


PRACTICAL TRAINING ON SPSS-BASED DATA ANALYSIS TO STRENGTHEN BUSINESS RESEARCH AND STUDENT FINAL PROJECTS

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Info Article	
Received :	<i>Abstract: This community engagement activity was designed to improve the statistical competencies of Management students at Cenderawasih University, with emphasis on the practical use of SPSS for academic research and undergraduate thesis preparation. Held on November 14, 2025, the program involved 55 seventh-semester students who engaged in interactive explanations, software demonstrations, and guided exercises. The training targeted students' limited understanding of quantitative techniques by introducing systematic procedures such as identifying variables, entering data, conducting classical assumption tests, and applying multiple linear regression. A discussion session supported participants in mastering each analytical stage and developing independent problem-solving skills. The outcomes showed clear progress in students' ability to execute and interpret tests for normality, multicollinearity, heteroscedasticity, autocorrelation, and linearity, along with regression results. Overall, the program significantly strengthened their statistical literacy and supported the enhancement of quantitative research quality in the Management Department.</i>
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Keywords:	<i>Abstrak: Program pengabdian ini bertujuan meningkatkan keterampilan analisis statistik mahasiswa Manajemen Universitas Cenderawasih melalui penggunaan SPSS untuk penelitian akademik dan penyusunan skripsi. Kegiatan yang dilaksanakan pada 14 November 2025 ini melibatkan 55 mahasiswa semester tujuh dan disampaikan melalui kuliah interaktif, demonstrasi langsung, serta latihan terarah. Program ini menanggapi rendahnya literasi statistik mahasiswa dengan mengenalkan prosedur kuantitatif yang sistematis, seperti identifikasi variabel, entri data, uji asumsi klasik, dan analisis regresi linear berganda. Forum diskusi juga disediakan agar mahasiswa memahami tahapan analisis dan mampu menerapkannya secara mandiri. Hasil kegiatan menunjukkan peningkatan kemampuan yang signifikan, terutama dalam menjalankan dan menafsirkan uji normalitas, multikolinearitas, heteroskedastisitas, autokorelasi, linearitas, serta output regresi. Secara keseluruhan, program ini berhasil memperkuat literasi statistik dan meningkatkan kualitas penelitian kuantitatif di lingkungan Program Studi Manajemen.</i>
<i>Statistical Training,</i>	
<i>Quantitative</i>	
<i>Analysis, SPSS,</i>	
<i>Classical Assumption</i>	
<i>Tests, Multiple</i>	
<i>Linear Regression.</i>	
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INTRODUCTION

Training in statistical analysis has become an increasingly vital component of community engagement programs, particularly within higher education institutions where quantitative research constitutes a significant portion of students' academic work. As universities emphasize data driven decision making and evidence based research, equipping students with the ability to accurately process, analyze, and interpret quantitative data is crucial. Numerous recent studies highlight the importance of practical, software-based statistical training in developing students' research competencies. Choiriyah and Noviani (2024) demonstrate that workshops oriented toward SPSS significantly enhance students' ability to design and implement quantitative research methodologies, leading to more reliable and replicable results. Similarly, Nugrahani and Imron (2023) emphasize that hands on experience with SPSS is critical for final-year students to consolidate their understanding of quantitative analytical procedures, especially in the context of thesis or capstone research projects.

Further evidence supports the notion that continuous engagement with statistical software strengthens analytical mastery. Wijaya and Yadewani (2023) report that repeated exercises with SPSS contribute to students' proficiency in conducting key statistical tests, fostering confidence in both interpreting outputs and drawing data driven conclusions. Oyata (2023) extends this perspective, suggesting that while software-assisted instruction effectively enhances comprehension of foundational statistical concepts, advanced analyses such as regression modeling or multivariate testing still require structured guidance from instructors or mentors to ensure methodological accuracy. Similarly, Rasikin and Widyaningrum (2023) provide empirical support showing that targeted SPSS training for preservice teachers results in measurable gains in performing instrument analyses and applying statistical testing procedures, demonstrating the transferability of software-based statistical competencies across disciplines.

