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Students' Perception of Guided Inquiry Learning in Physics Viewed from Collaboration Skills and Scientific Attitude

Hafiz Suhendra[1*], Yennita[1], Dedi Irawan[1]

[1] Department of Physics Education, Faculty of Teacher Training and Education, Universitas Riau, Riau, Indonesia.

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Corresponding Author:
Hafiz Suhendra
hafizhendra@gmail.com

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Abstract: This research aims to determine the students' perceptions of Guided Inquiry learning on physics and the effect of learning on collaboration abilities and scientific attitudes. This research is survey research. The subjects in this study consisted of 36 students from class X MIPA 1 MAN 1 Siak in the 2022/2023 academic year. The research instrument consisted of 20 statement items, including 8 Guided Inquiry statement items, 7 Guided Inquiry learning effects statement items on collaboration skills, and 5 Guided Inquiry learning effect statement items statement on students' scientific attitudes. Data on students' perceptions of Guided Inquiry learning were analyzed by descriptive analysis. The results of this study indicate that 39 students' collaboration abilities are in a low category and 40 students' scientific attitudes are in a low category. While the application of Guided Inquiry learning with a score of 59 is in the sufficient category. The conclusion of this study shows that the effect of Guided Inquiry learning on students' collaboration abilities is in a low category, the effect of Guided Inquiry learning on students' scientific attitudes is low and the use of Guided Inquiry learning has not been maximized so that it is necessary to use the Guided Inquiry learning model to improve collaboration abilities and scientific attitudes of high school students.

Keywords: Collaboration Skill; Guided Inquiry; Scientific Attitude; Student Perception

Introduction

The 21st century is a cognitive century marked by advances in the fields of technology, information, and communication quickly, rapidly, and broadly so that it has an impact on developments in various fields, especially in the fields of economics, culture, politics, and education (Ayu, 2019). The field of 21st-century education emphasizes various aspects of abilities and skills including creative thinking, critical and innovative thinking, problem-solving skills, communication, and collaboration skills (Nopilda & Kristiawan, 2018). Quality human resources in collaboration skills and mastery of technology can be improved, including through education (Purwati, 2020).

However, the reality is that Indonesia's education quality is relatively low and lagging behind other countries in the world (Agustang et al., 2021). One of the current educational problems is teachers' weak implementation of the learning process in educational units (Insani & Sunarti, 2018). Poor execution of the teaching and learning process that takes place in practically every subject of study, including physics studies (Lambonan et al., 2022).

The physics learning process places great emphasis on students as subjects in learning activities (Akbar & Noviani, 2019). This is to the implementation of the 2013 curriculum (Setiawati & Jatmiko, 2018). Physics learning without variation and innovation in learning impacts physics learning, which takes place only in the classroom without real media, so it uses very few experimental tools or educational technology (Andari, 2020). Learning that is often carried out conventionally can lead to low learning achievement and students' scientific attitudes because they do not familiarize students with real problems in everyday life (Malina et

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al., 2021). Teacher-centered learning also has an impact on the collaboration skills and communication skills of students who are in the low category (Taryono et al., 2019).

Collaborative abilities need to be developed more broadly and deeper to encourage learning together (Amalia, 2023; Nugroho et al., 2023; Saputri et al., 2022). The most important key in collaboration is listening and considering various points of view from one another in working as a solid team (Cholis & Yulianti, 2020). The scientific attitude of students also influences how students react to surrounding objects, other people, or events around them (Astalini et al., 2018). However, the reality of the physics teaching and learning process in schools sometimes does not match expectations (Wijaya et al., 2018). Analyzing learning needs is the most important task in learning planning carried out by the teacher (Malina et al., 2021). This is by the plans developed to address teaching and learning needs whose interactions are realized in learning (Marsa & Desnita, 2020; Mu'in et al., 2023).

Based on the description above, the researcher believes that there is a need for a learning model that fits the needs and characteristics of students. The purpose of this study is to present an analysis of students' needs for the application of guided inquiry and the effect of learning on collaboration abilities and scientific attitudes in Physics in high school.

Method

This research was conducted at Madrasah Aliyah Negeri 1 Siak. The study took place in October 2022. There were 36 students in class X MIPA 1, with 9 male students and 27 female students serving as the study's participants. In this study, dependent variables and independent variables are two different sorts of variables. Scientific attitude and collaboration ability as the dependent variable and the guided inquiry model is the independent variable.

This study used an instrument in the form of a student needs questionnaire to see the effect of scientific attitudes and collaboration abilities on the guided inquiry learning model. The questionnaire was given to each student in class X MIPA 1 with 20 open statement items with 8 statements about guided inquiry, 7 ability statement items about collaboration, and 5 scientific attitude statement items. The number of statement items can be seen in Table 1.

This research is a type of survey research using descriptive analysis. Descriptive research is a problem-solving step that can be investigated by describing or describing the current state of the object using facts that appear to be real as they are (Arikunto, 2019).

