# The Inquiry -Based Approach in Teaching Probability among Grade 8 Students of X National High School

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**Abstract:** The investigation decides the mean score and the critical distinction of the pre-test and post-test consequence of X National High School understudies. The investigation helped the instructor to more readily fathom why inquiry attempts to interface with and invigorate students learning, it is imperative to observe how an inquiry way to deal with manage demonstrating contrasts from a customary methodology. The examination used a pre-test-post-test plan under Pre-Experimental research design to decide the improvement of the students' scholastic execution utilizing the inquiry-based methodology in educating probability. The investigation uncovered that in a inquiry-based learning students adequately participate in learning and thus were dynamically busy with the procedure and content. Along these lines, there will be increasingly viable learning guidance with respect to the educator and utilizing the IBA may prompt better learning improvement.

**Keywords:** Inquiry based approach, Traditional approach, learning instruction, learning improvement, student's academic performance.

## 1 Introduction

Logical approach has gotten very well known on the planet in which numerous fields of information embraced the standards of this methodology in their execution. It is brought about by the noteworthy of science in our life especially identified with the valuable creations delivered by researcher that improve human life. As we realize that a few researchers for instance Copernicus, Thomas Alfa Edison, Galileo have a significant job in the improvement of science. They utilized logical techniques in finding the innovations. With respect to the huge commitment of science, a few fields of information embraced the guideline of logical methodology (Rejeki, 2017). One of them is the inquiry-based approach. Instructors can fuse inquiry ways to deal with learning, for instance, by enabling little gatherings of students to investigate a likelihood that may show certain results of occasions. Like any showing strategy, there are methodologies to help educator effectively run an inquiry movement. These techniques will likewise enable instructors and students to appreciate the full degree of inquiry-based learning's advantages. If we talk about Inquiry-based learning it is an approach to manage finding that anxieties the student's activity in the learning methodology. Rather than the instructor exhorting students what they need to know, students are asked to explore the material, present request, and offer contemplations. In inquiry based learning, instructors use questions, issues and situations to assist students with learning through individual idea and examination. Rather than addressing about learning

objectives, the educator develops a learning domain and assists students with investigating it through questions and encounters. According to the study of the strategies of teaching science using an inquiry based science education (IBSE) by novice Chemistry Teachers, the study revealed that the inquiry-based teaching strategies employed were able to stimulate excitement among students when learning science (Shamsudin, Abdullah and Yaamat 2012). Initially, inquiry-based method is intended for science and English classes but it can also be adopted for teaching Mathematics (Lee, 2014). Students battle to comprehend and utilize terms that portray probabilities. Such battles lead to troubles understanding study hall discussions. Likelihood uncovers a double character since its rise: a measurable side was worried about finding the target numerical principles behind groupings of results produced by irregular procedures through information and investigations, while another epistemic side perspectives likelihood as an individual level of conviction (Hacking, 1975). Numerous instructors perceive the estimation of inquiry- based learning, most think that it's a troublesome methodology in teaching mathematics. The customary method for showing math by figuring conditions and connecting numbers concentrates just on calculation. Educators have shown math along these lines for a considerable length of time, and it has grown such a poor notoriety, that students may effectively despise the subject or think that its scaring. New thoughts and points of view on training math may help beat this test. Unfortunately, our traditional instructive framework has worked in a manner that debilitates the common procedure of inquiry. Students

become less inclined to pose inquiries as they travel through the evaluation levels. In traditional schools, students learn not to pose such a large number of inquiries, rather to tune in and rehash the normal answers. This study aimed to determine if the inquiry-based approach in teaching probability can enhance students' academic performance among the grade 8 students in X National High School.

