Predictive Validity of Basic Mathematics with Statistics and Probability Performance of Grade 11 Senior High School Students

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Abstract: **This article aimed to determine whether arithmetic operations, algebraic concepts, and problem-solving skills are related to students' success in data analysis, probability problem-solving, and statistical reasoning. This research offered reinforcement activities to help improve students' abilities in Statistics and Probability. Test questionnaires assessed the performances of two hundred twenty-seven (227) Grade 11 Senior High School students in both basic mathematics and statistics and probability. Some mathematics teachers validated the results. The findings show that students are at the right age to learn Statistics and Probability subjects. There is a nearly equal distribution of male and female students, with a slight majority being female. However, the study found no significant link between students' age and their scores in basic mathematics, statistics, or probability. Both younger and older students performed similarly. In contrast, there is a significant relationship between sex and performance in arithmetic operations within basic mathematics. Male students tend to perform better than female students in this area. Additionally, regression analyses show that arithmetic operations significantly predict performance in statistics and probability, while algebraic concepts are mostly significant for probability problem-solving. Meanwhile, problem-solving skills are the strongest predictor for both probability problem-solving and statistical reasoning. To enhance students' statistical literacy and data-driven skills, the study proposes various reinforcement activities. These activities can help improve teaching methods, strategies, and techniques for learning statistics and probability. The researcher recommends that mathematics teachers adopt these reinforcement activities, which can lead to better practices in teaching mathematics. Finally, the researcher suggests further recommendations to develop knowledge and skills in higher mathematics, like statistics and probability.**

Keywords: **basic mathematics, statistics and probability, performance, problem-solving, reinforcement activities.**

I. INTRODUCTION

Mathematics is essential for developing students' logical reasoning, analytical, and problem-solving skills. It serves as the basis of a student's education and understanding that underlies science, engineering, business, social sciences, and other areas of study and professions. A solid grasp of essential mathematics concepts facilitates students' understanding of more advanced concepts.

The mathematical fundamental topics learned in junior high school impact learners' performance in the senior high school mathematics subject. Teachers and researchers, however, face the challenge of how much achievement in statistics and probability is linked to achievement in fundamental mathematics. For this reason, achievement in basic mathematics certainly aids mastery in higher-level mathematics subjects.

In the senior high school curriculum, statistics and probability assist students in analyzing data, trends, and risks and making calculated decisions using quantitative reasoning. Over time, as society has become increasingly data-driven, statistical literacy is no longer an ability reserved only for scientists and mathematicians; it is now an essential aspect in many other fields. Some researchers reveal that students who experience difficulty with fundamental arithmetical concepts tend to struggle in solving statistical problems. The great majority of these problems for students involve a basic understanding of

probability distributions, data analysis, and inferential statistics. These difficulties require considering whether students' earlier achievements in basic mathematics are likely to explain the comprehensible statistical and probabilistic processes.

Predictive validity is a key area in education research, and it relates to how well an educational measure of performance successfully predicts future academic success (Khan, A., & Ghosh, S. K. 2021). It is frequently used in standardized assessments and subject areas assessments as a way to analyze whether being proficient in assessment tasks early in a subject could indicate later future success (Breadmore, H., & Carroll, J., 2021). Knowing the predictive value of the most basic mathematical concepts for statistics and probability is fundamental to designing early recommendation plans. Understanding predictive validity is vital in determining learners' challenges and developing optimal learning experiences that support their learning development. Mastery of other subjects by the student, especially in professional subjects, heavily depends on their understanding of statistics and probability. Even though this aspect of mathematics is essential, many students struggle with it due to a lack of skills in basic mathematics.

This research explores how senior high school students with basic mathematics skills perform later in life as they progress through learning Statistics and Probability. It attempts to investigate predictive validity, positing that if students have attained some level of achievement in fundamental mathematics, they should be able to succeed in more advanced fields of mathematics, in this case, higher-order math. The results from the study will add to the existing educational research and, at the same time, aid in devising appropriate policies directed towards educators and policymakers. The relationships between elementary and advanced mathematical competencies call for the need to develop appropriate instructional frameworks and curricular materials that strengthen the students' skills in mathematics and statistical literacy.

