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Research Article

Inquiry-Based Teaching Practices, Attitudes and Difficulties of Secondary Science Teachers in Masinloc District Division of Zambales for S.Y. 2020-2021

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ABSTRACT

This study aimed to assess the science inquiry-based practices, attitudes, and difficulties of secondary science teachers in the district of Masinloc, division of Zambales.

The data gathered through the questionnaire were statistically treated with percentage, weighted mean, Pearson's Correlation Coefficient, and Analysis of Variance (ANOVA).

There is significant difference on the number of trainings towards origin of questioning, nature of problem, responsibility within the inquiry process, students' diversity and variability and explanation of learning goals. There is significant difference on highest educational attainment towards explanation of learning goals and significant on sex towards origin of questioning. There is significant difference on the perception towards attitude on the use of inquiry-based teaching and learning when grouped according to highest educational attainment. There is significant difference on the number of trainings towards all dimensions of practices of science teachers exhibited components of scientific inquiry-based learning approach;

The researcher recommended that the use of inquiry-based teaching and learning approach in teaching Science is highly encouraged in order to help the learners to overcome their problems in engaging with the lesson; that the teacher is encouraged to use the inquiry-based teaching and learning practices model to help them in attaining the consistency of the inquiry process within their lesson; and lastly a replication of this study is encouraged with in-depth and wider in scope so as to better determine the effectiveness of Inquiry-Based Teaching/Learning approach.

Keywords: *Inquiry-Based Teaching Practices, Secondary Science Teachers, Attitudes, Public schools, Masinloc, Zambales.*

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Background

Inquiry-Based Teaching/Learning approach has been a focus of interest for many years. It is a pedagogical approach that invites students to explore academic content by posing, investigating, and answering questions. Further, curriculum reform movements in K to 12 science education since the time of Dewey (1910b) emphasize the importance of instruction that supports students' adoption and engagement in scientific inquiry practices. From Dewey's (1910b) work on science as a method or process of inquiry and on student-centered approaches to education to the present interest in an inquiry-based science teaching, inquiry has been increasingly adopted by many countries as one of the salient features in K to 12 science curriculum reforms. This is because scientific inquiry has been considered to have the potential to improve scientific literacy which has been described as the goal of science education (Lederman et al., 2014).

However, thus far, there has only been a minor impact on science instructors' practice. Despite the fact that science teachers believe inquiry-based teaching/learning to be a significant instructional strategy, they only use it in their own classes on a limited basis. They cite a variety of challenges and external issues as explanations for this, including a lack of resources, inadequate organizational settings, and inconsistency with curricula, standards, and final tests. Also, internal factor like teachers' attitudes toward using Inquiry-Based Teaching and Learning affect their decision if they are going to use it or not. Therefore, the paucity of this research focuses on the assessment of science inquiry-based practices, attitudes, and difficulties of secondary science teachers in the district of Masinloc, division of Zambales.

Significance of the Study

This study deemed significant and beneficial to the following entities:

The School Administrator. The result of the study would give vital information to the administrators to support teachers in maintaining a context-based approach of teaching that can possibly decline absenteeism, as well as

possibly increase inquiry learning skills, and improvement in student achievement.

The Teachers. The result of this study would give vital information to the teachers that would help them to practice multiple assessment opportunities for their students. It can also assist teachers in communicating with students or groups of students in progressive and relevant ways on a variety of problems. The research will also aid teachers in planning and developing contextualized learning experiences for their pupils in order to prepare them for real-world learning.

The Students. The result of this study would help the students develop their 21st century skills. Students become engaged builders of a new knowledge base and become active learners. Their broader range of capabilities would be addressed thru solving problems and communicating the solutions.

The Future Researchers. The result of the study might be able to be used by the future researchers as reference. They can also gather additional information in the conduct of future researches that has relevance with this study.

Statement of the Problem

This study aimed to assess the science inquiry-based practices, attitudes, and difficulties of secondary science teachers in the district of Masinloc, division of Zambales.