## 2 Methodology

This study utilized a single blind experiment where the teacher who administered the lesson plan knows about this research study while the students who are involved do not know about the experiment. A pre-test-post-test under Pre-Experimental research design was utilized to determine the improvement of the students' academic performance using the inquiry-based approach in teaching probability. This study focus on the One Group Pre-test-Post-test design. This study is the simplest type of pre experimental design, where only the experimental group is selected as the study subjects. This design measures the effect of intervention before (pre-test) and after the experiment (post-test). In this study there was no control group as this design advised.
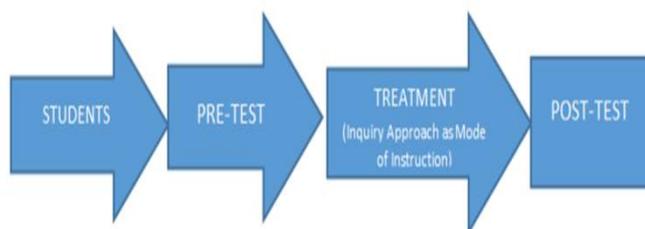


A pre-test perception of the dependent variable was made preceding the execution of the treatment to the selected group. A short time later the treatment is managed, lastly a post-test perception of dependent variable was done to survey the impact or treatment on the gathering. This study was conducted in X National High School. X National High School Formerly a DepED Managed Monograde Public Secondary School Located in 1st District of Cebu specifically in Bas, Perrelos, Carcar City. The study was administered in one classroom where there was proper ventilation and it was a conducive for learning. The respondents of this study are those Grade 8 high school students of X National High School located in Bas, Perrelos, Carcar City, Cebu. There were 120 Grade 8 students enrolled this school year. The researcher utilized complete enumeration wherein all the grade 8 students will be included in this research study. In selecting of the said respondents, the researcher will set the inclusion and exclusion criteria. Inclusion criteria: (1) Respondents must be a grade students in X National High School, and (2) Respondents must be currently enrolled by the year 2018-2019. Exclusion criteria: (1) respondents who are not grade 8 students, (2) who are not studying in X National High School, and (3) not enrolled by the school year 2018-2019. The researcher formulated a questionnaire. Since the instrument is a research made questionnaire then the researcher assure its validity and reliability of the said questionnaire. For Content Validity Index, researchers designed a new instrument and it should begin with a thorough conceptualization in constructing so that the instrument can capture the full content domain. An instrument's content validity is necessarily based on

judgment. There are no completely objective methods of ensuring adequate content coverage on an instrument, but in this research study, the researcher use a panel of experts to evaluate the content validity of new researchers' made instruments. The instrument would like to test the knowledge of Grade 8 students of X national high school about the basic probability. The item- level CVIs ranged from .86 to 1.00 and the scale- level CVI, using the averaging approach, was .993. For Reliability test, a questionnaire with 15 questions is administered to 20 senior high school students. After the students answers the researcher tallied and in tallying the researcher coded the correct question scores 1 and an incorrect question scores 0. To determine the reliability of the questionnaire the researcher used the Kuder and Richardson Formula 20. Based on the results the value $\rho KR20$ is equal to 0.731 shows that the test has high reliability. The researcher plans a systematic process, primary, permission from the Carcar City Division and the principal of the X National High School sought by the researcher. This research study will undergo ethics review to check if this study was technically and ethically sound. The researcher wait for the approval of the UV-IRB to start the data gathering procedure, Once approved and notice to proceed issued by the office, the researcher presented himself to the teacher who will implement the lesson that involved inquiry based approach in a friendly and non-threatening way. The researcher explained the rationale of the study. The teacher was also reminded of the rights of the learners and the researcher will only ask the process data or the scores of the learners and make sure the given data did not contain the names of the learners for confidentiality sake. The researcher plans a systematic process, primary, permission from the Carcar City Division and the principal of the X National High School sought by the researcher. This research study will undergo ethics review to check if this study was technically and ethically sound. The researcher wait for the approval of the UV-IRB to start the data gathering procedure, Once approved and notice to proceed issued by the office, the researcher presented himself to the teacher who will implement the lesson that involved inquiry based approach in a friendly and non-threatening way. The researcher explained the rationale of the study. The teacher was also reminded of the rights of the learners and the researcher will only ask the process data or the scores of the learners and make sure the given data did not contain the names of the learners for confidentiality sake.

## 3 Experimental Process

**Pre-test**
The teacher will give pre-test to the learners. The pre-test questionnaire was composed of 15 items and it will consume only 30 minutes. This kind of test will be served as the same as the actual classroom set up. The learners do not know that the given exam was part of the experiment. After having the pre-test, the teacher will apply the intervention on the next day.

