

## EFFECTIVENESS OF INQUIRY-BASED LEARNING IN ENHANCING CRITICAL THINKING SKILLS AMONG GRADE 10 JUNIOR HIGH SCHOOL STUDENTS

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### ABSTRACT

Inquiry-based learning encourages students to harness their curiosity to shape their questions and drive their learning process. It involves posing questions, developing scenarios, or tackling problems, motivating students to explore and seek information independently rather than simply listening to a teacher's lecture. This quasi-experimental research ought to examine the effectiveness of inquiry-based learning in enhancing critical thinking skills of junior high school students and social studies teachers from the six (6) Junior High Schools in Botolan, Zambales. This study administers a standardized test (pretest and posttest) in data gathering. The findings revealed a significant difference between the students' pre-test and post-test performance using inquiry-based learning. The results provide statistical evidence suggesting a meaningful difference on the perception of the Social Studies teachers during the implementation of inquiry-based teaching strategies. This study recommends that the Social Studies teachers create a conducive learning environment for inquiry-based learning while effectively managing and monitoring student's progress and behavior during inquiry-based learning activities, provide timely feedback and impose positive reinforcement to guide learners' behavior.

**Keywords:** Inquiry-based Learning, Critical Thinking Skills, Structured Inquiry, Social Studies.

### 1. INTRODUCTION

In the changing world of education, there is a growing focus on equipping students with skills that go beyond memorization and repetitive learning. Instead, the emphasis is on developing their ability to think critically and solve problems. Critical thinking skills are widely recognized as crucial for navigating the complexities of the world. Are highly valued by employers, educators and society. In recent years, there has been a growing recognition of the importance of active learning in education. Active learning as stated on the study of <sup>1</sup>Aguila and Ricafort (2023) refers to teaching methods that engage students in learning, requiring them to participate actively in their own learning.

The use of inquiry-based learning (IBL) in the Philippine education is supported by several legal bases and policies. One of the main policies in the K-12 program, which was implemented in 2013 through Republic Act No. 10533. According to Section 10 of the Republic Act 10533 also known as "Enhanced Basic Education Act of 2013", the curriculum shall use pedagogical approaches that are constructivist, inquiry-based, reflective, collaborative, and integrative. As stated on the <sup>2</sup>DepEd Order No. 21, 2019 or the Policy Guidelines on the K to 12 Basic Education Program, inquiry-based learning puts a premium on questioning, investigating, proving, probing, explaining, predicting, and establishing connection of evidence (Department of Education, 2019).

The K-12 program aims to enhance the basic education system in the Philippines by strengthening the curriculum and increasing the number of years for basic education. It also

includes the adoption of new teaching and learning strategies, such as IBL, to promote critical thinking and problem-solving skills among students (DepEd, 2019). However, while there is support for the connection, between inquiry based learning and critical thinking skills further empirical research is needed to establish and quantify these effects across various educational contexts. The purpose of this research is to examine the effectiveness of inquiry-based learning in enhancing critical thinking skills among both junior high school students and social studies teachers. By investigating the impact of inquiry-based learning (IBL) on these two groups, we can gain insights into the potential benefits and challenges of implementing this pedagogical approach.

## 2. OBJECTIVES OF THE STUDY

The main purpose of this research was to determine the effectiveness of inquiry-based learning in enhancing critical thinking skills among Junior High School students in Botolan District, Zambales, Philippines.

Specifically, it sought to answer the following questions:

1. What is the score on the pre-test and post-test of the students when inquiry-based learning is used?
2. What is the score on the pre-test and post-test of the students when the conventional method is used?
3. What are the challenges faced by social studies teachers in implementing inquiry-based teaching strategies?
4. What are the challenges faced by the students in the use of inquiry-based learning strategies?
5. Is there a significant difference in the pre-test and post-test score of students when inquiry-based and conventional method was used?
6. Is there a significant difference on the challenges faced by social studies teachers in implementing inquiry-based teaching strategies?