Specifically, the study sought to answer the following questions:

1. What are the profile of the teacher respondents in terms of:
 - 1.1.Age;
 - 1.2.Sex;
 - 1.3.Civil Status;
 - 1.4.Years in teaching;
 - 1.5.Highest Educational Attainment;
 - 1.6.Number of Trainings/Seminars attended about Inquiry-based Teaching/Learning Approach?
2. What specific practices of science teachers exhibited components of scientific inquiry based on the following dimensions:
 - 2.1.Origin of Questioning;
 - 2.2.Nature of the Problem;
 - 2.3.Responsibility Within the Inquiry Process;
 - 2.4.Students' Diversity and Variability;

- 2.5. Development of Argumentation;
- 2.6. Explanation of Learning Goals?
3. What are the attitudes of science teachers toward inquiry-based teaching approach?
4. What are the difficulties these science teachers encounter in the enactment of an inquiry-based practice from the following dimensions:
 - 4.1. Origin of Questioning;
 - 4.2. Nature of the Problem;
 - 4.3. Responsibility Within the Inquiry Process;
 - 4.4. Students' Diversity and Variability;
 - 4.5. Development of Argumentation;
 - 4.6. Explanation of Learning Goals?
5. Is there a significant difference on the assessment towards the level of practices in teaching science using inquiry-based approach when group according to profile variables?
6. Is there a significant difference on the assessment towards attitude in teaching science using inquiry-based approach when group according to profile variables?
7. Is there a significant difference on the assessment towards difficulty encountered in teaching science using inquiry-based approach when group according to profile variables?
8. Is there a significant relationship between scientific inquiry practices used by teachers and the difficulties they encountered using inquiry-based teaching and learning approach?
9. What model in inquiry-based practices must be formulated in the study?

Scopes and Limitations

The data collection was conducted to the total population of science teachers, in junior high school and in senior high school, from all the secondary public and private schools in Masinloc, Zambales with a total of 31 science teachers. District of Masinloc has six public secondary schools namely: Taltal National High School; Bani National High School; Bamban National High School; Coto High School; San Salvador National High School; and Sto. Rosario Integrated School. It also has two private secondary schools namely: San Andres School of Masinloc, Inc.; and Northern Zambales College,

Inc. The study was done through the utilization of questionnaire to the teachers as a survey and reference.

Methods

Research Design

The descriptive research design is a type of research that describes a population, situation, or phenomenon that is being studied. It focuses on answering the how, what, when, and where questions of a research problem, rather than the why.

Descriptive research is usually defined as a type of quantitative research, though qualitative research can also be used for descriptive purposes. The research design should be carefully developed to ensure that the results are valid and reliable.

A descriptive research plan can study one or more variables using a range of research methods. Unlike experimental research, the researcher does not influence or change the variables; instead, they are observed and measured.

Descriptive research is to describe an audience's features or behavior. Its goal is to describe, explain, or validate some kind of hypothesis or objective in relation to a specific group of people. This study used a survey that included interviews or conversations with bigger groups of people and was generally performed on more particular themes (McNeill, 2018).

The researcher utilized a descriptive-survey strategy in this investigation. A descriptive survey aims to determine the range and distribution of certain social factors, such as education or training, occupation, and location, as well as the relationship between these characteristics and specific behavior patterns or attitudes. As a result, the researcher can collect data to evaluate for frequencies, averages, and patterns. This involves discussing the demographics of scientific teachers, their beliefs and viewpoints on inquiry-based education, and what strategies they employed in past classes.

Respondents and Location

Table 1 below shows the distribution of the respondents by school.

Table 1. Distribution of the Respondents

Secondary Schools in Masinloc District	No. of JHS Science Teacher	No. of SHS Science Teacher	Total
Taltal National High School	4	2	6
Bani High School	3	2	5
Coto high School	1	1	2
San Salvador National High School	2	1	3
Bamban National High School	3	0	3
Sto Rasario Integreated School	4	0	4
San Andreas School of Masinloc, Inc.	3	1	3
Northern Zambales College, Inc.	4	0	4
Total	24	6	31

The researcher used total population of the respondents in the district of Masinloc. The respondents on this study are the science teachers of Masinloc, District who teach in the 8 secondary schools in the municipality. Taltal National High School has 4 junior high school science teacher and 2 senior high school science teachers. Bani National High School has 3 junior high school and 2 senior high school science teachers. 1 junior high and 1 senior high school

science teachers are in Coto High School. San Salvador National High School has 2 junior high and 1 senior high school science teacher. Bamban National High School has 3 junior high school science teachers. Sto. Rosario Integrated School is composed of 4 junior high school science teachers. San Andres School of Masinloc has 3 junior high school and 1 senior high school science teacher. Lastly, Northern Zambales College has 4 junior high school