**Intervention process**
On the second day of the experiment, the teacher will apply the daily lesson plan made by the researcher. This lesson plan talks about how to teach basic probability using the inquiry based approach. Before the teacher start, she wrote the multiplication of 5 with one mistake which was 5 x 1 is

equal to 6 and the rest of the multiples were correct. The teacher flips a coin twice, rolls a die once and introduces to the students the illustration of a triangle with balls inside on it. After the teacher performs or display the illustration, the teacher will ask the students to create questions or write their own insight about the activities did by the teacher. Once done, the teacher will try to introduce the topic which is probability. To introduce the topic, the teacher will give a rationalization about what had happen or what was the reason behind the 5 x 1 is equal to 6. The teacher emphasize to them the probability of the grade 8 students who will appreciate the 9 correct answers written in the board or what is the probability of the students who will judge and laugh the mistake of the teacher. By this, teacher can start to extract the lesson of probability. Next activity is flipping a coin, the teacher will introduce that in flipping a coin probability will be involve of the said activity. The teacher will ask the students, what is the probability that head and tail appear if the teacher flip the coin once. The teacher explains to the students and gives rationalization about flipping a coin. The teacher will call a student to formulate his/her own questions and ask his/her classmates and let his/her classmates answers the questions. By this activity, teacher let her students to look for a question and use their mind to formulate a certain arguments that can enhance their critical thinking in learning probability. The same thing with regards to rolling a die, the teacher call a student to roll the die and create questions and let his/her classmates to give their own argument of the said question. Students will be given enough time to perform in front of the class and try to construct own questions about rolling a die. Lastly, the teacher display or show a triangle with different colors inside on it. The teacher may expect understudies to suggest conversation starters in the exercise before the request is because of start. This gives the educator time to confine the request to specific themes. The educator could confine questions and remarks to those that identify with picking balls from the triangle or the game plan of the 'racked' balls. Along these lines, questions and remarks have incorporated the likelihood of picking certain hues (or of not picking specific shading) and the likelihood of picking a given arrangement of a few balls. They have likewise included the likelihood of racking the balls in the manner appeared or racking the reds and blues in columns of two and three individually. In the early periods of the request, the educator is encouraged to set up that every result that is the consequence of picking one of the six balls is similarly likely. After all the activities are done, the teacher will try to provide a written activity to check if they really acquire learning and end the discussions.

**Post-test process**
One day after the intervention done by the teacher, the teacher conducts a post-test to the grade 8 students. The post-test compose of 15 questions about the basic probability. As soon the data were gathered, the data will be encoded in an excel sheet. Once data were safely encoded the teacher gives the process data to the researcher. Only process data will be asked in order to maintain anonymity of the data. This step was essential in order to protect the participants' disclosure of their scores that can directly link to their identity. As soon the data were gathered and were safely encoded the researcher shred the answered questionnaires in order to maintain anonymity of the data. This step was essential in

order to protect the participants' disclosure of their scores. The data were then analyzed. The data were subjected to the following statistical treatment; Mean - is one of the most helpful and generally utilized technique to discover the normal in insights. It is determined by including all the number and partitioning that total by the absolute number of numbers. Standard Deviation- an amount determined to show the degree of deviation for a gathering all in all. The standard deviation is an estimation that gauges the dispersing of a dataset in regard to its mean and is resolved as the square establishment of the variance. Mean and standard deviation will be used to answers the questions regarding the mean performance of the pre-test and post-test of grade 8 high school in X National High School. Lastly, the T-Test- is a statistical tool that significance indicates whether or not the difference between the pre-test and post-test scores of the grade 8 students.