## 3. MATERIALS AND METHOD

This research study utilized a quasi-experimental research design. The perceptions and insights were solicited from the teachers and students-respondents.

The questionnaire is the main instrument used by the researcher in gathering the data for the study. It was patterned from the studies of <sup>3</sup>Bailey (2018), "The Impact of Inquiry-Based Learning on Academic Achievement in Eighth-Grade Social Studies (Doctoral dissertation); <sup>4</sup>Wilson (2020), "The Effects of Inquiry-Based Learning and Student Achievement in the Science Classroom"; and the PRIMAS Project: IBL Implementation Survey Report (2013). The instrument is divided into three parts. The first part of the questionnaire is composed of 15 questions standardized test (pretest and posttest) crafted from the work of <sup>a</sup>Malang (2020), "Araling Panlipunan – Ikasampung Baitang. Alternative Delivery Mode. Unang Markahan – Modyul 3: Pagkasira ng Likas na Yaman at Climate Change. The second part of the questionnaire was focused on the challenges faced by social studies teachers in implementing inquiry-based teaching strategies with 15-items survey checklist. The third part of the questionnaire was focused on the challenges faced by the students in the use of inquiry-based learning strategies with a total of 15-items survey checklist.

The validity of the research instrument, all the corrections in the instrument from the panel of oral examiners and adviser were considered in the editing of the instrument ready for validation and test of reliability.

#### 4. RESULTS AND DISCUSSIONS

This part presents the gathered and processed data using tabular form, interpreted and analyzed to provide a better and clear understanding on the problems stated in Chapter 1.

##### 1. Test Score of the Students Using Inquiry-Based Learning

The test score of the students using inquiry-based learning is shown in Table 1.

**Table 1**  
**Test Score of the Students Using Inquiry Based Learning**

Descriptive Rating	Scores	Pre - Test		Post - Test	
		Frequency	Percent	Frequency	Percent
Outstanding	13 - 15	3	1.75	29	16.96
Very Satisfactory	12	6	3.51	29	16.96
Satisfactory	11	27	15.79	34	19.88
Fairly Satisfactory	9 - 10	64	37.43	58	33.92
Did not meet expectation	1 - 8	71	41.52	21	12.28
	<b>Total</b>	<b>171</b>	<b>100.00</b>	<b>171</b>	<b>100.00</b>
		<b>7.82</b>		<b>10.29</b>	
	<b>Mean</b>	<b>Did not meet expectation</b>		<b>Fairly Satisfactory</b>	

Out of a total of 171 students, 71 (41.52%) scored in the range of 1-8, resulting in a performance level categorized as Did not meet expectation. Following closely, 64 students (37.43%) achieved scores of 9-10, earning a descriptive rating of Fairly Satisfactory. Additionally, 27 students (15.79%) attained a score of 11, corresponding to a rating of Satisfactory. Moreover, 6 students (3.51%) received a score of 12, signifying a Very Satisfactory performance. Notably, 3 students (1.75%) excelled with a score of 12 and earned the descriptive rating of Outstanding. The computed pre-test mean score for students utilizing inquiry-based learning was 7.82, which falls within the interpretation of Did not meet expectation. The result suggests that a notable number of students struggled to meet the expected performance level. It suggests that a substantial portion of the student population scored within the lower range of 1-8. The result implies that students may have faced challenges or difficulties in comprehending and mastering the subject matter assessed by the test. <sup>5</sup>Salsabila, Sidik, and Zulkarnaen (2021) further emphasized the prevalence of learning difficulties in multiplication, particularly in counting, knowledge transfer, and visual operations. These studies collectively underscore the need for targeted strategies to support students in overcoming these challenges.

Out of the total cohort of 171 students, 58 (33.92%) achieved scores in the range of 9–10, earning a descriptive rating of Fairly Satisfactory. Following closely, 34 students (19.88%)

attained a score of 11, corresponding to a rating of Satisfactory. Moreover, 29 students (16.96%) demonstrated excellence with tied scores of 12 and 13–15, receiving descriptive ratings of Very Satisfactory and Outstanding, respectively. On the other hand, 21 students (12.28%) obtained scores in the range of 1–8, resulting in a descriptive rating of Did not meet expectation. The computed post-test mean score for students utilizing inquiry-based learning was 10.29 with a descriptive rating of Fairly Satisfactory.