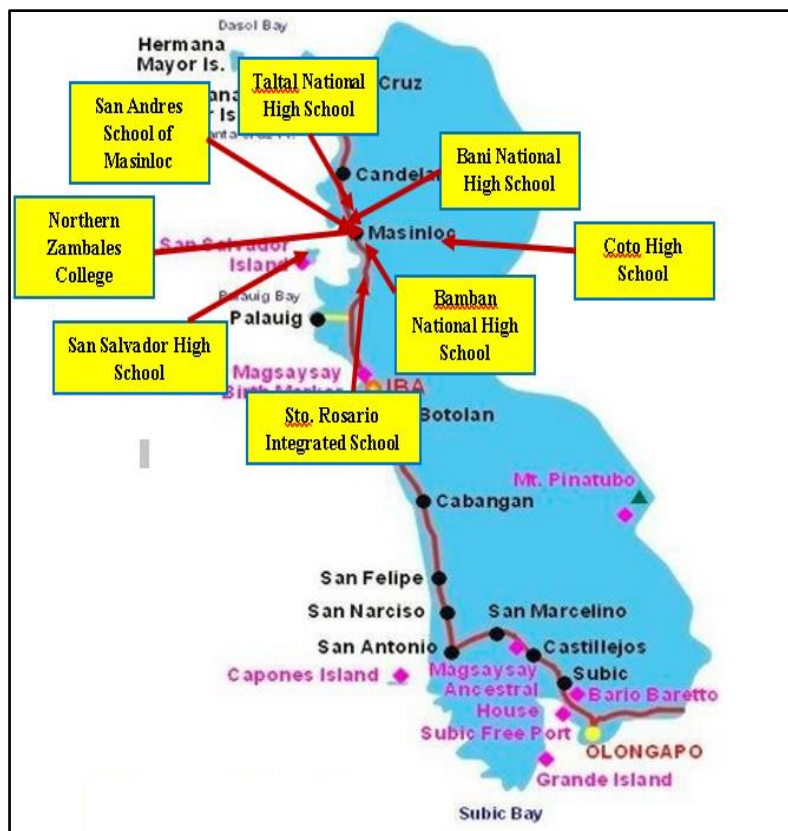


Figure 1. Map showing the Public and Private Secondary Schools in Masinloc District of DepEd Division of Zambales

The study was conducted in the district of Masinloc, division of Zambales. Masinloc district is composed of 13 barangays wherein 6 public and 2 private secondary school lies. This study focused on the 6 public secondary schools and 2 private secondary schools which may consist of junior high school, or a combination of junior high school and senior high school. These schools are as follows: a) Taltal National High School; b) Bani National High School; c) Coto High School; d) San Salvador National High School; e) Bamban National High School; f) Sto. Rosario Integrated School; g) San Andres School of Masinloc, Inc.; and h) Northern Zambales College, Inc.

Instruments

The questionnaire used in this study was adapted from the PRIMAS (Promoting Inquiry-Based Learning in Mathematics and Science Education) survey, which was designed for a comprehensive survey on inquiry-based teaching and learning across 12 European partner nations. The questionnaire consists of statements to which teachers were asked to react on a four-point Likert scale ranging from 1 to 4. The items are organized into groups based on inquiry-based learning components. Teachers' attitudes about inquiry-based teaching and learning, teachers' difficulty in enacting inquiry-based teaching and learning, and teachers' previous and current activities involving inquiry-based teaching and learning are the three dimensions of interest in this study.

Data Collection

The researcher used descriptive statistical analysis to show the associations, relationship, and significant difference of variables from Likert Scale data which allowed the respondents to express how much they agree or disagree with a particular statement in the given survey-questionnaire, how much they practice inquiry-based teaching in their lessons, and how difficult it was to implement inquiry-based teaching.

The data would be analyzed using a one-tailed paired data test with a significance threshold of 0.05. There is a cause to reject the

null hypothesis with at least a 95 percent confidence level if there is a significant change that is equal to or less than the level 0.05.

The data that are collected in the study were subjected to certain statistical treatments. The research utilized the SPSS (Statistical Package for the Social Sciences) program in the computation of the gathered data. As general rule, it does not need to show the formula using the software. The study also used the following statistical tools:

Percentage and Frequency. The study used frequency and percentage to display the comparison of the data gathered from the respondents.