Finally, the results of this study may pave the way for evidence-based recommendations for improving the mathematics curriculum so that students may be prepared to face the mathematical demands of statistical reasoning and data analysis. Through this research, educators can develop targeted interventions to reduce achievement disparities, enhance the performance of our students, and generate a deep understanding of mathematics as a critical means for solving problems and making decisions.

Considering the contexts above, the researcher, who is a senior high school mathematics teacher, engaged in researching this study to investigate whether students' success in basic mathematics has the potential to predict their success in statistics and probability. Understanding this relationship will help teachers identify students' needs for support, improve instructional strategies, and enhance curriculum planning. The results can inform reinforcement activities to better build up students' mathematical ability to improve learning success in the field of Statistics and Probability.

II.   RESEARCH METHODOLOGY

A. Design

The descriptive-correlational type of research was utilized in this study. Descriptive research aims to describe the characteristics of the population within the group; correlation research investigates the association among variables. This combination of methods in descriptive-correlational studies allows researchers to focus on the patterns and trends in a population (Creswell, 2014). The study aims to determine whether prior mathematical proficiency can predict future success in higher-level mathematics subjects. This study answered the following questions:

1. How may the socio-demographic profile of Grade 11 students be described in terms of:

    1.1 Age

    1.2 Sex

2. How may the basic mathematics performance among Grade 11 students be described in terms of:

    2.1 Arithmetic Operations

    2.2 Algebraic Concepts

    2.3 Problem-solving Skills

3. How may the statistics and probability performance among Grade 11 students be described in terms of:

    3.1 Data Analysis and Interpretation

    3.2 Probability Problem-Solving

    3.3 Statistical Reasoning

4. Is there a significant relationship between students' profile and their performance in Basic Mathematics and Statistics and Probability?

5. To what extent does basic mathematics performance (comprising Arithmetic Operations, Algebraic Concepts and Problem-solving Skills) predict students' achievement in statistics and probability (encompassing Data Analysis and Interpretation, Probability Problem-solving, Statistical Reasoning)?

6. What reinforcement activities can be proposed to improve students' performance in Statistics and Probability based on the findings of the study?

B. Environment

This study focused on the predictive validity of Basic Mathematics performance with Statistics and Probability performance among Grade 11 Senior High School students enrolled at General de Jesus College in San Isidro, Nueva Ecija. It aims to determine whether students' proficiency in Basic Mathematics can significantly predict their achievement in Statistics and Probability.

C. Respondents

The primary respondents in this study were 227 students from the STEM strand academic track during the second semester of the school year 2024-2025.

Table 1. DISTRIBUTION OF RESPONDENTS

Sections	
Aristotle	46
Carson	47
Mendel	46
Darwin	46
Lister	42
Total	**227**

D. Instrument

The study used test questionnaires designed by the researcher, which the head of the Mathematics Department at General de Jesus College validated as the main source of data. There are two sets of 60-item test questionnaires: Basic Mathematics Performance, which includes Arithmetic Operations, Algebraic Concepts, and Problem-Solving Skills, and Statistics and Probability Performance, which covers Data Analysis and Interpretation, Probability Problem-Solving, and Statistical Reasoning. The researcher used these instruments with a separate answer sheet to determine the socio-demographic profile and the mathematical ability and performance of the Grade 11 Senior High School students.

The reliability of this instrument was tested and retested by some students in another strand to establish its reliability. The internal consistency of the instrument was using Cronbach's alpha for reliability analysis and yielded 0.931 for Basic Mathematics and 0.921 for Statistics and Probability. The excellent internal consistencies of the instruments used indicates that the test questionnaires can give reliable results. The responses to the questionnaire were carefully tallied, tabulated, and organized.