The result suggests that students improved their performance after they took the pre-test. It suggests a commendable level of competence among this group. The instructional approaches may be considered as effective due to the enhancement of the students' performance level. The pre-tests may not directly lead to increased learning, they can be effective in improving post-test performance, particularly when combined with specific instructional approaches <sup>6</sup>(Dabade, & Dabade, 2018). The use of pre-tests has been shown to significantly improve post-test performance in various studies <sup>7</sup>(Dabade, & Dabade, 2018).

**2. Test Score of the Students Using Conventional Method**

The test score of the students using conventional method is shown in Table 2

**Table 2**  
**Test Score of the Students Using Conventional Method**

Descriptive Rating	Scores	Pre - Test		Post - Test	
		Frequency	Percent	Frequency	Percent
Outstanding	13 - 15	1	0.57	9	5.17
Very Satisfactory	12	10	5.75	24	13.79
Satisfactory	11	13	7.47	18	10.34
Fairly Satisfactory	9 - 10	71	40.80	66	37.93
Did not meet expectation	1 - 8	79	45.40	57	32.76
	<b>Total</b>	<b>174</b>	<b>100.00</b>	<b>174</b>	<b>100.00</b>
	<b>Mean</b>	<b>7.51</b>		<b>8.57</b>	
		<b>Did not meet expectation</b>		<b>Did not meet expectation</b>	

Among the 174 students assessed, 71 (40.80%) attained scores in the range of 9-10, reflecting a performance of Did not meet expectation. Subsequently, an additional 71 students (40.80%) received a descriptive rating of Fairly Satisfactory. A smaller portion, 13 students (7.47%), achieved a score of 11. Furthermore, 10 students (5.75%) obtained scores of 12, meriting a descriptive rating of Very Satisfactory, while only 1 student (0.57%) secured scores in the range of 13-15, earning the highest rating of Outstanding. The computed pre-test mean score for students using conventional method was 7.51, corresponding to a descriptive rating of Did not meet expectation.

The result shows that students obtained scores in the range of 9-10, indicating a performance level that fell below what was anticipated or considered proficient. This suggests that, on average, this group of students found it challenging to grasp and demonstrate the expected level

of understanding and skill in the assessed material. A range of studies have found that students often struggle to meet expected performance levels. <sup>8</sup>Mills and Mereku (2016) discovered that a significant portion of students in the Effutu Municipality failed to reach proficiency in mathematics, with public school students particularly affected.

Among the 174 students who completed the post-test, 66 (37.93%) achieved scores ranging from 9 to 10, earning them a descriptive rating of Fairly Satisfactory. Following closely, 57 (32.76%) students received a rating indicating that their performance Did not meet expectations. Notably, 24 (13.79%) students excelled with a score of 12, earning a descriptive rating of Very Satisfactory. Additionally, 18 (10.34%) students attained a score of 11, garnering a rating of Satisfactory. Lastly, 9 (5.17%) students demonstrated exceptional performance, obtaining scores between 13 and 15, and were garnered the rating of Outstanding. The computed post-test mean score for students utilizing conventional method was 8.57 with a descriptive rating of Did not meet expectation.

The result means that the students demonstrated an understanding of the subject matter and performed at a level considered fairly satisfactory. A group of students reaching this level of competence. Their achievement goes beyond just passing- they have grasped the learning material and demonstrated an understanding to the lesson given by the teacher.

The studies by <sup>9</sup>Obaob and Moneba (2014) emphasizes the importance of appropriate assessment tools and the role of teachers in helping students achieve competence. Their work highlights the need for valid assessment tools.

**3. Test of Significant Difference in Test Score of the Students Using Inquiry-Based Learning**

The test of significant difference in test score of the students using inquiry-based learning is shown in Table 3.