Weighted Mean. It was used to calculate the quantitative outcome based on the data gathered in the study.

Pearson's Correlation Coefficient. It was used to test the statistical relationship between two variables, and to give the correlation, as well as the direction of the relationship.

Decision Rule:

Interpretation of Correlation Coefficient Value (C)

An r from ± 0.00 to ± 0.20 denotes negligible correlation

An r from ± 0.21 to ± 0.40 denotes low or slight correlation

An r from ± 0.41 to ± 0.70 denotes marked moderate relationship

An r from ± 0.71 to ± 0.90 denotes high relationship

An r from ± 0.91 to ± 0.99 denotes very high relationship

An r from ± 1.00 denotes perfect correlation

Analysis of Variance (ANOVA). It was used to show the significant difference on the independent variables used in the study and to decide whether the null hypotheses will be accepted or rejected.

Result and Discussion

This chapter presents the gathered and processed data using SPSS software application in a tabular form, provided interpretation and analysis for better understanding on the problems asked in earlier Chapter 1.

Profile of the Teacher Respondents**Table 2. Frequency and Percentage Distribution of the Teacher-Respondents Profile Variables**

	Profile Variables	Frequency (f)	Percentage (%)
Age Mean=32.03 years old	20 – 25 years old	4	12.90
	26 – 30 years old	9	29.00
	31 – 35 years old	10	32.30
	36 – 40 years old	5	16.10
	41 years old and above	3	9.70
Sex	Male	12	38.70
	Female	19	61.30
Civil Status	Single	8	25.80
	Married	23	74.20
Years in Teaching Mean=9.94 years	1-5 years	5	16.10
	6-10 years	15	48.40
	11-15 years	8	25.80
	21 years or more	3	9.70
Highest Educational At- tainment	Bachelor's Degree	1	3.20
	Bachelor's Degree with Master's Units	22	71.00
	Master's Degree	4	12.90
	Master's Degree with Doctorate Units	2	6.50
	Doctorate Degree	2	6.50
Number of Trainings/ Seminars Attended about Inquiry-Based Teaching/ Learning Mean=2.80 or 3	1-3 trainings	25	80.60
	4-6 trainings	4	12.90
	7-10 trainings	2	6.50

Age. Most of the teacher-respondents were from age group of 31-35 years old with 10 or equivalent to 32.30%; 9 or 29.005 from age group of 26-30 years old; 5 or 16.10% from 36-40 years old; 4 or 12.90% from 20-25 years old; 4 or 21.90% from 21-25 years old and 3 or 9.70% from 41 years old and above. Sex. Majority are females with 19 or 61.30% while 12 or 38.70% who are males. The data clearly manifest on the superiority of the female sector in engaging teaching profession. Civil Status. Majority are married with 23 or equivalent to 74.20% while only 8 or 25.80% who are still single. The data clearly implies on then psychological, financial and emotional readiness of the respondents to handle marital and family responsibilities. Years in Teaching. Most of the teacher-respondents had been in the teaching service for 6-10 years; 8 or 25.80% with 11-15 years; 8 or 16.10% with 1-5 years and 3 or

9.70% with 21 years or more. The computed mean years in teaching was 9.94 or 10 years in teaching. Highest Educational Attainment. Majority have attained bachelor's degree with Master degree units; 4 or 12.90% with master's degree; 2 or 6.50% who have master's degree with doctoral units, and doctorate degree respectively while only 1 or 3.20% who is only a bachelors' degree. Number of Trainings/ Seminars Attended about Inquiry-Based Teaching/ Learning. Majority have 1-3 trainings with 25 or equivalent to 80.60%; 4 or 12.90% with 4-6 trainings and only 2 or 6.50% with 7-10 training.

