MATHEMATICS TEACHING STRATEGY IN STATISTICS AND PROBABILITY

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Abstract

Strategies are crucial in the learning process. This is an important tool for teachers to use in order to make learning more efficient and effective. However, these strategies have been tested in the last two years due to a pandemic that has altered the school structure. Distance learning is now used for teaching, and the presence of technology is significant. This prompted the researcher to conduct this study with the goal of determining the efficacy of existing strategies in the New Normal System. This study determined the difference and effectiveness of the Mathematics Teaching Strategies in Statistics and Probability, School Year 2021-2022. It sought to answer the following questions: (1) what is the level of Mathematics Teaching Strategies in terms of cooperative learning, discovery learning and discovery learning; (2) what is the level of students' performance using Mathematics Teaching Strategy with regards to pre-test and post-test?; (3) Is there a significant difference before and after using the Mathematics Teaching Strategies in Statistics and Probability and (4) Do the Mathematics Teaching Strategies have significant effect to the Learner's performance in Statistics and Probability? The study's research design was quasi-experimental. The MELC was used to identify the topics. Under online distance learning, the study has fifty (50) student-respondents. The majority of those who completed the questionnaire believed that the Mathematics Teaching Strategies of Cooperative Learning, Discovery Learning, and Problem-based Learning were helpful in classroom setup.

As a result, Mathematics Teaching Strategies in terms of Cooperative Learning, Discovery Learning, and problem-based learning as a learning tool have improved their performance and provided the requisite knowledge and abilities in Statistics and Probability. Before adopting the Mathematics Teaching Strategies, the respondents' pre-test level with some of the topics in Statistics and Probability was average. The post-test level then rose to Above Average. This indicates that they have a deeper comprehension of concepts and theories than the minimum criteria and can apply their knowledge to solve more mathematical problems. It was also discovered that some of the pupils scored below average in Statistics and Probability. This suggests that, despite the lack of a traditional face-to-face classroom approach, students were able to follow the proper information provided, leading to correct responses.

The findings revealed that the level of mathematics teaching strategy in terms of cooperative learning, discovery learning, and problem-based learning was noteworthy. Students' pretest performance was average, but their posttest performance was higher in terms. There is a significant difference between the pretest and post-test scores because the gained score increased after the mathematics teaching strategy was used. Except for problem-based learning, which has an impact on learner performance, the level of mathematics teaching strategy has no significant effect on students' academic performance.

Keywords: Strategies, Performance, Cooperative learning, Discovery learning, and Problem-based.

1. Main Text

Introduction

In education, terminology like strategies and approaches are crucial. These aid teachers in giving pupils with opportunities to learn and improve their skills. However, much has changed in recent years, particularly in terms of facilitating learners. From the traditional to the incorporation of new technologies. In the classroom, technology allows teachers and students to interact more effectively. Last year, a pandemic occurred, putting the importance of technology to the test. From using chalk and board in the classroom to participating in various online platforms such as Google Meet, Zoom, and MS Teams. This issue tests teachers' flexibility in dealing with varied approaches in the so-called New Normal System.

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Despite the pandemic's obstacles, we continue to provide education through the alternative through the present system. Instead of meeting face to face, this technique connects teachers and students via computers. Sadly, true communication has vanished. Some students are learning in a restricted amount of time because too much computer time is harmful to their health, while teachers provide a variety of tools for them to learn.

While the present strategy is being tested, new ones are being discovered. In the New Normal System, the teachers provide ways to meet the needs of the students. The material was made simple to understand using multiple apps such as MSWord, PowerPoint presentations, and even Excel.

Everyone appears to be going through a period of adjustment. "How am I going to learn?" students wondered. ", "How should I proceed? Teachers are "What method should I use?" and "How can I finish this?" while students are "How can I finish this?" and "How can I finish this?" ", "How can I put this into action?" " and "Will they be able to complete this?". The system is riddled with concerns and uncertainties, but everyone is doing their best to see it through.

These questions helped the researcher to develop the topic of using teaching strategy as a method in learning mathematics in the new learning environment.

