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Quantitative Evaluation of the Inferential Statistics Integration Skills in Practical Research of Grade 12 Students: As a Basis for a Remediation Program

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Abstract. This study evaluated students' perceived versus actual integration skills in statistics on seven central topics of the course concerning so-called 'inferential statistics,' namely: t-tests (independent and dependent), Analysis of Variance (ANOVA), Chi-square tests, Pearson Product Moment correlation coefficient, Spearman rank correlation coefficient and regression analysis. Descriptive statistics indicated that students perceived their skills as developing (mean = 1.62), but their actual performance was lower, categorized as beginning (mean = 1.38). Students performed weakest on Chi-square tests (mean = 1.10) and ANOVA (mean = 1.30). However, correlation analysis showed that most topics had no significant relationship between perceived performance and actual performance ($p = 0.045$), except for the Pearson Product Moment correlation coefficient, which had a moderate positive correlation ($\rho = 0.260$). Despite this, the actual performances for all topics were still low. Thus, the findings show a gap between perceived and actual skills. These results indicate that a comprehensive remediation program will include all seven inferential statistics topics utilized in this study. The course of study in this regard should be designed to enhance conceptual understanding, practical competency, and the student's capacity for appropriate self-assessment. A structured approach that matches focused workshops with practical work and individual support will help ensure that students develop both the theoretical and practical competence they need to do the statistical analysis, and that is through targeted instructional workshops and interactive statistical software training as the remediation program.

Keywords: Inferential Statistics; Statistical integration skills; Student Performance; Self-Assessment; Remediation Program.

1.0 Introduction

In recent years, much enthusiasm and eagerness have been developed in Grade 12 students about research, especially among schools in the Philippines. The K-12 curriculum was designed to prepare these students for further education and professional life by introducing research skills. It comes with this growing interest in the function of research, emphasizing the developing requirement for statistical literacy, as statistics are at the center of correctly analyzing and interpreting data about quantitative research. The competencies the students are to develop will certainly involve effectively embedding relevant statistical concepts into practical research. This reflects a wider educational trend that emphasizes data-driven decision-making and empirical inquiry.

Despite students' increasing interest and enthusiasm for research, some pressing concerns remain—one most serious being integrating statistical knowledge into their research projects. Among the serious issues identified was the lack of statistical skills on the part of some teachers handling Practical Research 2, particularly in inferential statistics, which is an important input in conducting quantitative research. Blömeke et al. (2020) highlighted that profiles of teachers' competence have a significance to instructional quality, and as linked to this study, most of the teachers, though proficient in other areas of research, may not have the necessary knowledge in statistics to the point of being able to assist the students accordingly. This would make the students poorly apply statistical methods and hence give incorrect results for the research. This gap between students' eagerness to learn, on one hand, and instructional support given, on the other, is the priority area where targeted interventions should focus in their quest to improve teaching and learning. This was supported by Doabler et al. (2022), who claimed that measurement and statistical research are areas of math that are notably overlooked in education-related research, especially when it comes to studies that involve students who have or are at risk of having math problems.

Sonza (2024) showed how students gain a deeper conceptual understanding of statistics when they learn through projects of data gathering, frequency distribution, and interpretation of results. However, statistical literacy research is full of errors, be it cognitive or procedural, according to Putri et al. (2023). Tsaniyah (2020) furthers that this thinking style contributes to differences in field-dependent and field-independent students' statutory thinking skill levels. These studies indicate that while high school students can learn statistical integration skills, there needs to be some focused instruction and support in addressing conceptual and practical gaps in their learning.

Given the focus of the current study, it is important to appreciate what core statistical deficiencies students will have when integrating statistics. According to research, students often encounter difficulties with statistical analysis in both conceptual and procedural senses. Li (2023) points out that many students need help conceptualizing research questions in the literature correctly or applying proper statistics, and they end up with flawed findings. Inferential statistics, which deals with projecting sampled data onto a larger population, requires hypothesis testing and test selection for a result to be meaningful. Masic et al. (2019) examples included small sample sizes and abuse of statistical tests that may significantly compromise the validity of inferential analysis. These issues directly affect Grade 12 students who must apply inferential statistics in practical research, particularly at the theoretical level, to understand data outputs and make conclusions (Sulistyani, 2019).

