descriptive computational results of each learning model applied before and after this learning. In general, the application of guided inquiry can provide information about student activities in the teaching and learning process in the classroom (Hasyda, 2021; Pardosi, 2020; Sari & Masri, 2020). The improvement in the learning outcomes of the students in the culinary subject of the two schools where the study was conducted can be described as significant, as evidenced by the mean difference test with a significance value below 0.05; thus, the difference in the learning of the students by the students in the culinary subject. The results achieved at both study sites are significant (the differences cannot be ignored). This shows that after the experiment, there will be noticeable changes or improvements in students' learning outcomes in the culinary arts subject compared to the initial condition.

In addition to using the mean difference test for calculations, the calculation results of the two-way ANOVA show that the calculated FA value is larger than the F table, and its significance value is smaller than 0.005, which means the two sections in each school. There were differences in the student learning outcomes related to culinary classes, with guided inquiry improving student learning outcomes in the culinary arts subject category more than the prescriptive approach used in other classes. This is evident in the final test results of each student achieved after implementing the learning method. The results of this calculation show that the proposed hypothesis is acceptable, namely that there are differences in student learning outcomes in culinary arts subjects in class X taught using guided inquiry learning and expository learning in class X SMA. The application of guided inquiry improved student learning outcomes in culinary arts subjects compared to the expository method. This is inseparable from the advantages and benefits of guided inquiry itself (Guo et al., 2021; Kaczkó & Ostendorf, 2023; Lee et al., 2021). The benefits of using this inquiry method to learn are as follows: (1) It can form and develop students' "self-concept" so that students can better understand basic concepts and ideas; (2) It helps in the application of memory and transfer to adapt to new learning process context; (3) It encourages students to think and work proactively, objectively, honestly, and openly; (4) It encourages students to think intuitively and come up with their hypotheses; (5) It ensures intrinsic satisfaction, (6) It stimulates learning process context, (7) It can develop personal talents or skills; (8) It gives students the freedom

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to study independently; (9) It causes students avoid traditional learning methods; and (10) It gives students enough time to learn, absorb, and process information.

In addition, through the teaching and learning process based on inquiry, students are allowed to experience for themselves or do it themselves, follow a process, observe an object, analyze, prove, and draw their conclusions regarding an object, situation, or process of something (Gorat & Haryadi, 2020; Nuayi, 2020; Sitorus & Surya, 2020) so that it can foster interest and motivation in students so that students are motivated to continue studying and observing objects until they discover the underlying concepts of the materials. Meanwhile, in the expository method, students have less active involvement in learning. This is less able to foster students' interest and motivation to learn, so students tend to be passive (Hardiyanto et al., 2018; Nurdin et al., 2021; Oktaviani et al., 2018).

## Culinary learning outcomes for students with high critical thinking abilities and low critical thinking abilities

A study on students' critical thinking skills found a difference in the learning outcomes of Class X students with higher critical thinking skills in culinary subjects compared to Class X students. Overall, the application of guided research positively impacted student learning outcomes in the Culinary Arts discipline and was valued by students, as evidenced by the number of students with high critical thinking skills in the two applied courses. However, student learning outcomes in culinary arts subjects are achieved through the application of this learning. Guided inquiry can lead to better student learning outcomes in culinary arts subjects compared to expository methods. Any learning method, especially guided inquiry, can explain the better learning outcomes of students with high critical thinking in culinary arts subjects than students with low critical thinking. Likewise, the prescriptive approach also focused on students with high critical thinking skills, who achieved better learning outcomes than students with low thinking skills.