## 4 Results and Discussions

Students can encounter to comprehend and utilize terms that portray probabilities. Such encounters lead to challenges fathoming study hall discussions. Likelihood uncovers a double character since its rise: a measurable side was worried about finding the goal numerical guidelines behind groupings of results produced by arbitrary procedures through information and analyses, while another epistemic side perspectives likelihood as an individual level of conviction

Legend: 75% below – did not meet expectation 76% - 79%

**Table 1.** *Pre-test and Post-test Mean Score*

|  | Mean | Mean % Score | Std. Deviation | Interpretation |
|---|---|---|---|---|
| Pre Test | 4.36 | 29.07% | 2.506 | Did not meet expectation |
| Post Test | 8.22 | 54.8% | 1.615 | Did not meet expectation |

- Fairly satisfactory
       80% - 84% - satisfactory                    85% - 89% - very satisfactory          90% - 100% - outstanding

Based on the above table, the table shown that the mean score of the pre-test was 4.36 with a standard deviation of 2.506 and the post-test mean score was 8.22 with a standard deviation of 1.165. As researcher can see to both mean value and standard deviation of the pre and post-test results, it was far to each other. So the researcher can say that the pre-test and post-test score were distant with their mean value and standard deviation. A pre and post test was conducted and resulted in low performance because it did not meet the 75% of the baseline hence, it did not meet the expectation. However, upon seeing the mean percentage score of the pre-test it was increased by 25% upon conducting the post-test. Therefore, if there was an absence of applying the inquiry approach as mode of instruction, students cannot really acquire the learning concerning to the basic probability. If a teacher apply inquiry based approach as mode of instruction, the X National High School students really develop and improved their academic performance concerning to the basic probability.

_**Table 2.** Difference between the Pretest vs. Posttest_

|  | t | df | Sig. (2-tailed) |
|---|---|---|---|
| Pair 1 Pretest - PostTest | -18.541 | 120 | .000 |

A p value of 0.000 indicated that there was a significant difference in pre and post-test scores of the X National High School students in terms of Basic probability. The table also revealed that there was a significant increase of learning after the inquiry based approach was implemented in the discussions. The result showed that Inquiry based approach was more effective compare to the traditional way of teaching basic probability.

## 5 Conclusion

Based on the findings, the respondents learning in probability topic increased when teacher have an inquiry based approach as mode of instruction or delivering the lesson. The study concluded that using the Inquiry approach in teaching probability improved students' academic performance. It was important to give the students an opportunity to represent their very own request fundamentally giving their own one of a kind solicitation, as opposed to tending to about learning destinations, the teacher builds up a learning area and assists students with investigating it through questions and encounters.

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## Author Profile

Author received the Bachelor of Secondary Education degrees in Mathematics from University of the Visayas in 2016. During 2011-2015, he was a working scholar assigned in Center for Research and Development (CRD), of the same University. He is currently finishing his Master of Arts in Education major in Mathematics in the University of the Visayas. He is currently employed in the University of the Visayas as the University-Institutional Review Board Administrative Officer. The IRB Administrative Officer acts as the Secretariat for the IRB Office. It has the responsibility for assisting the IRB Office Manager in the Office Administration that is related to the processing, record keeping, physical distribution, and logistics, within the IRB processes. The University of the Visayas provide the UV-IRB that is adequately staffed to support them in their review and record keeping duties. He is also a regular member of the UV-IRB Primary Reviewer. He serves as Primary Reviewer for research protocol documents within their area of ethical soundness of the said research study.

She was born and raised in Cebu City. She graduated from Cebu Normal University March 2000 with a Bachelor of Science major in Mathematics (BS Math). She took up Master's degree in University of the Visayas - MAED Math. She had her on-the-job training in the accounting department of Land Bank of the Philippines, Cebu branch. She is connected with the Deparment of Education from year 2002 until present and teaching Math for Grade 9 Junior High at Lawaan National High School, Lawaan 1, Talisay City, Cebu. She has given various designation in the school for the past years, as School IT from 2005 to 2009, Math Department head from 2010 up to 2013, Registrar for 11 years and now the Supply officer from 2016 up to present. She is also designated as a member for the Junior High Selection Screening committee on the applicants for teachers from 2012 up to present. She has a strong interest in the field of computer. She is motivated to pursue her graduate studies with the guidance of the Lord.

Mr. Felix M. Diano Jr. is currently finishing his doctorate degree in Doctor of Philosophy in Education major in Research Evaluation in the Cebu Normal University. He was graduated his master of Arts in Education major in Mathematics in the University of the Visayas last 2016. He was also have his vocational as Trainer's Methodology I in the University of Cebu last August 2015 and completed his PlUmming NC II in Abellana National HIGH School last March 2015. He received his Bachelor of Secondary

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