Test of significant difference on the assessment towards level of practices in teaching science using inquiry-based approach when group according to profile variables Origin of Questioning

Table 3. Analysis of Variance to test significant difference on the assessment towards level of practices in teaching science using inquiry-based approach as to Origin of Questioning when group according to profile variables

Sources of Variations		SS	df	MS	F	Sig.	Decision
Age	Between Groups	0.275	4	0.069	0.494	0.740	Accept Ho
	Within Groups	3.622	26	0.139			Not Significant
	Total	3.897	30				
Sex	Between Groups	0.624	1	0.624	5.527	0.026	Reject Ho
	Within Groups	3.273	29	0.113			Significant
	Total	3.897	30				
Civil Status	Between Groups	0.004	1	0.004	0.033	0.858	Accept Ho
	Within Groups	3.892	29	0.134			Not Significant
	Total	3.897	30				
Years in Teaching	Between Groups	0.529	3	0.176	1.413	0.261	Accept Ho
	Within Groups	3.368	27	0.125			Not Significant
	Total	3.897	30				
Highest Educational Attainment	Between Groups	1.093	4	0.273	2.534	0.064	Accept Ho
	Within Groups	2.804	26	0.108			Not Significant
	Total	3.897	30				
Number of Trainings/ Seminars	Between Groups	1.367	2	0.683	7.562	0.002	Reject Ho
	Within Groups	2.530	28	0.090			Significant
	Total	3.897	30				

Since the computed P-values of 0.740, 0.858, 0.261, and 0.064 which are higher than 0.05 Alpha Level of Significance, therefore the null hypothesis is accepted, hence there is no significant difference on the assessment towards level of practices in teaching science using inquiry-based approach as to Origin of Questioning when group according to profile variables of age, civil status, years in teaching, and highest educational attainment. On the

other hand, the computed P-values of 0.026 and 0.002 which are lower than (<) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is rejected, hence there is significant difference when grouped according to sex and number of trainings/seminars.

Test of significant relationship between scientific inquiry practices used by teachers and the difficulty they encountered using IBTL

Table 4. Pearson Product Moment Coefficient of Correlation to test significant relationship scientific inquiry practices used by teachers and the difficulty they encountered using IBTL

Sources of Correlations		Scientific Inquiry Practices	Difficulty Encountered using IBTL
Scientific Inquiry Practices	Pearson Correlation	1	0.591**
	Sig. (2-tailed)		0.000
	N	31	31
Difficulty Encountered using IBTL	Pearson Correlation	0.591**	1
	Sig. (2-tailed)	0.000	
	N	31	31

** . Correlation is significant at the 0.01 level (2-tailed).

The computed Pearson r value was +0.591** which denotes moderate relationship. The computed P-value of 0.000 which is

lower than (<) 0.05 Alpha Level of Significance. The results rejected the null hypothesis that the

scientific inquiry practices is significantly correlated with the difficulty encountered using Inquiry-Based Teaching/Learning approach. This means that teachers scientific inquiry

practices increase the difficulty encountered using IBTL also increases.

Model for the Inquiry-Based Teaching Practices

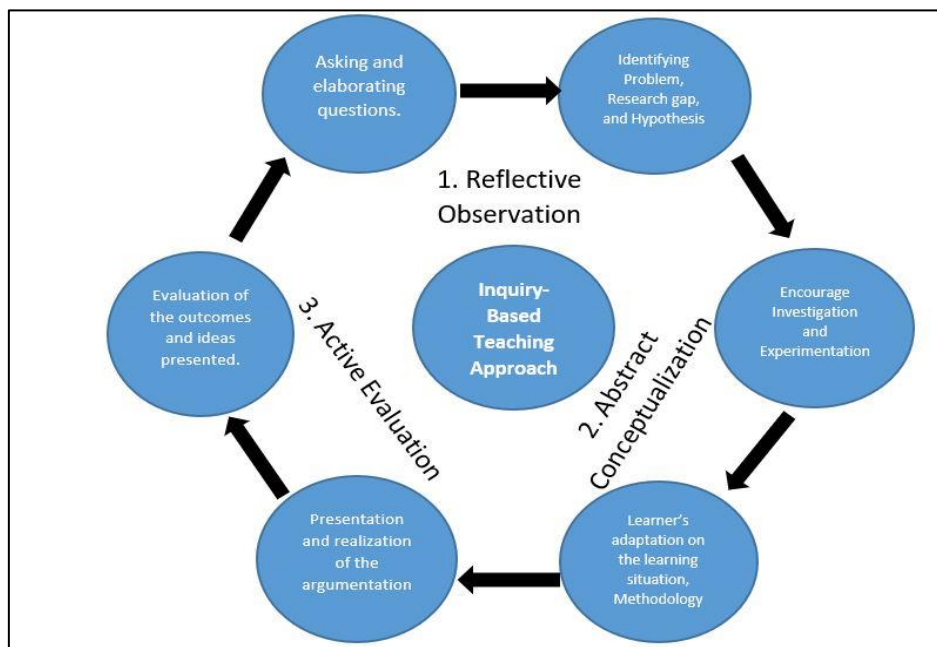


Figure 2. Model for the Inquiry-Based Teaching Practices

Figure 2 shows the proposed inquiry-based learning approach model. The component of the inquiry-based teaching and learning approach include the dimensions on asking and elaborating questions; identifying problem, research gap and hypothesis; encourage investigations and experimentation; learning adaptation on the learning situations and methodology; presentation and realization of the argumentation; and evaluation of the outcomes and ideas presented.