Table 1. The Number of Items in the Needs Analysis Questionnaire Statement

Observed Aspects	Number of Statement Items		Amount
	Positive	Negative	
Guided Inquiry	5	3	8
Collaboration Skills	4	3	7
Scientific Attitude	2	3	5
Total	11	9	20

In this study, the research location chosen was MAN 1 Siak. A questionnaire was utilized as the method of data collection in this study. Data about students' perceptions of guided inquiry's use and its impact on high school students' ability to collaborate and their attitudes toward science will be gathered using this study technique. All students of class X MIPA 1 were given a questionnaire. The questionnaire consists of 20 statement items containing statements about guided inquiry, collaboration skills, and scientific attitudes.

Data from this study were analyzed using descriptive statistics. There are two types of statement item categories in the questionnaire, namely positive and negative. The scoring techniques for both categories of statements are listed in Table 2.

Table 2. Statement Item Score

Statement Type	Respondent Score			
	SA	A	D	SD
Positive	4	3	2	1
Negative	1	2	3	4

Where,
SA = Strongly Agree; A = Agree; D = Disagree; and SD = Strongly Disagree.

The data processing technique uses a Likert scale with four categories, namely strongly agree = 4, agree = 3, disagree = 2, and strongly disagree = 1 in the positive question category. In the category of negative questions, the opposite is true. Score calculation can use the Formula 1.

$$Final\ score = \frac{Total\ Score}{Score\ max} \times 100 \quad (1)$$

The results of the statement aspect can be determined and the results of subsequent decisions can be seen in Table 3.

Table 3. Research Aspect Scoring Category

Interpretation Score	GI	CS	ScA
$80 < X \leq 100$	Very high	Very collaborative	Very high
$60 < X \leq 80$	High	Collaborative	High
$40 < X \leq 60$	Enough	Simply Collaborative	Enough
$20 < X \leq 4\ 0$	Low	Less Collaborative	Low
$0 < X \leq 20$	Very low	Not Collaborative	Very low

Where:
GI = Guided Inquiry; CS = Collaborations Skills; and ScA = Scientific Attitude.

Result and Discussion

After carrying out the research by giving questionnaires on students' perceptions of *guided inquiry* in SMA/MA Physics learning, as well as the effect of *guided inquiry* on collaboration abilities and scientific attitudes, the results obtained for each variable are shown in Table 4.

The results for each statement item of guided inquiry are shown in Table 5. The results for each statement item of the effect of inquiry learning on collaboration skills are shown in Table 6.

Table 4. Categories of Research Results

Indicator	Average	Category
Guided Inquiry	59	Enough
Collaboration Skills	39	Less Collaborative
Scientific Attitude	40	Low

Table 5. Results for Each Statement Item of Guided Inquiry

Question Items	Average	Category
I am happy when given the chance to attempt, evaluate, identify, and resolve a problem using what I have learned	66.25	High
I always have the chance to present to a group in a physics lesson	68.75	High
I enjoy sharing my opinions and ideas during discussions	63.75	High
I am always given the opportunity to provide temporary answers (hypotheses) in learning	62.50	High
I prefer to design experiments myself rather than being assisted by a teacher	48.75	Enough
I cannot do the experiment without being guided by the teacher	51.25	Enough
I always present the experimental results in front of the class	56.25	Enough
I do not make conclusions in physics experiments	53.75	Enough

Table 6. Results for Each Statement Item of the Effect of Inquiry Learning on Collaboration Skills

Question Items	Average	Category
I agree to join a group that the teacher has chosen	42.50	Simply Collaborative
I am more enthusiastic about doing individual assignments than group assignments	42.50	Simply Collaborative
I enjoy learning that requires group work (cooperation) among students to finish a physics assignment	42.50	Simply Collaborative
I often complete group assignments that are mine not on time	35.00	Less Collaborative
I do not actively participate in group discussions	35.00	Less Collaborative
I often study individually than study groups	40.00	Less Collaborative
I am not interested in learning if I only listen to the teacher's explanation without involving my active participation	37.50	Less Collaborative

The results for each statement item of the impact of inquiry learning on scientific attitude are shown in Table 7.

Table 7. Results for Each Statement Item of the Impact of Inquiry Learning on Scientific Attitude

Question Items	Average	Category
I enthusiastically searched for the right answers while conducting experiments	32.50	Low
I do not write down the real data if it does not match the concepts in physics learning	32.50	Low
I respect the opinions of groups that differ from mine	31.25	Low
I give up easily when I fail a physics experiment	30.00	Low
I always keep the school environment clean	75.00	High

The average value of students' perceptions of guided inquiry learning was 59 in the enough category, the average value of the effect of guided inquiry learning on students' collaboration abilities was 39 in the less collaborative category and the impact of guided inquiry learning on students' scientific attitudes was 40 also in the low category. The percentage of students' perceptions of guided inquiry learning on physics material can be seen in Figure 1, Figure 2, and Figure 3.