Background of the Study

Mathematics is one of the subjects that will be impacted by the new educational system. The transition from addressing problems on a whiteboard to using a computer, from graphing on paper to utilizing programs, and the limited time they had with their facilitators drove students to work autonomously. This pandemic posed a challenge to teachers in terms of how we would impart content, particularly in mathematics. This subject necessitates a lot of time and examples for students to master, as well as a guide to assist them relax while completing problems. Unfortunately, because of the epidemic, physical contact is outlawed, and we must rely solely on an unsteady online connection. During the distance learning implementation process in Philippine education, it is critical to assess whether students truly grasp the self-learning

Students who are new to distance education, such as E-Learning, may struggle to concentrate and fully understand their self-learning modules on their own, as well as to be motivated to engage in self-study, particularly when learning difficult subjects like mathematics.

Both students and teachers are looking for and discovering coping strategies in the New Normal System. Some people are inventing their own system. Because of the obstacle that we are facing, communication while studying has become a thing of the past.

Constructivism, in which learners actively participate in the learning process, is one of the methodologies that necessitates contact with learners. Regardless of the barrier, this technique will assist students and teachers in gaining a deeper knowledge of the subject matter. Before the epidemic, and when face-to-face learning is permitted, a common constructivist technique was used. "Now, even if we are in the New Normal system, is it really conceivable to adopt this strategy?" We may use a variety of platforms to improve our plan and make it more effective. This manner, we can assist students and teachers in determining the most appropriate technique for them.

These things made the researcher wanted to know if the existing strategies can be an effective in the new set-up of our education.

Theoretical Framework

Teachers create scenarios in which students challenge their own and each other's assumptions in a constructivist classroom. A constructivist teacher, in a similar way, creates scenarios in which he or she can question the assumptions that underpin traditional teaching and learning.

Based on Jean Piaget as cited by Jagodowski (2020), known as one of the first theorists in constructivism. His theories indicate that humans create knowledge through the interaction between their experiences and ideas. His view of constructivism is the inspiration for radical constructivism due to his idea that the individual is at the center of the knowledge creation and acquisition process. Most Piaget’s theories develop through working with children where he would challenge the idea that children are inferior thinkers compared to adults. His work provides evidence that children are not cognitively inferior to adults. He proves that children develop differently by establishing a theory involving cognitive stages.

Jean Piaget's schema theory suggests new knowledge with students' existing knowledge, the students will gain a deeper understanding of the new topic. This theory invites teachers to consider what their students already know before starting a lesson. This theory plays out in many classrooms every day when teachers begin lessons by asking their students what they already know about a particular concept.

Piaget's theory of constructivism, which states that individuals construct meaning through action and experience, plays a major role in schools today. A constructivist classroom is one in which students learn by doing, rather than by passively absorbing knowledge. Constructivism plays out in many early childhood education programs, where children spend their days engaged in hands-on activities.

Jagodowski (2020) also mentioned in his article about the theory of the spiral curriculum, Jerome Bruner contends that children are capable of comprehending surprisingly challenging topics and issues, provided that they are presented in an age-appropriate manner. Bruner suggests that teachers revisit topics annually (hence the spiral image), adding complexity and nuance every year. Achieving a spiral curriculum requires an institutional approach to education, in which the teachers at a school coordinate their curriculums and set long-term, multi-year learning goals for their students. The use of cooperative learning groups in the classroom is founded on the constructivism principle, which emphasizes the importance of social interaction. Constructivism is based on the premise that people learn by developing their own knowledge by connecting new ideas and experiences to previous knowledge and experiences to produce new or improved understanding (Bransford, et al., 1999) as cited by the research conducted by Jagodowski (2020). The study of the role that groups can play in this process is based on social interdependence theory, which arose from Kurt Koffka and Kurt Lewin's discovery of organizations as dynamic entities with varying levels of interdependence among members and members driven to attain common goals. Morton Deutsch defined various types of interdependence, with a positive association between group members' goal accomplishments fostering interdependence.

According to the sociocultural theory of development, learning occurs when students tackle challenges that are beyond their current developmental level with the assistance of their instructor or peers. Thus, cooperative learning is founded on the concept of a zone of proximal development, which is fostered by positive group interdependence. (Johnson, et al., 2014).