In a related study on assessing inferential statistics integration skills in practical research among senior high school (SHS) students, some related local studies in the Philippines supported the idea that learning environments, baseline skills, and teaching strategies have significant effects. For example, Retutas & Rubio (2021) showed that the school type of the students in their study significantly predicts whether or not they will perform well on statistical inferential questions, suggesting that institutional resources and teaching practices could influence student capacity at applying inferential statistics in their research work. This will be part of learning about inferential statistics in the real world. In addition, Reston et al. (2014) examined statistics education research in the Philippines with particular attention to program and teacher training. These findings indicate that the accessible skills of Grade-12 students from inferential statistics could be strongly influenced by overall pedagogical strategies in schools and teachers, potentially influencing the extent to which statistics can be integrated into research projects. Similarly, Verzosa-Quinto and Mabansag (2023) highlighted the necessary skills for effective problem-solving in mathematics that call for basic skills like reading comprehension and analytical reasoning directly related to understanding inferential statistics. These two studies together underline the importance of considering both cognitive development and learning environments in creating a rich environment for developing inferential statistics skills, which research examines within the context of practicum research for Grade 12 students.

Bete (2020) measured scientific and statistical literacy among the students in the eighth grade. The results depicted highly challenging tasks at odds with obtaining appropriate knowledge. These findings emphasize foundational skills and the learning environment as key factors in integrating statistics into research, supporting the focus on Grade 12 students. Testing of intermediate skills, according to Magno and Piosang (2016), suggests poor statistical performance even by Grade 12, which is considered crucial in ensuring successful students. Celiz et al. (2023) established that some students encounter difficulty since they have no past statistical knowledge, which boils down to their research in the statistical tool. Lacson and Dejos (2022) identified the framework for how research and statistical competencies may be gauged among senior high students and provided insight into how Grade 12 students are statistically integrated into research. It is an important sequence in statistical education since the students go up the academic ladder.

This study aimed to address the challenges related to statistical integration in research practices of Grade 12 students. Results from this study will go a long way toward informing assessment skills in statistical integration among Grade 12 students and serving to highlight perceived versus actual ability in a numeric sense. The study, therefore, will help develop effective instructional pedagogies and complementing resources for the reinstruction of particular statistical areas where the subjects reveal poor competencies. Recommendations from this study will also be made available to teacher training programs concerning how instructors can improve their knowledge of statistics to support students in developing these research skills. This research has as its ultimate goal the filling in of gaps that exist in statistical integration skills, which will, in turn, improve the quality of students' research and better prepare them for subsequent academic and professional challenges.

2.0 Methodology

2.1 Research Design

This study employed a descriptive-correlational research design to evaluate the statistical integration skills of Grade 12 students in their practical research projects. The research design is chosen to effectively capture both the students' self-perceived and actual skills in inferential statistics and examine the relationship between these two variables. The descriptive aspect of the study focused on gathering detailed information about the students' integration skills in inferential statistics.

2.2 Research Participants

This study's participants comprise sixty Grade 12 students who passed the Practical Research 2 course at Louella Gotladera Alcoba National High School. These students are in the final stage of their secondary education, where they are expected to demonstrate proficiency in research skills, including integrating statistical methods. The number of participants is determined using a sample size calculator. The selection of participants involved a stratified random sampling technique to ensure a representative sample across different academic tracks, performance levels, and demographic backgrounds within the Grade 12 cohort. This approach provided a comprehensive understanding of the integration skills of inferential statistics across a diverse group of students.

2.3 Research Instrument

The instruments were used to assess the perceived and actual skills in statistical integration among Grade 12 students in this study. Data was collected using a Self-Assessment Questionnaire and Practical Statistical Skill Test. Self-perceived statistical skills were assessed using the Self-Assessment Questionnaire. It was designed to capture student confidence in using inferential statistics in their research practice. This survey was modified from several instruments used in other educational research with this study sample to ensure the reliability and validity of the final product. Students perceived ability was measured on a 5-point Likert scale format (advanced, proficient, approaching proficiency, developing, and beginning).