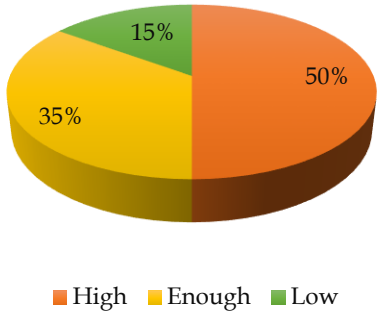

Figure 1. Students' Perceptions of Guided Inquiry Learning

Initial student perceptions of guided inquiry learning were heavily influenced by the high category, which was 50%, followed by enough category at 35%, and the low category at 15%. In general, students are not used to and maximize guided inquiry learning. Learning with guided inquiry is learning in groups where students are allowed to think independently and help each other with other friends (Chowdhury & Behak, 2022; Hajrin, 2019). Guided inquiry learning trains students to have individual, group, or partner responsibilities (Kurniasih et al., 2020). The reality in the field is that teachers only explain using the lecture method and learning is very rare by forming groups (Pramesti et al., 2020). Teacher-centered learning is the main factor in the implementation of guided inquiry learning that is less than optimal (Mahrun & Ardiansyah, 2021).

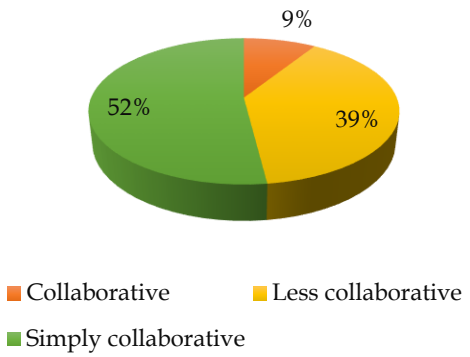

Figure 2. The Impact of Guided Inquiry on Collaboration Skills

The less collaborative category accounted for 52% of the influence of guided inquiry on collaboration skills, followed by 39% of the simply collaborative and 9% of the collaborative categories. Most students lack the necessary group learning and collaboration skills. According to Cerelia et al. (2021), collaboration abilities were dormant during the pandemic. Another factor is learning that rarely involves students and is teacher-centered so students cannot practice collaboration skills in their groups (Fatwa Gustiara, 2020; Nurhayati et al., 2019; Trilling & Fadel, 2009). This is one of the reasons why student collaboration abilities are insufficient.

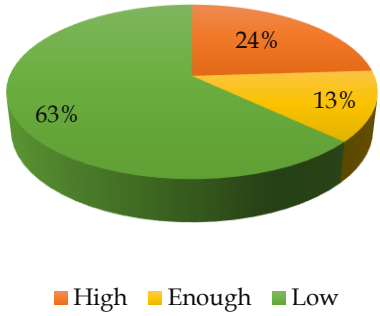

Figure 3. The Impact of Guided Inquiry on Scientific Attitudes

The impact of guided inquiry on scientific attitudes is dominated by the low category, which is 63%, then 13% is enough, and 24% is high. In general, students are not used to learning and cultivating a scientific attitude in teaching physics (Parwati et al., 2020). This shows that students do not show a positive attitude toward learning physics such as feeling interested in and enjoying physics subjects (Fitriansyah et al., 2021).

The scientific attitude is the most important thing in learning science, so it should not be taken for granted (Zulkan et al., 2019). One of the classic problems in science education that still occurs today is the lack of involvement of students in scientific activities (Sari et al., 2020). This can cause students not to instill a positive attitude toward science (Zulirfan et al., 2018). Problems in Physics cause learning difficulties for students. Learning difficulties are one of the symptoms shown by differences in behavior patterns that originate within and outside students (Nova et al., 2021). Usually influenced by external and internal factors (Azhar, 2020). A scientific attitude is needed in a scientific process and knowledge obtained through a scientific process makes a person a scientist.

Conclusion

Based on research on the use of *guided inquiry* and the impact of physics learning on collaboration skills and scientific attitudes in SMA/MA, it was found that the application of the guided inquiry model at MAN 1 Siak was in enough category and had not been maximally applied. The impact of *guided inquiry* learning on the collaboration skills of MAN 1 Siak students is in the less collaborative category. The impact of *guided inquiry* learning on the scientific attitude of MAN 1 Siak students is in a low category. So, it is hoped that

classroom action research can be carried out with the *guided inquiry model* to improve the collaboration skills and scientific attitudes of MAN 1 Siak student.

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Author Contributions
The lead author, Hafiz Suhendra, contributed to designing the study, preparing research instruments, conducting research, and writing research articles. The second author, Yennita, played a role in directing research implementation, guiding research, preparing research instruments used in data collection, and guiding research to writing articles. The third author, Dedi Irawan, played a role in guiding research to writing articles. All authors have read and agree to the published version of the manuscript.

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Conflicts of Interest
The authors declare no conflict of interest.

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