The Inquiry-Based Teaching/Learning Practices can be summarized with three main steps: 1) Reflective Observation regarding the topic or the problem in the lesson which is comprised of asking and elaborating questions that will motivate the learners to think beyond the box and arouse their interest with the lesson, and identifying the problem and research gap, and making hypothesis; 2) Abstract Conceptualization of the topic and new information that will be acquired through thorough investigation and experimentation, and letting learners

to adapt in varied learning situations to cater their individual differences and to propose methodology that suits them best; and 3) Active Evaluation of the concepts and information that are gathered from the previous steps through, presentation of students' argumentation in the class, thus involves sharing their own learnings with their fellow classmates, and evaluation of outcomes and ideas presented, correcting misconceptions, and scaffold learning (Grangeat, 2011).

Conclusion and Recommendation

Summary

Profile of the Teacher Respondents

Age. Most of the teacher-respondents were from age group of 31-35 years old with 10 or equivalent to 32.30%; 9 or 29.005 from age group of 26-30 years old; 5 or 16.10% from 36-40 years old; 4 or 12.90% from 26-30 years old; 4 or 21.90% from 21-25 years old and 3 or 9.70% from 41 years old and above. The computed mean age of the respondents was 32.03

or 32 years old. Sex. Majority are females with 19 or 61.30% while 12 or 38.70% are males.

Civil Status. Majority are married with 23 or equivalent to 74.20% while only 8 or 25.80% who are still single. Years in Teaching. Most of the teacher-respondents had been in the teaching service for 6-10 years; 8 or 25.80% with 11-15 years; 8 or 16.10% with 1-5 years and 3 or 9.70% with 21 years or more. The computed mean years in teaching was 9.94 or 10 years in teaching. Highest Educational Attainment. Majority of the teacher-respondents have attained Bachelor's Degree with Masteral units; 4 or 12.90% with master's degree; 2 or 6.50% who have master's degree with doctoral units, and doctorate degree respectively while only 1 or 3.20% who is only a bachelors' degree.

Number of Trainings/ Seminars Attended about Inquiry-Based Teaching/ Learning. Majority have 1-3 trainings with 25 or equivalent to 80.60%; 4 or 12.90% with 4-6 trainings and only 2 or 6.50% with 7-10 training. The computed mean number of trainings was 2.80 or 3 trainings.

Test of significant difference on the assessment towards level of practices in teaching science using inquiry-based approach when group according to profile variables

Origin of Questioning. The computed P-values of 0.740, 0.858, 0.261, and 0.064 which are higher than 0.05 Alpha Level of Significance, therefore the null hypothesis is accepted, hence there is no significant difference on the assessment towards level of practices in teaching science using inquiry-based approach as to Origin of Questioning when group according to profile variables of age, civil status, years in teaching, and highest educational attainment. On the other hand, the computed P-values of 0.026 and 0.002 which are lower than (<) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is rejected, hence there is significant difference when grouped according to sex and number of trainings/seminars.

Test of significant relationship between scientific inquiry practices used by teachers and the difficulty they encountered using IBTL

The computed Pearson r value of 0.591** which denotes moderate relationship. The computed P-value of 0.000 which is lower than (<) 0.05 Alpha Level of Significance. The results rejected the null hypothesis that the scientific inquiry practices is significantly correlated with the difficulty encountered using Inquiry-Based Teaching/Learning approach. This means that teachers scientific inquiry practices increase the difficulty encountered using IBTL also increases.

The inquiry-based learning approach model is proposed

The component of the IBTL approach include the dimensions on asking and elaborating questions; identifying problem, research gap and hypothesis; encourage investigations and experimentation; learning adaptation on the learning situations and methodology; presentation and realization of the argumentation; and evaluation of the outcomes and ideas presented.