On the other hand, the Practical Statistical Skills Test is supposed to objectify what the students know from inferential statistics. These problems also covered key inferential statistical methods, specifically t-test, chi-square test, ANOVA, and correlation analysis. This was designed to be a tough measure of how well the students could complete those steps while searching in research. The two instruments used in all studies were developed based on established instruments that had previously been validated. This has given confidence that the tools the researcher used for measurement were genuinely related to — and provided meaningful information relevant to — the constructs they originally purported to measure. The use of validated tools renders the research findings more credible and provides strong support for the possibility that Grade 12 students in schools would have been able to angle their skills integrative within inferential statistics with scrutiny aligning closer to Practical Research 2.

2.4 Data Gathering Procedure and Analysis

This study followed a step-wise process of structured method for data collection to prevent erroneous data collection and subsequent bias. The researcher sought permission from the relevant authorities in Louella

Gotladera Alcoba National High School to secure information/data. The selected Grade 12 students contributed to the questionnaire in their scheduled class period. Before taking the survey, students had to look at documentation explaining each word's meaning. To maintain the integrity of responses acquired upon completion. On a separate occasion, the students were put to an abilities check to mimic the exam environment so there were no distractions. This test was used to investigate the accuracy of their sophistication inferential statistics style in factorial research situations. Questionnaires and test performance data were securely stored for subsequent analysis. The data collected from questionnaires and scores were recorded in SPSS software as quantitative data for analysis. An in-depth analysis of the data collected was performed to evaluate the students' statistical integrating ability and the difference between what they perceived about their capability and their actual performance to generate some directed self-improvement.

2.5 Ethical Considerations

The study complied with all ethical rules for the care and use of animals to ensure that the research participants lived with well-being and dignity. The purpose was explained, and if the students volunteered, so did their teachers. He needed their written consent to demonstrate that the participants were willing to participate in the study voluntarily. Written informed consent was obtained from parents of students under 18. Confidentiality was maintained for all respondents in this study. No names or personal identifiers were used in this study's research reports or publications. All data were de-identified with coded identification numbers and stored on password-protected files accessible only by the research group. They were told that they could drop out of the study at any time without penalty or explanation. This was done to avoid any compulsion on the participants to continue performing an act they felt otherwise intolerably uneasy. The experimental procedure was consistent with the Declaration of Helsinki after being reviewed and approved by a local Ethics Committee, which stated that it did not expose any risks or discomfort to the participants. The questions and tests were age-appropriate; nothing was identified that could have been revealed. After data collection, a briefing session was held to explain the findings, discuss their meaning and implications, and allow the participants to ask questions or voice concerns.

3.0 Results and Discussion

3.1 Self-Perceived Statistical Integration Skills

Table 1. Descriptive statistics of the self-perceived statistical integration skills of the respondents

Indicators	Mean	SD	Interpretation
1. I can perform t-tests for independent samples.	1.63	0.802	Developing
2. I can perform t-tests for dependent samples.	1.73	0.733	Developing
3. I can perform an Analysis of Variance (ANOVA).	1.77	0.890	Developing
4. I can perform the Chi-square test.	1.55	0.675	Developing
5. I can perform the Pearson Product Moment correlation coefficient.	1.50	0.792	Developing
6. I can perform the Spearman rank correlation coefficient.	1.58	0.645	Developing
7. I can perform regression analysis	1.55	0.699	Developing
Total	**1.62**	**0.748**	**Developing**

Table 1 presents the self-perceived skills of Grade 12 students in performing various statistical techniques based on a 5-point Likert scale. It provides a mean and SD for every indicator and interprets the skill level. The overall mean score was 1.62 with a standard deviation of 0.748, which indicated that students perceived their statistical competencies as developing across all areas. Some of the specific indicators found were the lowest mean score: the ability of students to compute Pearson Product Moment Correlation (M = 1.50, SD = 0.792), meaning they have less confidence in this than the other areas. A critical finding noted here is that they posted the highest mean score regarding their ability to carry out ANOVA (M = 1.77, SD = 0.890). However, this is still within the "Developing" range, signifying a further requirement for improvement in understanding and applying ANOVA. Competence in performing t-tests for independent and dependent samples was similarly found to reflect a developing skill level with mean scores of 1.63 (SD = 0.802) and 1.73 (SD = 0.733), respectively. Consistency in all the statistical methods used, which included Chi-square, Spearman rank correlation, and regression analysis, can be deduced since all the mean scores obtained fall within the range of 1.50 to 1.77. This indicates that the perception regarding students' ability development in these aspects is uniform. Low standard deviations, ranging from 0.645 to 0.890, show that students have consistent responses with very little variability in how they self-assess their competencies.