E. Data Analysis Plan

To describe the profile of the respondents, frequency and percent distribution were used. The mean, frequency, and percent distribution are used to summarize students' performance in basic mathematics and statistics and probability.

The academic performance of the respondents in both basic mathematics (comprising Arithmetic Operations, Algebraic Concepts, and Problem-Solving Skills) and Statistics and Probability Performance (encompassing Data Analysis and Interpretation, Probability Problem-Solving, and Statistical Reasoning) are interpreted using the following verbal description and its numerical range:

Verbal Description	Numerical Range
Outstanding	17-20
Very Good	13-16
Satisfactory	9-12
Needs Improvement	5-8
Poor	0-4

The study employed statistical methods to analyze the relationship between students' profile and their performance in basic mathematics and statistics and probability. Spearman's rho determined the strength and direction of the relationship between students' profile and their performance in basic mathematics and statistics and probability. The multiple regression analysis is used to determine the predictive validity of basic mathematics performance with statistics and probability achievement.

III. RESULTS AND DISCUSSION

This section of the study elaborates the results and translates the gathered data on the profile and performances of Grade 11 Senior High School students in Basic Mathematics and Statistics and Probability.

A. Profile of the Respondents

The profile distribution of senior high school students is presented in table 2. Frequency and percent were obtained to show the distribution of students in terms of their age and sex.

Table 2. PROFILE OF THE RESPONDENTS

	FREQUENCY	PERCENT
AGE		
15	1	0.4
16	91	40.1
17	123	54.2
18	12	5.3
Total	**227**	**100.0**
SEX		
Male	110	48.5
Female	117	51.5
Total	**227**	**100.0**

Age: The data indicates that the majority of the student respondents are within the typical senior high school age range of 16 to 18 years. It implies that most of them entered school at the age required by the Department of Education. The integrity of the learner age distribution in this study is further supported by Agaton & Cueto (2017), who pointed out that age clustering within a grade level is an indication of appropriate educational placement and progression.

Sex: The nearly equal number of male and female respondents helps keep gender bias low in the results. This balance improves the representativeness and reliability of gender-based analyses in the study. It reflects a common trend in educational settings, where female participation is often equal to or slightly higher than that of males. Mendezabal and Tutaan (2020) pointed out that more females are participating in academic settings, especially in senior high school.

B. Basic Mathematics Performance

The table below shows the performance of 227 students in three important areas of Basic Mathematics.

TABLE 3. BASIC MATHEMATICS PERFORMANCE

	Frequency	Percent	Verbal Description
Arithmetic Operations			
0-4	1	0.4	Poor
5-8	8	3.5	Needs Improvement
9-12	42	18.5	Satisfactory
13-16	102	44.9	Very Good
17-20	74	32.6	Outstanding
Total	227	100.0	
Mean Score	**14.6**		**Very Good**
Algebraic Concepts			
0-4	1	0.4	Poor
5-8	7	3.1	Needs Improvement
9-12	44	19.4	Satisfactory
13-16	115	50.7	Very Good
17-20	60	26.4	Outstanding
Total	227	100.0	
Mean Score	**14.5**		**Very Good**

Problem-Solving Skills			
0-4	1	0.4	Poor
5-8	41	18.1	Needs Improvement
9-12	81	35.7	Satisfactory
13-16	77	33.9	Very Good
17-20	27	11.9	Outstanding
Total	227	100.0	
Mean Score	**12.1**		**Satisfactory**

Students usually do well in arithmetic operations like addition, subtraction, multiplication, and division. The result shows that they have a strong foundation in basic math skills. The high average score shows that teaching and understanding in this area work well.

The students show strong proficiency in Algebraic Concepts. It supports the idea that a solid understanding of foundational math helps with symbolic and abstract reasoning, including variables, equations, and simplification techniques.

Unlike Arithmetic and Algebra, problem-solving skills show a clear gap. Students' performance in this area suggests that there is room for improvement since more than half of the students do not achieve the "Very Good" level. Many students can perform mathematical procedures, but fewer can use them effectively to solve real-world problems. While the average is still acceptable, the results point to a need for focused teaching on analytical thinking, practical applications, and strategic reasoning.