Adding to this growing body of research, Latif et al. (2025) observed significant improvement in students' analytical performance following SPSS-based thesis preparation workshops. Their findings indicate that structured training not only increases technical skill but also enhances students' confidence in executing analyses independently. Saryadi et al. (2024) similarly found that carefully designed SPSS modules improve students' understanding of both data quality and the correct application of statistical testing procedures, fostering methodological rigor. Putra and Alisman

(2023) highlight the added value of integrating SPSS with multiple regression exercises, noting that this approach helps students develop practical model-building skills while reinforcing interpretive capabilities. Complementing these studies, Cahyono et al. (2023) demonstrate that combining SPSS with other software such as JASP in a multimodal training framework broadens learners' statistical perspective, while Putranto et al. (2023) emphasize that training focused on data processing activities not only enhances technical competence but also improves academic writing quality, as students can translate quantitative findings more effectively into their research reports.

Collectively, these studies illustrate the growing demand for statistical software-based instruction, particularly in academic programs that heavily rely on quantitative research designs. Within the Management Study Program at Universitas Cenderawasih, institutional records indicate that approximately 85% of undergraduate students opt for quantitative approaches in their final projects. Despite this high interest, a considerable gap persists between students' selection of quantitative methods and their mastery of the technical skills required to implement them. Many students encounter difficulties in executing classical assumption tests, such as normality, multicollinearity, heteroscedasticity, autocorrelation, and linearity checks procedures that are essential for validating regression models and ensuring robust analytical outcomes.

The student population targeted by this initiative reflects a diverse mix of academic preparedness and socio-cultural backgrounds. However, opportunities for formalized statistical training remain limited, constrained by institutional resources and geographic factors. While the university functions as a central hub for higher education in the region, structured training modules in statistical software are not consistently provided, leaving students reliant on self-learning or fragmented guidance. These circumstances create both challenges and opportunities: the challenge lies in ensuring research quality and timely thesis completion, while the opportunity arises to leverage community engagement programs to systematically address competency gaps.

Observational assessments conducted prior to the training confirmed that a significant number of students struggled with SPSS operations and the application of essential quantitative procedures. These limitations posed barriers to producing methodologically sound research, threatening the overall rigor and validity of students' final projects. Consequently, the primary objective of the community engagement initiative was to strengthen participants' ability to perform comprehensive quantitative analyses, including classical assumption testing and multiple linear regression, in

accordance with established scientific standards. The program was designed with a structured approach, combining theoretical instruction with guided practical exercises, ensuring that students not only understood statistical concepts but also developed the confidence and independence necessary to apply them in real research contexts. By providing pre and post assessment measures, the program could quantify improvements in technical proficiency and track shifts in student confidence. Beyond technical skill development, the initiative sought to foster greater methodological awareness, enabling participants to critically evaluate their data, interpret SPSS outputs accurately, and make informed, evidence-based decisions in their research projects.

Ultimately, the program aimed to contribute to the broader development of management education by bridging the gap between theoretical knowledge and practical application. Through structured, interactive, and software-based training, students were expected to achieve enhanced methodological rigor, higher analytical accuracy, and increased readiness to conduct independent quantitative research. This approach not only benefits individual learners but also reinforces the university's capacity to cultivate future graduates capable of producing data driven insights and contributing meaningfully to evidence-based decision-making in the fields of economics and business.

METHOD

This community engagement program implemented a participatory training model designed to enhance students' practical and theoretical understanding of statistical analysis. The approach combined concise theoretical explanations with guided demonstrations and closely supervised hands-on exercises, ensuring that participants could immediately apply concepts in real-time scenarios. By integrating these methods, the program aimed to create an interactive learning environment that encouraged active participation, immediate feedback, and peer-to-peer collaboration, which are critical for mastering complex analytical techniques.