Overall, the findings show that grade-12 students have a basic understanding of these statistical techniques but are still developing their competence early. More systematic instruction and practice in statistical methodology are needed to improve their confidence and competence. The literature discussed students' difficulties with statistics and applying them to life (Sonza, 2024; Putri et al., 2023). Putri et al. (2023) found widespread cognitive and procedural errors, indicating that students might have an unrealistic perception of their statistical proficiency. The results of the self-perceived skills portion of the study reported if students believed they were better or worse at something than reality favored. To mirror this, the differences identified in the study were consistent with the current literature regarding students' frequent underestimation of their ability to use statistical concepts in practice (Tsaniyah, 2020; Lacson & Dejos, 2022), which emphasizes measuring skill levels appropriately.

3.2 Actual Statistical Integration Skills

Table 2. Descriptive statistics of the actual statistical integration skills of the respondents

Indicators	Mean	SD	Interpretation
1. T-tests for independent samples.	1.42	1.319	Beginning
2. T-tests for dependent samples.	1.73	1.219	Beginning
3. Analysis of Variance (ANOVA).	1.30	1.078	Beginning
4. Chi-square test.	1.10	.838	Beginning
5. Pearson Product Moment correlation coefficient.	1.30	1.169	Beginning
6. Spearman rank correlation coefficient.	1.37	.938	Beginning
7. Regression analysis	1.42	1.319	Beginning
Total	**1.38**	**1.126**	**Beginning**

Table 2 describes the actual statistical integration skills of the respondents, as measured in a test examination consisting of 10 items for each topic, by describing the mean and standard deviation for each indicator and interpreting the students' competence level. The overall mean score of 1.38 with an SD of 1.126 signifies that, on average, the student's skills are at the "Beginning" level. Among the specific statistical techniques, the highest mean score was that for the T-tests on dependent samples (M = 1.73 and SD = 1.219), thus interpreted as the "Developing" status since students stand better in the presence of competence than the other items. However, that is understandable to be on the low side, showing areas needing further improvement. By contrast, the Chi-square test showed the lowest average score (M = 1.10, SD = 0.838); this means that in this technique, students have the toughest time and remain at a "Beginning" level. The remaining subjects, independents samples T-tests (M = 1.42, SD = 1.319), ANOVA (M = 1.30, SD = 1.078), Pearson Product Moment correlation coefficient (M = 1.30, SD = 1.169); Spearman rank correlation coefficient (M = 1.37, SD = 0.938), Regression Analysis (M = 1.42, SD = 1.319), are below the "Beginning" level of competence. The standard deviations obtained are relatively high, ranging from 0.838 to 1.319, which clearly shows that variability in performance has been observed among the respondents. Whereas some students performed a bit above average, others had very poor performances. This generally points out that the actual competence of the respondents in statistical integration is very limited. Most students scored very low in the items; the majority were within the "Beginning" level on most topics, suggesting a large gap between perceived competence and actual skills for most. This means an urgent need for tailored interventions and instructional support for their mastering of such basic statistical methods.

These results are explained by the research of Masic et al. (2019) and Sulistyani (2019), who claim that students mistakenly interpret their data into whole conditions and misinterpret it to reach inferences for understanding inferential statistics. Returns & Rubio (2021) and Reston et al. (2014) were few to blush the teaching practices, school environment-affiliated characteristics, as well as the initial capacity of students to perform inference. Well, suppose the study found gaps between student competency levels and what the curriculum expects from them. In that case, we might expect this because teaching practices and available resources have a huge role in shaping students' real-world skills.

Some factors hinder a student's capacity to apply inferential statistics. The first factor affecting this ability is the students' prior exposure to and understanding of fundamental concepts. Most students do not know the foundational notions in statistics essential for inferential statistics in their research. This lack of understanding influences their ability to interpret data and correctly make relevant assumptions. Therefore, it affects the overall outcome, and performance in practical research tasks is compromised. On the other hand, some Practical Research 2 teachers teaching quantitative research do not have strong foundations in statistics. Given that they are not acquainted with the concepts of inferential statistics themselves, they become unable to disseminate this knowledge to the students. As a result, they, too, cannot help the students properly use statistical tools. When teachers do not understand statistics, consistent teaching quality is not promoted, and the variation in student performance increases.