C. Statistics and Probability Performance

The table shows how 227 students performed in three important areas of Statistics and Probability.

TABLE 4. STATISTICS AND PROBABILITY PERFORMANCE

	Frequency	Percent	Verbal Description
Data Analysis and Interpretation			
0-4	0	0.0	Poor
5-8	16	7.0	Needs Improvement
9-12	70	30.8	Satisfactory
13-16	103	45.4	Very Good
17-20	38	16.7	Outstanding
Total	227	100.0	
Mean Score	**13.5**		**Very Good**
Probability Problem-Solving			
0-4	0	0.0	Poor
5-8	23	10.1	Needs Improvement
9-12	71	31.3	Satisfactory
13-16	99	43.6	Very Good
17-20	34	15.0	Outstanding
Total	227	100.0	
Mean Score	**13.0**		**Very Good**
Statistical Reasoning			
0-4	7	3.1	Poor
5-8	46	20.3	Needs Improvement
9-12	99	43.6	Satisfactory
13-16	57	25.1	Very Good
17-20	18	7.9	Outstanding
Total	227	100.0	
Mean Score	**10.9**		**Satisfactory**

The data indicates that most students have a strong ability to analyze and interpret data. It includes organizing data sets and deriving statistical measures such as mean and median. Instructional strategies in this area are largely effective, but some learners still need support to reach higher levels of understanding.

Students show their ability to solve probability problems. It includes calculating probabilities for specific random variables. They also identify the area under the normal curve and calculate probabilities and percentiles using the standard normal curve.

Compared to the other areas, performance in statistical reasoning is weaker. This area involves making inferences, justifying conclusions, and using statistical thinking in various contexts. These skills are more abstract and need more cognitive effort.

D. Relationship between Students' Profile and their Performance in Basic Mathematics and Statistics and Probability

TABLE 5: SIGNIFICANT RELATIONSHIP BETWEEN STUDENTS' PROFILE AND THEIR PERFORMANCE IN BASIC MATHEMATICS AND STATISTICS AND PROBABILITY

		Age	Sex
Basic Math Performance			
Arithmetic Operations	Correlation Coefficient	.110	**-.148**[*]
	Sig. (2-tailed)	.099	.026
	N	227	227
Algebraic Concepts	Correlation Coefficient	.071	-.100
	Sig. (2-tailed)	.287	.134
	N	227	227
Problem-Solving Skills	Correlation Coefficient	.037	-.095
	Sig. (2-tailed)	.576	.153
	N	227	227
Statistics and Probability Performance			
Data Analysis and Interpretation	Correlation Coefficient	.059	.009
	Sig. (2-tailed)	.380	.898
	N	227	227
Probability Problem- Solving	Correlation Coefficient	-.027	-.050
	Sig. (2-tailed)	.684	.455
	N	227	227
Statistical Reasoning	Correlation Coefficient	.008	.052
	Sig. (2-tailed)	.901	.437
	N	227	227
*. Correlation is significant at the 0.05 level (2-tailed).			
**. Correlation is significant at the 0.01 level (2-tailed).			

The only significant finding is the link between sex and arithmetic performance. Male students are more likely to perform better in basic math operations. Other demographic factors, such as age and sex, do not significantly predict performance in algebra, problem-solving, or statistics. Students' age is not significantly related to their performance in Basic Mathematics, Statistics, and Probability. Younger and older students perform similarly. It highlights the need for gender-sensitive pedagogy in early math instruction and supports a focus on teaching quality and curriculum structure over demographic predictors in statistics education.