**Table 3**  
**Test of Significant Difference on Pre – Test and Post – Test in Test Score of Students Using Inquiry – Based Learning**

Strategy	t	df	Significance		Cohen's d	Decision/ Interpretation
			One-Sided p	Two-Sided p		
Inquiry Based Learning	-8.57	170	0.00	0.00	1.1426 Large Effect	Reject Ho <b>Significant</b>

<sup>a</sup>Cohen's effect size (d):  
d0.2 (small effect)  
0.2<d0.5 (medium effect)  
0.5<d0.8 (large effect)

The computed significance value (Sig. = 0.00) for the difference between the pre-test and post-test scores of students using inquiry- based learning was lower than the 0.05 alpha level of significance. Therefore, there was a significant difference between the students' pre-test and post-test performance using inquiry- based learning. The use of inquiry- based learning had a large

effect ( $d = -1.1426$ ) in the improving their performance from pre- test mean score of 7.82 (Did not meet expectation) to the post- test mean score of 10.21 (Fairly Satisfactory).

The results strongly suggest that incorporating such pedagogical approaches can lead to meaningful improvements in student learning outcomes. The positive results encourage teachers to explore an effective pedagogical approach.

Inquiry-based learning has been shown to significantly improve student learning outcomes<sup>10</sup>(Utami, & Sundari, 2019). This approach is particularly effective when teachers have prior experience with inquiry-based instruction<sup>11</sup>(Chichekian, 2016).

**4. Challenges Faced by Teachers – Respondents in Implementing Inquiry – Based Learning**

The perception of the teacher – respondents on challenges faced during implementation of inquiry base teaching strategies is shown in Table 4.

**Table 4**  
**Perception of the Teacher – Respondents on Challenges Faced During Implementation of Inquiry-Based Teaching Strategies**

Social Studies Teachers Challenges in Implementing Inquiry-Based Teaching Strategies	AWM	Descriptive Rating	Rank
<i>I have challenges in implementing IBL teaching strategies, because...</i>			
1. ...the curriculum does not encourage inquiry-based learning (IBL).	2.09	Disagree	9
2. ...I have a lack of adequate teaching materials.	1.91	Disagree	14
3. ... Inquiry-based learning (IBL) is not included in textbooks I use.	2.04	Disagree	11
4. ...I don't know how to assess inquiry-based learning (IBL).	2.13	Disagree	8
5. ...I don't enjoy the way teaching works right now.	3.48	Strongly Disagree	1
6. ...I don't have access to any adequate Continuing Professional Development (CPD) programs involving inquiry-based learning (IBL).	2.00	Disagree	12
7. ...I worry about students' discipline being more difficult in IBL lessons.	2.48	Disagree	3
8. ...I don't feel confident with inquiry-based learning (IBL).	2.09	Disagree	9
9. ...I worry about my students getting lost and frustrated in their learning.	2.30	Disagree	5
10. ...I think that group work is difficult to manage.	2.17	Disagree	7
11. ...I think students are not happy with the way I teach.	3.30	Strongly Disagree	2

12. ...I don't have sufficient resources such as computers, laboratory.	1.96	Disagree	13
13. ...there is not enough time in the curriculum.	2.26	Disagree	6
14. ...my students have to take assessments that don't reward inquiry-based learning (IBL).	2.35	Disagree	4
15. ...the school system does not encourage changes.	1.83	Disagree	15
<b>Overall Weighted Mean</b>	<b>2.29</b>	<b>Disagree</b>	

The Social Studies teachers strongly disagreed that they don't enjoy the way teaching works right now, with a mean of 3.48 (ranked 1). They also strongly disagreed that they are not happy with the way the teachers teach, with a mean of 3.30 (ranked 2). However, the teachers disagreed on the concern that students' discipline might be more challenging in IBL lessons, with a mean of 2.48 (ranked 3). While the teachers disagreed that they don't have sufficient resources, such as computers and laboratories, with a mean of 1.96 (ranked 13), they also disagreed on having a lack of adequate teaching materials, with a mean of 1.91 (ranked 14). The Social Studies teachers disagreed that the school system does not encourage changes, with a mean of 1.83 (ranked 15). The perception of the teacher – respondents on challenges faced during implementation of inquiry base teaching strategies was 2.29 with a descriptive rating of Disagree.