The above theory is related to the current study in that using a teaching strategy allows teachers and students to actively participate in the learning process. Regardless of the new learning environment, these methods can have an impact on students' performance. It will allow students and teachers to communicate effectively from a distance.

The researcher conceptualized the utility of different teaching strategies as tool to help the students learning in Mathematics. It consists of learning cooperative learning, discovery learning and problem-based, which will be used to identify if there is an impact and effective to the performance of the learners amidst the absence physical communication.

Statement of the Problem

This study aimed to identify the effectiveness of using Mathematics Teaching Strategies to the Learner's performance.

It seeks to answer the following questions:

1. What is the level of Mathematics Teaching Strategies based on LEAP in terms of:
   1.1 Cooperative learning;
   1.2 Discovery learning; and
   1.3 Problem-based?
2. What is the level of student's performance using Mathematics Teaching Strategy with regards to:
   2.1 Pre-test and;
   2.2 Post-test?
3. Is there a significant difference before and after using Mathematics Teaching Strategy in Statistics and Probability?
4. Do the Mathematics Teaching Strategies has significant effect to the students' performance in Statistics and Probability?

Research Methodology

This research explores the different existing strategies in learning Statistics and Probability. However, specifically, it addressed the effectiveness of using mathematics teaching strategies on the learners' performance.

Research Design

The research design that will be employed in this study is experimental, specifically the Quasi-experimental Research Design. In quasi-experiments, participants are not randomly assigned, therefore they are used in situations when randomization is problematic or impossible. The term "experimental research design" refers to the process of creating research with a high level of causal (or internal) validity. The accuracy of statements about cause-and-effect relationships is called causal validity.

This research design is appropriate for this topic since the researchers will gather data using a pre- and post-test. In a pretest-posttest design, the dependent variable is measured twice: once before and after the treatment is implemented. The obtained data will then be compared if there is a substantial discrepancy between the two. Choueiry (2021) went on to say that the results of the pre- and post-intervention measures are compared to see how the independent variable affects the dependent variable.

Specifically, the study utilized the quasi-experimental research design to gather the required primary data on the homogenous group that undergone a pre-examination or initial test and a post-examination or final test both containing mathematical concepts and exercises. Applying the pretest-posttest design in this research is the right approach as the score results collected from the initial and final test would be the primary data that was compared in the final procedure. Using a quasi-experimental research design allows the researcher to manipulate the independent variable as well as the treatment and the conditions that the participants are assigned to before measuring the dependent variable.

Population and Sampling Technique

The Purposive Sampling Technique was used in this study; it is a technique in which respondents are picked based on the researcher's judgment and on respondents' attributes. Because there is no face-to-face interaction due to the pandemic, only those who will complete diagnostic and summative tests, as well as the survey questionnaire, are chosen.

Purposive sampling, according to Vijayamohan (2022), is the process of picking samples from a larger sample size depending on the survey taker's or researcher's assessment. In other words, a purposive sample is chosen to meet the needs of the test, survey, or research for which it will be utilized.

Research Procedure

The researcher provides titles and one of this was approved by her professor. After the professor pick and give a title that was approved. The researcher begins to conduct and construct his research. This research is all about " Mathematics Teaching Strategy in Statistics and Probability. This is also limited on selected topics in Statistics and Probability which include in the second quarter. The researcher started with the Chapter 1 entitled The Problem and Its Background with a content of the introduction, background of the study, theoretical framework, conceptual framework, statement of the problem, hypothesis, and significance of the study, scope and limitation and definition of terms. This was followed by the Chapter 2 which called the Review Related Literature which contains six readings for related literature and six readings for related studies for each indicator and variable. The third Chapter Research Methodology which includes research design, respondents, research instrument, sampling techniques and the statistical treatment.

Research Instrument

The proponent utilized the ***Numerical Rating*** and the Equivalent to rate the respondents' perception from 1 to 5, with 5 as the highest rating. The levels (or scale) used to differentiate between Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree. Each level is accompanied by a criterion, or set of criteria, that specifies what is needed to reach that level of quality.