E. Extent to which Basic Mathematics performance (comprising Arithmetic Operations, Algebraic Concepts and Problem-solving Skills) Predict Students' Achievement in Statistics and Probability (encompassing Data Analysis and Interpretation, Probability Problem-solving, Statistical Reasoning)

TABLE 6. EXTENT TO WHICH ARITHMETIC OPERATIONS, ALGEBRAIC CONCEPTS, AND PROBLEM-SOLVING SKILLS PREDICT STUDENTS' PERFORMANCE IN DATA ANALYSIS AND INTERPRETATION

Predictors	B	Sig	R^2	Sig (Model)
Arithmetic Operations	.187	.012	.358	.000
Algebraic Concepts	.110	.157		
Problem Solving Skills	.327	.000		

Dependent Variable: Data Analysis and Interpretation

Predictors: Arithmetic Operation, Algebraic Concepts, Problem-Solving Skills

The extent to which Arithmetic Operations and Problem-solving Skills predict performance in Data Analysis and Interpretation is statistically significant, as demonstrated by the regression model. Among the three predictors, Problem-Solving Skills exert the strongest influence, while Algebraic Concepts show minimal contribution. Furthermore, the result indicates that while all three predictors have theoretical importance, problem-solving, and arithmetic skills are the most substantial and statistically significant contributors to student performance in data analysis and interpretation. It also points out the need for instructional strategies that strengthen students' problem-solving capabilities and arithmetic proficiency as key components of mathematics education in the modern curriculum.

TABLE 7. EXTENT TO WHICH ARITHMETIC OPERATIONS, ALGEBRAIC CONCEPTS, AND PROBLEM-SOLVING SKILLS PREDICT STUDENTS' PERFORMANCE IN PROBABILITY PROBLEM-SOLVING

Predictors	B	Sig	R^2	Sig (Model)
Arithmetic Operations	.212	.003	.515	.000
Algebraic Concepts	.308	.000		
Problem Solving Skills	.341	.000		

Dependent Variable: Probability Problem-Solving

Predictors: Arithmetic Operations, Algebraic Concepts, Problem-Solving Skills

The extent to which Algebraic concepts and Problem-solving Skills predict performance in Probability Problem-solving is highly significant, as demonstrated by the regression model. Otherwise, arithmetic operations still show statistical significance. In conclusion, this study confirms the important role of essential math skills in improving students' performance in probability-based problem-solving. The strength of the results underscores the need for teachers to focus on developing problem-solving skills, algebraic thinking, and arithmetic fluency in math instruction.

TABLE 8. EXTENT TO WHICH ARITHMETIC OPERATIONS, ALGEBRAIC CONCEPTS, AND PROBLEM-SOLVING SKILLS PREDICT STUDENTS' PERFORMANCE IN STATISTICAL REASONING

Predictors	B	Sig	R^2	Sig (Model)
Arithmetic Operations	.270	.002	.426	.000
Algebraic Concepts	.163	.071		
Problem Solving Skills	.412	.000		

Dependent Variable: Statistical Reasoning

Predictors: Arithmetic Operations, Algebraic Concepts, Problem-Solving Skills

The extent to which Arithmetic Operations and Problem-Solving Skills predict performance in Statistical Reasoning is statistically significant, as shown by the regression model. Similar to Data Analysis and Interpretation, problem-solving and arithmetic skills are crucial for students' statistical reasoning abilities. Problem-solving skills have the most substantial impact, while Algebraic Concepts contribute very little. These results support teaching methods that emphasize these skills. That is especially true when creating interventions to improve statistical literacy.

F. Proposed Reinforcement Activities to Improve Students' Performance in Statistics and Probability based on the Findings of the Study

The proposed reinforcement activities will maximize the potential of students to become more data-driven and statistically equipped. Aside from that, it will also allow teachers to be flexible and adaptable in presenting it to the class. School administrators may look into it as beneficial in developing students' needs and capacities. Thus, the researcher recommends that these proposed reinforcement activities must be put into practice.