The mean difference test found that the difference is very significant, with a significance value of less than 0.05, which means that there are differences in the academic performance of the culinary arts subject of Class X among the students of Class X. Regarding critical thinking skills, grade X has a higher proportion of students with lower critical thinking skills. This can be explained by the fact that students' learning outcomes in culinary arts subjects are affected by their critical thinking, with students with higher critical thinking skills improving their learning and learning activities by implementing targeted questions to achieve Learning Objectives Discuss, analyze arguments, and ask questions, being able to answer questions about interpretation or questioning, can check the credibility of sources, observe and consider observations, draw conclusions and consider the consequences of conclusions, draw conclusions and weigh them, know the consequences of induction, make decisions and consider consequences, recognize terms and consider definitions, identify assumptions, and think carefully about the course of decisions taken.

In addition, critical thinking in the teaching and learning process will encourage students to analyze and reflect on the results of their thinking. Undoubtedly, there is a need for clear observation as well as exploration and inquiry activities to collect accurate information that makes it easy to see whether or not a regularity or something striking occurs (Launuru et al., 2021; Situmorang et al., 2022; Suhirman et al., 2021). In short, someone who thinks critically will always be sensitive to the information or situation they are facing and tend to react to that situation or information. Based on the above description, it can be explained that the second hypothesis is acceptable; there is a difference in the learning outcomes of the culinary arts subject between students with high critical thinking skills and students with low critical thinking skills in Class X.

### Interaction of learning methods and critical thinking skills

Based on the two-factor analysis of variance, the calculated FAB score>F-table, the significance level is less than 0.05 (5%), so it was declared that there was an interaction between the critical thinking skills and guided inquiry learning methods on grade X high school with impact on students' culinary learning outcomes. Based on the research results, it can be explained that there has been an increase in student learning outcomes in culinary arts subjects in each learning application, either using guided inquiry or using the expository method. Students taught using guided inquiry have better learning outcomes in culinary arts subjects than those taught using the expository method. Each lesson encourages students to have high critical thinking skills manifested through planning, observing, and analyzing the learning activities that students have

gone through.In this study, students who experienced guided inquiry instruction primarily possessed higher critical thinking skills. However, in general, the two lessons applied have high critical thinking skills in both guided inquiry and expository methods, where its implementation can improve student learning outcomes compared to the initial abilities. Also, the guided inquiry learning outcomes in culinary arts subjects were higher than the expository method. This is inseparable from the fact that the guided inquiry provided has been carried out well in the research site school where students can implement the guided inquiry, and it appears to meet the student's learning needs and desires. Apart from that, guided inquiry fulfills the components related to the need to improve student learning outcomes. Guided inquiry learning undergoes the science phase, so it challenges the students with the process of observing, analyzing, and proving, so they must be able to develop the mindset or ability to think critically. This means that student's critical thinking skills will help them to reveal the problem or material being discussed (Berg et al., 2023; Lun et al., 2023; Ma et al., 2023).

This critical thinking ability will encourage students to improve their ability to ask questions, analyze observation results, and criticize opinions and experimental results so that it will provide students with experience in learning. Students will be able to master the knowledge and concepts of the material well. Based on the above description, it is hopeful that the guided inquiry approach can be helpful as a way to improve student culinary learning outcomes.

### CONCLUSION

Based on the results of the research and discussion carried out above, this research concluded that there are differences in the culinary learning outcomes of students who have high critical thinking abilities and those with low critical thinking abilities and there is an interaction between the application of the guided inquiry method and critical thinking abilities on students' culinary learning outcomes. In addition, the current research has many shortcomings and limitations, including the data generated that were only from the questionnaire based on the perception of the respondent's answers. Therefore, the conclusions drawn are based only on data collected through the written questionnaire instruments, not equipped with interviews. This study also suggests that research planning and critical thinking skills must be applied, particularly in culinary arts. It would be better if further research included not only culinary topics but also other precise materials about other languages.

### Author contributions

The authors made significant contributions to the study's conception and design. The authors were in charge of data analysis, interpretation, and discussion of results. The final manuscript was read and approved by the authors.

### Funding

There was no specific grant for this research from any funding organization in the public, private, or nonprofit sectors.

### **Conflict of interest**

The authors declare that there is no potential conflict of interest.

### Data availability statement

All data are available from the authors.

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