3.3 Relationship between Self-perceived and Actual Statistical Integration Skills

Table 3. Analysis of the relationship between the students' self-perceived and actual statistical integration skills

Indicators	ρ	p-value	Interpretation	Decision to Ho
1. T-tests for independent samples.	0.031	0.815	Not Significant	Accept
2. T-tests for dependent samples.	0.098	0.458	Not Significant	Accept
3. Analysis of Variance (ANOVA).	-.0210	0.107	Not Significant	Accept
4. Chi-square test.	0.039	0.766	Not Significant	Accept
5. Pearson Product Moment correlation coefficient.	0.260	0.045	Significant	Reject
6. Spearman rank correlation coefficient.	-0.042	0.748	Not Significant	Accept

This study addressed how accurately students can judge their general competence in applying statistical concepts (5-point Likert scale) about a partially objective measure on an examination covering seven basic statistical topics. The Spearman's Rank Correlation was used to examine the strength and significance of the relationship between self-assessment and actual test performance on these topics. The results in Table 3 suggest that most statistical tests conducted to assess the connection between students' self-reported and actual statistical integration capabilities were insignificant. In particular, independent and dependent samples t-tests (ρ = 0.031, Sig = 0.815; ρ = 0.098, Sig = 0.458), ANOVA (ρ = -0.210, Sig = 0.107), chi-square test (ρ = 0.039, Sig = 0.766), Spearman rank correlation (ρ = -0.042, Sig = 0.748), and regression analysis (ρ = 0.100, Sig = 0.445) were carried out, demonstrating that there were no significant correlations between self-perception and actual performance. These results suggest that students' statistical competence does not match their confidence within these areas. The causes of such may include students' low familiarity with these methods, teaching that does not support proper practical skills, or students' inability to estimate the skills they command.

In contrast, the Pearson Product Moment correlation coefficient was significant (ρ = 0.260, Sig = 0.045), meaning students who see themselves as competent in this subject have an improved performance. Pearson correlation is a common teaching method in statistics courses; its relative simplicity and frequent use in theoretical and practical applications may help students assess their competency correctly. Therefore, the correlation between self-perception and real performance shows that familiarity and reinforcement play an important role in learning statistical concepts.

In conclusion, the one statistically significant relationship, the Pearson Product Moment correlation, about a moderate positive association, suggests that students were primarily accurate for self-assessment in this area. Nevertheless, significant relationships were not found for the other six statistical learning goals, which indicates that students' self-perception of their knowledge and actual performance is not uniform. Though these results give evidence that on certain dimensions (Pearson correlation), students may be able to judge their capabilities more accurately, they indicate possible over- and underestimation of mastery across different learning goals. Few statistical tools are considered more introductory than Pearson correlation, a metric introduced early in statistics education, particularly within academic settings. The fact that we use it to test the relationships between variables that we investigate in everyday research may render it more familiar and easier to grasp for students. As it is an already familiar concept, it could be that students have the sense of a higher self-perception of skill when asked about Pearson correlation times compared to other measures, and this is likely because they encountered Pearson correlation multiple times during both theoretical lessons and practical exercises. Also, for students, Pearson correlation may seem like a simple statistical method since it is based on the linear relationship between two variables and might be misperceived as less complex than regression or ANOVA. This must also contribute to their confidence and is part of why they are so good at this test.

The results of this study suggest that students' self-perceived statistical integration skills are not strong predictors of their test performance, apart from scores on knowledge-based questions about Pearson correlation. Few significant correlations resulted for most topics at that level, suggesting there may be a gap between perceived and actual ability, where feedback or instructional methods targeting improved self-assessment in understanding statistical terms should focus. As for its causes, first, teaching methods play a huge role in building confidence in students. When the focus is on theory as far as possible without enough practical exercise, students are prone to overestimating their abilities. For example, they may feel comfortable about a t-test or an ANOVA after lecturers but flounder when they must apply this knowledge to real data sets. Students will likely acquire an inflated sense of their abilities if not given opportunities to exercise these techniques. In addition, some practical research teachers teaching quantitative research do not possess strong foundations in inferential statistics. Second, past mathematics or statistics performances also influence students' self-assessment. Thus, a student who performs badly in quantitative subjects may think of himself as weak in statistics when his performance improves. On the other hand, students receiving A's or close on their earlier coursework tend to be overconfident and inflate self-perception where understanding is still developing. Lastly is the cognitive bias, such as the Dunning-Kruger effect, where lower-ability students overestimate their competence. However, the more capable ones are forced to underperform because of self-doubt or anxiety. This explains why some say they possess depth in places where they do not or why others, despite performing exceptionally, do not know their abilities.