The result implies that they find the techniques and strategies used in the classroom engaging, effective, and possibly well-suited to the needs of both educators and students. Enjoyment in teaching is often associated with a sense of fulfillment and effectiveness in conveying information to students. This indicates a high level of satisfaction with the instructional techniques employed by the teachers.

This suggests a moderate level of confidence in maintaining discipline within this teaching approach. Consequently, the study demonstrates the power of teacher enthusiasm in predicting and shaping students' behavior in the classroom. Teacher enthusiasm and engagement are key factors in effective teaching and student learning <sup>12</sup>(Zhang, 2013).

### 5. Challenges Faced by Students – Respondents in Using Inquiry – Based Learning

The perception of the students – respondents on challenges faced during implementation of inquiry base teaching strategies is shown in Table 5.

**Table 5**  
**Perception of the Student – Respondents on Challenges Faced by the Students Using Inquiry – Based Learning Strategies**

<b>Students Challenges in the Use of Inquiry-Based Learning Strategies</b>	<b>AWM</b>	<b>Descriptive Rating</b>	<b>Rank</b>
<i>I have challenges in using IBL strategies, because...</i>			
1. I take long to settle down after the lesson begins.	2.46	Disagree	8
2. I am lacking of initiative and participation to the class.	2.31	Disagree	11
3. I am noisy and disruptive.	1.74	Strongly Disagree	14
4. I am lack of guidance from our teacher.	1.68	Strongly Disagree	15
5. I often require to manage our time effectively.	2.98	Agree	1
6. I have access to vast amounts of information online, I may find it challenging to sift through and evaluate the credibility and relevance of the sources.	2.87	Agree	2
7. I struggle with these developing research skills initially, leading to frustration and discouragement.	2.50	Agree	7
8. I'm having differences in work styles, conflicts, or challenges in expressing ideas and it can hinder effective teamwork.	2.74	Agree	4
9. I'm having fear of making mistakes or being judged and it can hinder my willingness to take risks and explore alternative solutions.	2.81	Agree	3
10. I might feel uncertain about how my work will be evaluated, leading to anxiety or confusion.	2.64	Agree	5
11. I have difficulties with collaboration and teamwork.	2.27	Disagree	13
12. I have a lack of focus and organization.	2.29	Disagree	12
13. I don't know if the outcome activities will be successful.	2.60	Agree	6
14. I struggle with taking an active role in learning, which is a crucial component of inquiry-based learning.	2.36	Disagree	9
15. I'm limited in prior knowledge and lack of experience with concepts outside the school environment that can make inquiry difficult to us.	2.35	Disagree	10
<b>Overall Weighted Mean</b>	<b>2.44</b>	<b>Agree</b>	



The students agreed that they often need to manage their time effectively, with a mean of 2.98 (ranked 1). They also agreed that, despite having access to vast amounts of information online, they may find it challenging to sift through and evaluate the credibility and relevance of the sources, with a mean of 2.87 (ranked 2). Additionally, that the fear of making mistakes or being judged can hinder their willingness to take risks and explore alternative solutions, with a mean of 2.81 (ranked 3). On the other hand, the students disagreed that they have difficulties with collaboration and teamwork (ranked 13). They strongly disagreed that they are noisy and disruptive, with a mean of 1.74 (ranked 14). Furthermore, they are strongly disagreed that they have a lack of guidance from their teacher with a mean of 1.68 (ranked 15). The perception of the student respondents regarding challenges faced during the implementation of inquiry-based teaching strategies was 2.44, with a descriptive rating of Agree.

The result shows that they recognize the importance of time management in their academic pursuits, indicating a level of self-awareness and responsibility among the student body. The students recognize the challenges of navigating or searching the vast information on the internet. This insight into students' concerns about judgment and fear of making mistakes can be crucial for teachers and parents to address, as fostering a supportive and risk-tolerant learning environment is essential for growth.