Scale	Range	Remarks
5	4.21-5.00	Strongly Agree
4	3.41-4.19	Agree
3	2.61-3.39	Neutral
2	1.81-2.59	Disagree
1	1.00-1.80	Strongly Disagree

Statistical Treatment of Data

Statistical treatment of data of the present study is shown in the table below.

Statement of the Problem	**Statistical Tool**
To determine the level of mathematics teaching strategies.	Mean and Standard Deviation
To determine the level of students' performance in Statistics and Probability.	Mean and Standard Deviation
To identify whether there is a significant difference between the before and after using the mathematics teaching strategy.	T-test
To ascertain whether the mathematics teaching strategies has no significant effect on the students' performance.	Regression Analysis

Results and Discussion

Level of the Mathematics Teaching Strategies

The respondents assessed the level of mathematics teaching strategy in Statistics and Probability in terms of Cooperative learning, discovery learning and problem-based which was revealed in the following tables, which shows the average mean, standard deviation, and remarks.

Table 1. Level of the Mathematics Teaching Strategies in terms of Cooperative Learning.

STATEMENT	MEAN	SD	REMARKS
It provides me an opportunity to address my lack of competitiveness.	3.82	0.85	Agree

It helps forming positive bonds with my classmates.	4.04	0.78	Agree
It builds a learning community that is welcoming to all learners.	4.18	0.83	Agree
It allows us students to benefit from each other's knowledge.	4.28	0.83	Strongly Agree
It nurtures friendliness, readiness to help, and an appreciation for the importance of caring and sharing.	4.10	0.81	Agree
Overall Mean	**4.08**		**Agree**

Legend:

Scale	Range	Remarks
5	4.21 – 5.00	Strongly Agree
4	3.41 – 4.20	Agree
3	2.61 – 3.40	Neutral
2	1.81 – 2.60	Disagree
1	1.00 – 1.80	Strongly Disagree

Overall, the level of the Mathematics Teaching Strategy in terms of Cooperative Learning attained a mean score of 4.08 and a standard deviation of 0.56 and was Agree among the respondents. As shown in the data gathered, cooperative learning assisted students in learning more and engaging in the learning process in Statistics and Probability. This strategy enables them to be more participative and recognize the value of sharing and caring.

As cited on the study of Cox (2017), cooperative learning is a great technique to implement into your curriculum. As you begin to think about and design this strategy to fit into your teaching, consider using the following tips. Present the material first, cooperative learning comes after students are taught. Choose your strategy and explain how it works to the students. For this sample lesson, students will be using the jigsaw strategy. Assess students individually. Although students will work together as a team, they will also be working individually to complete a specific task.

Table 2. Level of the Mathematics Teaching Strategies in terms of Discovery Learning.

STATEMENT	Mean	SD	Remarks
It cultivates my scientific mindset as well as a habit of working systematically.	3.82	0.66	Agree
I find the direct experience valuable.	3.66	0.77	Agree
It encourages thoughtful interaction with mathematical concepts as well as teamwork.	4.02	0.80	Agree
It encourages me to take an active role in dealing with mathematical concepts.	3.76	0.77	Agree
It encourages independence while dealing with logical.	3.78	0.74	Agree
Overall	**3.79**		**Agree**

Legend:

Scale	Range	Remarks
5	4.21 – 5.00	Strongly Agree
4	3.41 – 4.20	Agree
3	2.61 – 3.40	Neutral
2	1.81 – 2.60	Disagree
1	1.00 – 1.80	Strongly Disagree

Overall, the level of the Mathematics Teaching Strategy in terms of Discovery Learning attained a mean score of 3.79 and a standard deviation of 0.58 and was agreed among the respondents.

Including the data gathered, discovery learning has an impact on students' learning processes. It implies that this strategy assisted them in being involved, thinking critically, and being independent in understanding the lesson while under the supervision of the teachers.