That is, misconceptions in self-assessment are mostly based on poor teaching, previous experiential learning, and cognitive bias. The course can rectify most problems through much more experiential learning and constructive feedback so that the students can better perceive themselves in their statistical skills. For instance, Li (2023) argued that students made mistakes by not conceptualizing research questions properly, and they used incorrect types of statistics to make the results questionable. This is consistent with the study's results in that there appeared to be discrepancies between how competent participants thought they were and their actual skill levels. Magno and Piosang (2016) report the discrepancy between what students believed to know and absolute competency—that is, students felt good about themselves as they undertook number crunching that required thought yet lacked understanding. This deficit underscored the importance of enhanced instructional interventions to achieve not just perceptions of capacity but competencies in understanding statistical analysis.

3.4 Basis for Remediation Program Plan

Many studies identified difficulties experienced by students in statistical synthesis specifically. The significance of skills in reading comprehension and analytical reasoning as they contribute to understanding and using inferential statistics was also highlighted by Verzosa-Quinto and Mabansag (2023). The study also corroborated the assertions of Celiz et al. (2023) by identifying hypothesis testing and data interpretation as areas requiring remediation. It also corresponds with comments made by Bete (2020) concerning students needing more prior knowledge or statistical literacy. However, together, these studies highlighted that both cognitive and practical gaps needed to be addressed through targeted support, which complemented the focus of the fourth objective of this study.

This study aimed to explore the relationship between students' self-perceived statistical integration skills and performance in hopes of informing a specific, targeted remediation program. Results indicate substantial discrepancies in assessing students' abilities and performance competency relative to seven essential statistical topics. These results underscore a call for educational intervention to enhance student competence.

Descriptive statistics for students' self-perceived skills are summarized in Table 1, with students tending to rate themselves as a 'Developing' level of competence across all statistical topics by wish list number. The average self-perceived score was 1.62, and students ranked lower on their t-test together with ANOVA analysis Chi-square tests plus correlation methods performance capabilities instead of teaching and learning levels. Students rated themselves through the self-perceived options (mean in Analysis of Variance = 1.77 and mean in Pearson Product Moment correlation = 1.50). While the self-assessment indicates that students consider their understanding of these subjects adequate, they know they are not proficient.

The results using the actual performance data from Table 2 clearly show that students have 'Beginning' skills in all seven statistical topics, with an unweighted mean score of 1.38. The results show a large gap in the ability of students to apply statistical theory. In the students' actual performance, the weakest areas for both Rubber- and Coffee-matriculated students were the Chi-square test (mean = 1.10) followed by ANOVA (mean = 1.30), where there are large gaps in their ability to perform these analyses. In short, students are also not good at putting what they learn via book knowledge into practical skills, as seen by the very poor testing of topics like t-tests and correlation methods.

Seemingly, what students know is not what they can do. The comparison in Table 3 reinforces the distance separating self-perceptions of proficiency from objective performance. There were only very low and non-significant correlations between self-perception and actual performance of almost any topic considering independent t-test, dependent t-test, ANOVA, Chi-square tests, Spearman rank correlation, and regression analysis. Students who believe skills are not important scores generally knew how skilled they were in those areas since the correlation was negative, which shows that students tend to think too high or too low of their competence in these fields. One relationship reached statistical significance ($r = 0.260$, $p = 0.045$): that between students' self-assessment and their results for topics—which indicated a moderate positive correlation between students' scheduled skills vs actual performance in this topic. However, with such a high correlation, students still performed poorly, indicating much to be desired in an area that seems relatively stronger.