There are 51.90% of participants possessed moderate to low level time management scores. 24.1% of the participants never wrote a set of goals for themselves for each day and 21.5% never spent time for each day planning. Whereas 48% always keep their desk beyond everything aside from what they are performing on, 40.5% sometimes review their class notes, 37.9% sometimes make a schedule of the activities that they need to try to do on workdays. To conclude, more than half of the students have shown only moderate time management skills. Majority of the respondents do not always plan their day before they begin it and not always spend time every day<sup>13</sup>(halYazhini, Priya, & Gayathri 2021).

#### **6. Test of Significant Difference on Perception of the Teacher – Respondents Among the Challenges Faced During Implementation of Inquiry- Based Teaching Strategies**

The test of significant difference on perception of the teacher – respondents among the challenges faced during implementation of inquiry- based teaching strategies is shown in Table 6.

**Table 6**  
**Test of Significant Difference on Perception of the Teacher – Respondents Among the Challenges Faced During Implementation of Inquiry- Based Teaching Strategies**

t	df	Significance		Decision/ Interpretation
		One-Sided p	Two-Sided p	
14.886	22	0.000	0.000	Reject Ho Significant

*\*One-Sample Test*

The computed significance value (Sig. = 0.00) for the difference on perception of the teachers among the challenges during the implementation of inquiry- based teaching strategies was lower than the 0.05 alpha level of significance. Therefore, there was a significant difference to the Social Studies teachers among the challenges during the implementation of inquiry- based teaching strategies.

The results provide statistical evidence to suggest that there is a meaningful difference in how Social Studies teachers perceive challenges during the implementation of inquiry-based teaching strategies. This finding has practical implications for educational practice and underscores the importance of considering teachers' perspectives in the ongoing refinement of teaching methodologies.

The challenges identified in the implementation of inquiry- based learning such as lack of knowledge and training, workload, and scarce resources, can hinder their effectiveness<sup>14</sup>(Merawi, 2018). Therefore, while the strategies themselves may be beneficial, addressing these challenges is crucial for their successful implementation.

## 5. CONCLUSIONS

Based on the summary of findings, the researcher concluded that:

1. The students obtained results did not meet expectation in the pre-test while Fairly Satisfactory in the post-test using inquiry-based learning.
2. The students obtained results did not meet expectation in the pre-test and post-test using conventional method.
3. The teachers disagree on the challenges they face during implementation of inquiry-based teaching strategies.
4. The students agree on the challenges they faced during implementation of inquiry-based learning strategies.
5. There is a significant difference between the students' pre-test and post-test performance using inquiry-based learning.
6. There is a significant difference to the teachers among the challenges during the implementation of inquiry-based teaching.

## 6. RECOMMENDATION

Based on the summary of findings and the conclusions arrived at, the researcher offered the following recommendations:

1. Social Studies teachers are encouraged to embrace and implement inquiry-based teaching methods, fostering active student engagement through questioning, exploration, critical thinking, and collaborative activities.
2. Social Studies teachers may enhance their approach by incorporating hands-on activities, experiments, research, and other interactive learning experiences that enable students perceive the practical relevance of their studies.
3. Social Studies teachers may create a conducive learning environment for IBL while effectively managing discipline concerns by actively monitoring their progress and behavior during IBL activities, provide timely feedback on both the process and content of their inquiries, positive reinforcement and constructive feedback can help guide behavior.
4. Teachers should encourage students to use peer-reviewed articles, scholarly publications, reputable news outlets, and established publishers and consider the domain of the website.
5. Students are suggested to have study routines help form good habits and contribute to effective time management.
6. Students are recommended to develop a supportive network of friends, family, and mentors who can encourage and uplift them, boost their confidence, and reduce anxiety.
7. Future researchers are encouraged to undertake similar studies with the aim of broadening the scope and affirming the validity of the findings presented in this research.

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