Discovery Learning was introduced by Jerome Bruner, and is a method of Inquiry-Based Instruction. This popular theory encourages learners to build on past experiences and knowledge, use their intuition, imagination and creativity, and search for new information to discover facts, correlations and new truths. Learning does not equal absorbing what was said or read, but actively seeking for answers and solutions. Discovery learning made an impact when it comes to the learning experiences of our students, which makes our learners more involved in the learning process (Pappas, 2014)

Table 3. Level of the Mathematics Teaching Strategies in terms of Problem-Based Learning

STATEMENT	Mean	SD	Remarks
It motivates me to take responsibility for my self-learning and problem-solving efforts.	3.96	0.83	Agree
It enables me to prove and solve difficulties employing critical thinking.	3.76	0.85	Agree
It assists me in making sound decisions in facing various challenges.	3.74	0.75	Agree
It instills confidence in my ability to think mathematically	3.58	0.83	Agree
It helps me to identify alternative solutions and deciding on the best line of action.	3.86	0.83	Agree
Overall	**3.78**		**Agree**

Legend:

Scale	Range	Remarks
5	4.21 – 5.00	Strongly Agree
4	3.41 – 4.20	Agree
3	2.61 – 3.40	Neutral
2	1.81 – 2.60	Disagree
1	1.00 – 1.80	Strongly Disagree

Overall, the level of the Mathematics Teaching Strategy in terms of Problem-based learning attained a mean score of 3.78 and a standard deviation of 0.56 and was agreed among the respondents.

Based on the data gathered, as shown in the table above, the problem-based approach allows learners to think methodically and relate their experience on how to solve one problem.

To support the result, problem-based learning is a student-centered learning strategy that involves groups of students working together to solve a real-world problem, as opposed to direct teaching, which involves a teacher providing information and concepts about a subject to a classroom of students. Students improve not just their cooperation, communication, and research skills, but also their critical thinking and problem-solving ability, which are important for lifelong learning, as stated in the article written by Kurt (2020).

Level of the Student's Performance in Statistics and Probability

The researcher assessed the level of the Student's Performance in Statistics and Probability in terms of Pre-test and Post-test as revealed in the following table, which shows the frequency, relative frequency, mean, standard deviation and verbal interpretation.

Table 4. Level of the Student's Performance in Statistics and Probability in terms of Pre-test.

Scores	Frequency	Relative Frequency	Remarks
25-30	0	0%	Outstanding
19-24	8	16%	Above Average
13-18	34	68%	Average
7-12	8	16%	Below Average
0-6	0	0%	Needs Improvement
Total	**50**	**100%**	
Mean	**15.54**		**Average**
SD	**2.80**		

It can be gleaned from the table that most of the scores of the respondents obtained by the score 72-24 got a mean score of 15.54 and a standard deviation of 2.80 with a remark of Average. This means that the students, before using the Mathematics Teaching Strategies already have an average remark with some of the topics. The students at this stage acquire a minimum level of knowledge and core understanding about the selected topics in Statistics and Probability.

Similarly, Kelly (2019) states that pretests provide pupils a sneak peek into what they'll learn in a new lesson. Often, these assessments constitute a student's first exposure to new vocabulary, concepts, and ideas. As a result, pretests can be utilized as unit introductions. Pre-testing your pupils on what you're planning to teach can help them relax when the time comes for a post-test. Pretests can provide more exposure because students feel more at ease with subject, they are familiar with.

Table 5. Level of the Student's Performance in Statistics and Probability in terms of Post-test

Scores	Frequency	Relative Frequency	Remarks
25-30	2	4%	Outstanding

19-24	33	66%	Above Average
13-18	15	30%	Average
7-12	0	0%	Below Average
0-6	0	0%	Needs Improvement
Total	**50**	**100%**	
Mean	**19.78**		**Above Average**
SD	**2.41**		

On the above results, it is very evident and implies that the mathematics teaching strategies have impact with the on the performance of the students after using it. This indicates that the students were able to follow the correct information given that would lead them to correct responses despite the absence of the traditional face-to-face classroom approach.

In the study of Mestre (2012), pre- and post-tests, like checklists, can be used to assess student needs prior to a tutorial and subsequently assess how well the tutorial satisfied those needs. There is no method to quantify change in a given student's experience unless the same student is requested to finish both. Checklists can help you collect information that will help you construct a tutorial. After completing a tutorial, a participant can offer information about the tutorial's relevance as well as other attitudes and opinions. However, pre- and post-tests are utilized with the same student to determine whether the tutorial improved the student's ability to complete a task, process, or function. Mestre (2012).