These studies highlight that remediation efforts must extend the range of statistical topics. The part where the remediation is required was found to be in all the seven inferential statistics topics covered in this study, namely the T-tests for independent samples, T-tests for dependent samples, Analysis of Variance (ANOVA), Chi-square test, Pearson Product Moment correlation coefficient, Spearman rank correlation coefficient, and Regression analysis, since the result of the skill test evaluation on the mention topics is all hanging in low scores and interpreted as 'Beginning in terms of skills.' These topics are to be focused on in the remediation program since they have become areas of struggle with higher occurrence both in understanding and application. Further, most topics are associated with trivial or no correlation between self-perception and actual performance, suggesting that students may not need to be fully aware of their weaknesses. Accordingly, the remediation program should likewise enhance students' self-assessment skills with more realistic understanding through formative assessments and reflective learning exercises.

To ensure that students benefit from practical research and relate theoretical concepts with real-world examples, it is important to conduct targeted instructional workshops as the remediation program to improve their inferential statistics skills. In this way, students learn how to use these statistical methods in practice by focusing on such issues as hypothesis testing, confidence intervals, and real-life data. First, in the case of hypothesis testing workshops, it is possible to help each student formulate and test his hypothesis, which is related to real life. Second, in the case of confidence intervals, it is possible to introduce the concept of estimating the interval's confidence level containing a population parameter. Thus, improving students' skills in interpreting the data is possible. Finally, students study how to use real-life data to solve research questions. As a result, students gain new ideas about how to apply inferential statistics in their work and learn that these methods are significant in a researcher's career.

The remediation program can also be an interactive statistical software training in SPSS, Jamovi, or Python. Using statistical software helps students learn to handle data and make finer analyses. Interactive statistical software training helps students avoid common mistakes when handling large datasets. Students get hands-on tutorials, meaning they input their data, choose which test to run, and interpret results. In doing so, students learn theory and then apply it to real data, giving them a comprehensive understanding. With simulations, students can make different changes to that data so that they can see how it influences the results obtained. The chance to work on real data gives the learners the relevant experience and expertise in what they do. Students can use their statistical software comfortably and interpret the results by being more guided. Unlike simulations, where the software is only used to calculate and test figures, interacting with real-world data confirms to the students that the software can be used to analyze data. It also helps to break the notion that learning to analyze data is only for theory; it helps to apply their knowledge in different areas, which is greatly beneficial.

4.0 Conclusion

The remediation should include focused workshops on the advanced topics that are difficult and scored low in the statistical skill test conducted in this study, concluding that all seven topics in inferential statistics that are utilized are to be included in a comprehensive remediation program to consolidate the understanding of concepts and applications. The remediation will be done through targeted instructional workshops and interactive statistical software training as part of the remediation program. Hands-on will be essential for students to successfully go from theory to more practice in which teachers can teach students how to apply statistical methods to real-world data. In addition, a pretest and posttest examination will be indispensable to check the aptitude of students as well as assess their attained skill set from the remediation program, thus assuring that the remediation mentioned above program has worked. Individualized tutoring or small groups can also be offered for students struggling with certain topics.

In summary, the data show strong evidence from this study stage that a remediation program concentrating on integrating statistical information is essential for supporting usability as an effective strategy. The substantial gaps between the self-perceived and observed performance, mainly in Chi-square tests, ANOVA methods, and Correlation, represent the implementation of intervention measures targeting these deficiencies. An extensive remediation task combining didactic teaching, application to problems, and practice self-assessment will help students gain more realistic expectations of their capability, leading to better statistical performance.

These findings and recommendations could be applied to broader educational settings or inform curriculum changes. In the curriculum, more time should be allocated to complex topics such as ANOVA and chi-square tests, while those should be interspersed with real-world applications and copious amounts of hands-on practice. Scaffolding over time allows competence and confidence to build over time. From applied psychology to health sciences and economics, workshops, hands-on learning, and feedback loops can be used as an ideal approach in training to improve students' skills in statistics application. Policymakers can update education standards to emphasize statistics' practical and real-life applications in preparing students for careers based on data.

5.0 Contributions of Authors

Mr. Jan Angelo G. Morata edited, wrote, supervised, analyzed, and encoded the data. Mr. John Paulo H. Poblete designed the study and collected the data. Both authors revised, reviewed, and approved the final work.

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7.0 Conflict of Interests

There is no conflict or no conflict of interest.

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9.0 References

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