TABLE 9. PROPOSED REINFORCEMENT ACTIVITIES

Activities	Objectives	Timeline	Persons Involved	Resources Needed	Expected Outcome
Data Analysis and Interpretation					
1. School Mini-Census A hands-on activity where students conduct a small-scale census in the school community to collect, organize, and analyze real data. This task lets learners use statistical tools in a practical setting, building skills in data interpretation and decision-making based on actual findings.	Demonstrate statistical tools in summarizing school-based data.	Quarterly (Twice per semester: 1st & 2nd quarter.)	Students, Mathematics Teacher, Admin Staff	Questionnaires, MS Excel/SPSS, charts/posters	The learners can experience real-world application of data analysis.
2. Interclass Quiz Bee on Statistics and Probability A competitive and interactive activity designed to reinforce students' understanding of statistical concepts through a friendly quiz competition. It encourages teamwork, quick thinking, and mastery of key topics in data analysis and probability across different classes.	Reinforce concepts through friendly academic competition.	Quarterly (Twice per semester: 1st & 2nd quarter.)	Students, Mathematics Teacher	Quiz materials, projector, buzzer system	Students boost their mastery on statistical concepts and peer learning.
3. Data Analysis Using Software Workshop A practical workshop where students learn to use data analysis tools like Microsoft Excel or SPSS. This activity improves their technical skills in organizing, computing, and interpreting statistical data. It prepares them for real-world applications of statistics in academic and professional settings.	Train students on how to use tools like Excel or SPSS for statistical analysis.	Once a month (five per semester)	Students, ICT Teacher, Mathematics Teacher	Computer lab, projectors, Excel/SPSS tutorial guides	Teachers can help students to improved their digital literacy and confidence in tech-based data interpretation.
Probability Problem-Solving					
1. Math Escape Room A gamified learning activity lets students solve a series of probability problems and puzzles to escape from a themed scenario within a set time. This hands-on experience promotes critical thinking, teamwork, and the practical use of probability concepts in an enjoyable and engaging manner.	Use problem-solving in a gamified escape challenge based on probability tasks	During the class/ discussion	Mathematics Teacher, Students, School Admin	Printed clues, locks/props, stopwatch, classroom setup	Students are engaged in problem-solving with fun and challenging environment.

2. Real-life Probability Scenarios An activity that engages students in analyzing everyday situations—like weather forecasts, medical testing, or traffic patterns—using probability concepts. It aims to deepen their understanding by connecting classroom learning to real-world applications and decision-making.	Apply probability in real-life situations such as weather forecasts or risks	Every week	Mathematics Teacher, Students	News articles, online resources, worksheet templates	Teachers can improved students' analytical thinking and real-world application of probability concepts.
3. Peer Teaching Workshops A collaborative activity where students take turns teaching probability concepts to their classmates. This approach reinforces their own understanding, builds communication skills, and promotes a deeper, shared learning experience within the classroom.	Enhance understanding by teaching probability concepts to peers	During the class/ discussion	Selected students, Mathematics Teacher	Printed modules, visual aids	Students can have a better retention and mastery through collaborative learning.
Statistical Reasoning					
1. Infographics A creative program where students design visual representations to simplify and communicate key statistical concepts. By combining data, graphics, and concise explanations, this activity enhances understanding and promotes effective communication of statistical reasoning.	Creatively summarize statistical data using visuals	1 day	Students, ICT Coordinator, Mathematics Teacher	Canva or MS Publisher, computers, internet	The visual learning will reinforce and students can present statistical processes in a clear manner.
2. Mock Statistics Fair/Exhibit A culminating program where students showcase their statistical investigations and data analysis projects. Through posters, charts, and presentations, they demonstrate their ability to apply statistical reasoning to real-world issues, fostering communication, critical thinking, and analytical skills.	Showcase projects that apply statistical reasoning to real-world problems	Quarterly (Twice per semester: 1st & 2nd quarter.)	All students, Mathematics Teacher, Parents, Admin	Booth materials, poster boards, evaluation rubrics	There will be public presentation and validation of learning which also strengthen communication skills.
3. Self and Peer Assessment Activities A reflective program that encourages students to evaluate their own work and that of their peers. It promotes critical thinking, accountability, and deeper understanding by fostering constructive feedback and self-awareness in the learning process.	Encourage reflection and critical evaluation of own and peers' understanding	Ongoing (Bi-weekly)	Students, Mathematics Teachers	Checklists, reflection journals, Google Forms	Students become more self-aware and accountable for their learning.