Test on the Significant Difference of the Students' Performance in Statistics and Probability in terms of Pre-Test and Post Test upon using the Mathematics Teaching Strategies

Shows the difference of the Students' Performance in Mathematics 10 in terms of Pre-Test and Post Test upon using the Student Learning Packet. The data were statistically treated using Paired t-test. The following shows estimation for mean, mean difference, standard deviation, p-value, and its analysis.

Table 6. Test on the Significant Difference of the Students' Performance in Statistics and Probability in terms of Pre-Test and Post Test upon using the Mathematics Teaching Strategies

Variables	Mean	Mean Difference	Computed t-value	p-value	Critical t-value	Analysis
Pre-test	15.54	4.24	11.013	0.000	2.010	Significant
Post-test	19.78					
$\alpha = 0.05$						

The test of the difference between the pre-test and post-test of students' mathematics in Statistics and probability shows a computed value of (t-value= 11.013; p< .05) interpreted as Significant.

Based on the data, it is shown that there is a significant difference between the students' performance of the Grade 11 students in pre-test and post test scores in using the Mathematics Teaching Strategies. It shows that the null hypothesis "There is no significant difference between the students' performance of the Grade 11 students in pre-test and post test scores in using the Mathematics Teaching Strategies" is being rejected.

In the study of Capistrano (2013), the idea of pre and post testing of the students is often accepted as a viable method to assess the extent to which an educational intervention has had an impact on students learning.

Test on the Significant Effect of the Students' Performance in Statistics and Probability in terms of Post Test upon using the Mathematics Teaching Strategies

Shows the Students' Performance in Statistics and Probability in terms of Post Test upon using the mathematics teaching strategies. The data were statistically treated using regression analysis. The following shows estimation for mean, mean difference, standard deviation, p-value, and its analysis**.**

Table 7. Test of Significant Effect between the Mathematics Teaching Strategies and Learners' Performance in Statistics and Probability in terms of Post Test upon using the Mathematics Teaching Strategies

Strategies		Computed t-value	p-value	Analysis
Cooperative Learning	Learners' Performance	0.848	0.401	Not Significant
Discovery Learning		-0.624	0.536	Not Significant

Problem-based		2.342	0.024	Significant
$\alpha = 0.05$				

Based on the data, it is shown that there is no significant effect between Mathematics Teaching Strategies and Learners' Performance in Statistics and Probability in terms of Post Test upon using the Mathematics Teaching Strategies in terms of Cooperative Learning and Discovery Learning except for the indicator of Problem-based learning. It shows that the null hypothesis "There is no significant effect between Mathematics Teaching Strategies and Learners' Performance in Statistics and Probability" is being accepted.

The result given above indicates that teaching learning strategies have an impact on the performance of the students especially the problem-based learning. These methods help the teachers to introduce effectively the lesson and maintain the interaction between the student's despite of the absence of physical interaction.

As Tanner (2018) mentioned that there is another 'classic' experimental design is the pre-test/post-test control group. It has experimental and control groups that are chosen at random. Both groups are tested and measured on the variable in question at first. The experimental group is then given the treatment and then tested again. The control group is kept separate from the experimental group and retested. Comparisons are conducted between pre-test and post-test scores for each group when analyzing findings.

Summary of Findings

This chapter includes the presentation of a summary, findings, conclusion based on the hypothesis, and the corresponding recommendations.

Summary

This study determined the difference and effectiveness of the Mathematics Teaching Strategies in Statistics and Probability, School Year 2021-2022. The information on related literature and studies were gathered to formulate the objectives of the studies. Specifically, the information is found in books, journals, documents, published and unpublished materials like thesis, journals, and the internet.

It sought to answer the following questions: (1) what is the level of Mathematics Teaching Strategies in terms of cooperative learning, discovery learning and discovery learning; (2) what is the level of students' performance using Mathematics Teaching Strategy with regards to pre-test and post-test?; (3) Is there a significant difference before and after using the Mathematics Teaching Strategies in Statistics and Probability and (4) Do the Mathematics Teaching Strategies have significant effect to the Learner's performance in Statistics and Probability?