Conclusions

Based on the summary of the investigations conducted, the researcher concluded that:

1. The teacher-respondent is a typical female in her middle adulthood, married, BS degree with masteral units, had been in the teaching service for a decade, and few numbers of training and seminars attended.
2. Assessed "Highly Practiced" on the dimensions towards practices of science teachers exhibited components of scientific inquiry-based learning approach.
3. The respondents "Agreed" towards positive attitude in using inquiry-based teaching and learning approach, for it develops critical thinking of students, and it can be used not only for those who are high performing but also for those who are slow performing learners.
4. The respondents assessed "Difficult" on the dimensions towards practices of science teachers exhibited components of scientific inquiry-based learning approach.
5. There is significant difference on the number of trainings towards origin of questioning, nature of problem, responsibility

within the inquiry process, students' diversity and variability and explanation of learning goals. There is significant difference on highest educational attainment towards explanation of learning goals and significant on sex towards origin of questioning.

6. There is significant difference on the perception towards attitude on the use of IBTL when grouped according to highest educational attainment.
7. There is significant difference on the number of trainings towards all dimensions of practices of science teachers exhibited components of scientific inquiry based learning approach; significant on highest educational attainment towards origin of questioning, and nature of the problem; and significant on sex towards responsibility within inquiry process.
8. There is moderate relationship between dimensions on practices and difficulty on the use of inquiry-based learning approach.
9. The Inquiry-Based Teaching/Learning Practices can be summarized with three main steps: 1) Reflective Observation which is comprised of asking and elaborating questions, and identifying the problem and research gap, and making hypothesis; 2) Abstract Conceptualization that will be acquired through thorough investigation and experimentation, and letting learners to adapt in varied learning situations to cater their individual differences and to propose methodology that suits them best; and 3) Active Evaluation through, presentation of students' argumentation in the class, thus involves sharing their own learnings with their fellow classmates, and evaluation of outcomes and ideas presented, correcting misconceptions, and scaffold learning.

Recommendations

Based on salient findings, the researcher recommended that:

1. The use of inquiry-based teaching/learning approach in teaching Science is highly encouraged in order to help the learners to overcome their problems in engaging with the lesson.

2. The school administration is strongly encouraged in the conduct of in-service training for the teachers to heighten level of awareness on the principles of inquiry-based teaching/learning and apply it to their teaching process.
3. The teacher is encouraged to continuously practiced the inquiry-based teaching and learning approach in his lesson to broaden knowledge of students in solving scientific problems and making research.
4. The teacher is encouraged to construct different questions and choose which is more appropriate on the learning objectives.
5. The teacher is encouraged to have a positive attitude towards the use of inquiry-based teaching/learning approach to apply it effectively in his lessons.
6. The science teachers are advised and encouraged to further learn and study the behavior and nature of the learner in order to motivate them engage in the inquiry-based teaching/learning approach.
7. The teacher is advised to create varied learning activities to cater students' individual differences and diversity.
8. The teacher is encouraged to use the inquiry-based teaching and learning practices model to help them in attaining the consistency of the inquiry process within their lesson.
9. A replication of this study is encouraged with in-depth and wider in scope so as to better determine the effectiveness of Inquiry-Based Teaching/Learning approach.

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Nobody really constructs a paper by himself, and this is so in the case of the researcher. This study was made possible not only by the researcher's ideas and efforts, but also by the contributions of many others who contributed their time, talent, and ideas. It is the outcome of pursuing graduate school classes and communicating with people in academia and the teaching profession. It is the product of clinical research published in books. It also incorporates information gleaned from surveys and interviews.

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References

- Grangeat, M. (2011). Dimensions and Modalities of Inquiry-Based Teaching: Understanding the Variety of Practices *Education Inquiry*, v7 n4 Article 29863 p421-442 2016
- Lederman JS, Lederman NG, Bartos SA, Bartels SL, Meyer AA & Schwartz RS 2014. Meaningful assessment of learners' understandings about scientific inquiry—The views about scientific inquiry (VASI) questionnaire. *Journal of Research in Science Teaching*, 51(1):65–83. <https://doi.org/10.1002/tea.21125>
- McNeill, K. L. (2018, April). *Transitioning to the Next Generation Science Standards: Shifting classrooms to support students in science practices*. Keynote address at the Rhode Island Science Teachers Association annual meeting, East Greenwich, RI.