These proposed reinforcement activities may not only help teachers with other strategies and techniques that they can use in teaching but also help the students strengthen their abilities in understanding Statistics and Probability subjects.

IV. CONCLUSION AND RECOMMENDATIONS

A. Conclusion

1. Most grade 11 senior high school students in General de Jesus are 17 years old, with nearly equal sex distribution and a slight predominance of female students.

2. Most students have strong skills in arithmetic and algebra, and many perform at a higher level. Only a few students fall below the expected level. However, many students struggle with problem-solving and perform at a lower level. It indicates they need more practice using mathematics in real-life situations and thinking through problems carefully.

3. Students show strong skills in data analysis and probability problem-solving, with many performing at a higher level. They are generally able to organize data and solve probability problems accurately. However, performance in statistical reasoning is weaker, with some students struggling to apply higher-level thinking. Overall, students demonstrate solid understanding in key areas, but some need more support in developing deeper reasoning and critical thinking skills.

4. Students' age is not significantly related to Basic Mathematics and Statistics, and Probability performance. Younger and older students perform similarly. Furthermore, students' sex is significantly related only to the Basic Mathematics Performance in Arithmetic Operations. Male students are most likely to have better performance in Basic Math Performance in Arithmetic Operations.

5. The arithmetic operations, algebraic concepts, and problem-solving skills of students significantly predict students' performance in data analysis and interpretation, probability problem-solving, and statistical reasoning. However, algebraic concepts do not considerably predict students' performance in data analysis and interpretation and statistical reasoning, while it is highly significant in probability problem-solving. Meanwhile, problem-solving skills serve as the strongest predictor among other variables, and they highly significantly predict students' performance in statistics and probability.

6. Reinforcement activities were proposed based on the predictive validity of students' performance in basic mathematics with their performance in statistics and probability. These activities can be useful in enhancing and improving the practices in learning statistics and probability.

B. Recommendations

1. Instructional strategies in Basic Mathematics and Statistics, and Probability should be gender-inclusive, incorporating differentiated instruction, contextualized methods, and collaborative learning activities to cater to diverse learning preferences and enhance academic performance.

2. To improve students' computational skills but weak problem-solving abilities, teachers should integrate real-life math problems, use inquiry-based learning strategies, organize workshops, use formative assessments, incorporate digital tools, receive training, and encourage student reflection.

3. Teachers should include challenging tasks that help students spot data trends, assess results, and make decisions based on data. They should also provide rigorous activities that require strong statistical reasoning. Reflective discussions, teamwork in solving problems, and inquiry-based learning all lead to a better understanding and stronger critical thinking skills. Frequent assessments and ongoing professional development provide a solid mathematical foundation.

4. Instructional strategies should not focus on age. Students of different ages can benefit equally. Gender is strongly linked to Basic Math performance, with male students showing better results. Specific interventions, like teaching methods that consider gender, activities that build confidence, and resources that include everyone, can help close this gap.

5. Senior high school mathematics instruction should aim to develop problem-solving skills by incorporating real-life tasks that include statistical and probabilistic concepts. The teacher should be enthusiastic about delivering algebraic lessons that focus on more integrated, context-based, and straightforward discussions. Incorporating tasks such as algebra-based data modeling, graphical representations, and variable analysis in real-life scenarios can help students build the necessary cognitive connections. Such integrative strategies not only improve problem-solving skills but also foster a more meaningful and relatable understanding of abstract algebra concepts (Karjanto & Acelajado, 2022). Furthermore, teachers should strengthen foundational arithmetic skills. The curriculum should encourage a well-rounded understanding of statistics and probability through problem-based learning.

6. The proposed reinforcement activities should be used by the mathematics teachers and school administration, as they will lead to enhanced and better practices in learning statistics and probability.

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