The research design utilized in this study is experimental specifically the Quasi-experimental Research Design- In quasi-experiments, because the participants are not chosen at random, they can be exploited in circumstances where randomization is difficult or impossible. This is appropriate for this study because the researcher compiled data using a pre- and post-test. In a pretest-posttest design, the dependent variable is measured twice: once before and after the treatment is implemented.

Based on the gathered data. The following findings are hereby presented:

1.Level of Mathematics Teaching Strategy

The level of mathematics teaching strategy gathered an overall mean of 4.08 in terms of cooperative, 3.79 for discovery learning, and 3.78 for problem-based. This further implies that respondents agreed that the activities enable them to work collaboratively and has an impact on the learning process even in an online set-up.

2. Level of Students' Performance

The overall of pretest (M=15.54) means average in the task. On the other hand, the grand mean of (M=19.78) of posttest means above average. These findings mean that the students perform exceptionally well in the above activity.

3. Significant Difference of the Students' Performance in Statistics and Probability in terms of Pre-Test and Post Test upon using the Mathematics Teaching Strategies

The test of the difference between the pre-test and post-test of students' mathematics in Statistics and probability shows a computed value of (t-value= 11.013; p< .05) interpreted as Significant. Based on the data, it is shown that there is a significant difference between the students' performance of the Grade 11 students in pre-test and post test scores in using the Mathematics Teaching Strategies. It shows that the null hypothesis "There is no significant difference between the students' performance of the Grade 11 students in pre-test and post test scores in using the Mathematics Teaching Strategies" is being rejected.

4. Significant Effect of the Students' Performance in Statistics and Probability in terms of Post Test upon using the Mathematics Teaching Strategies

The test of the effect between Mathematics Teaching Strategies and Learners' Performance in Statistics and Probability in terms of Pre-Test and Post Test upon using the Mathematics Teaching Strategies in terms of Cooperative shows a computed value of (t-value= 0.848; p> .05) interpreted as Not Significant. Discovery learning to the performance shows a computed of (t-

value= -0.624; p> .05) interpreted as Not Significant. Lastly, Problem-based to the Learners' Performance shows a computed value of (t-value= 2.342; p<.05) interpreted as Significant. Based on the data, it is shown that there is no significant effect between Mathematics Teaching Strategies and Learners' Performance in Statistics and Probability in terms of Post Test upon using the Mathematics Teaching Strategies in terms of Cooperative Learning and Discovery Learning except for the indicator of Problem-based learning. It shows that the null hypothesis "There is no significant effect between Mathematics Teaching Strategies and Learners' Performance in Statistics and Probability" is being accepted.

Conclusion

Based on the finding of the study, the following conclusions were drawn: (1) The hypothesis stating that there is no significant difference before and after using Mathematics Teaching Strategy in Statistics and Probability is rejected. This implies that there is a significant improvement in students' acquired skills and knowledge. (2) The hypothesis stating that there is no significant effect of using mathematics teaching strategy in student's performance in terms of pretest and posttest in Statistics and Probability is accepted.

Recommendations

Based on the results and conclusion posted in the study, the following recommendation was formulated to the following.
1. To the teachers, the problem-based learning as Mathematics Teaching Strategy can be used as a tool for better learning of students in Statistics and Probability that is evident in the findings of this study.
2. The findings of the study would create an opportunity to provide the best methods that students be able to acquire the expected knowledge, skills, and values expected of them.
3. Since the study found out that there is a significant effect of using problem-based learning, the teacher may use this strategy in fit in to the skills and knowledge of the students. In line with this, they can be more involved in the learning process and think critically and may understand the concepts in Mathematics, specifically, in Statistics and Probability.
4. To the future researcher, they can continue this research in validating the information gathered in a large number of respondents and in different areas of Mathematics.
5. School heads and teachers under this study may conduct seminars and trainings involving efficacy enhancement programs for further dissemination of best practices.
6. The findings of the study encourages to create an opportunity to extend the continual learning of the students by giving webinars about best practices to the teachers in key areas which would help the students to learn despite of this new normal education where students are learning independently.

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