The target population consisted of students enrolled in the Management Study Program at Cenderawasih University, with a total of 55 seventh-semester students participating in the training. These students had previously completed research methodology courses, but preliminary assessments revealed significant variability in their statistical competencies, particularly in conducting classical assumption tests and performing multiple linear regression analysis. This context underscored the importance of a structured, practice-oriented training program to bridge gaps between theoretical

knowledge and practical application. Data collection was conducted using a combination of quantitative and qualitative methods. Pre-tests and post-tests were administered to evaluate improvements in technical knowledge and analytical accuracy. In addition, structured observation of participants during training sessions provided insight into engagement levels, confidence, and problem-solving approaches, while practice sheets were used to systematically monitor progress in applying SPSS software to real datasets. This multi-faceted data collection strategy allowed for a comprehensive understanding of both measurable skill improvements and changes in participants' attitudes toward quantitative research.

The program focused on strengthening students' quantitative research competencies, including proper identification of variables, accurate data entry, execution of classical assumption tests, and application of multiple linear regression analysis using SPSS. The hands-on component enabled participants to practice step-by-step procedures under guidance, promoting confidence in interpreting outputs and drawing valid conclusions. Comparative analysis of pre- and post-training assessments revealed a marked improvement in both technical skills and analytical independence. Descriptive evaluations further highlighted participants' enhanced ability to follow structured analytical procedures, troubleshoot errors, and communicate statistical findings effectively. Overall, the program demonstrates that a participatory, practice-based training approach can significantly improve students' statistical literacy and readiness for quantitative research. By combining theoretical instruction with applied exercises and structured evaluation, the initiative not only enhanced technical competencies but also fostered greater confidence and independence in conducting data-driven analysis. These outcomes suggest that similar training models could be effectively employed to support the development of research skills in higher education, particularly in fields where quantitative analysis is essential for academic and professional success.

RESULTS AND DISCUSSION

The community service program was designed to enhance the competencies of 7th-semester management students in conducting classical assumption tests and multiple linear regression analyses using SPSS. The initiative was structured into three main phases preparation, implementation, and evaluation each carefully planned based on preliminary observations and assessments to address the specific needs and challenges of the participants. The program aimed not only to improve technical statistical skills but

also to foster students' confidence, analytical independence, and readiness to apply quantitative methods in their research projects.

Preparation Stage

The preparation stage involved a comprehensive field assessment using direct observation and informal interviews with students who had completed research methodology courses. This initial assessment highlighted a noticeable gap between students' strong interest in quantitative research, chosen by approximately 85% of participants for their final projects, and their limited technical skills in performing statistical analyses. Many students struggled with fundamental tasks such as conducting classical assumption tests and running multiple linear regression analyses independently. To address these gaps, the program team developed a set of structured training materials, including instructional modules, evaluation instruments, pre- and post-tests, and SPSS software tools. Coordination with the Management Study Program ensured that all logistical requirements including training facilities, participant scheduling, and access to necessary resources were fulfilled. This careful preparation aimed to create an environment conducive to interactive learning and practical application, ensuring that participants would benefit fully from both theoretical explanations and hands-on exercises.

Implementation Stage

The training session was conducted on November 14, 2025, with a total of 55 participants. The program began with theoretical sessions covering the structure of datasets, classical assumption testing, and procedures for multiple linear regression analysis. These theoretical explanations were immediately followed by guided practical exercises using SPSS, in which students worked with simulated datasets under the supervision of instructors. The activities were designed to be highly interactive, combining demonstrations, individual practice, group mentoring, and discussion sessions. This approach encouraged peer learning, fostered collaboration, and provided immediate feedback to participants, helping them internalize statistical concepts effectively. Quantitative improvements were measured through pre- and post-tests, which indicated a significant increase in participants' technical skills. Concurrently, qualitative observations focused on changes in student behavior, engagement, and confidence during the exercises. It was observed that students became more proactive in

asking questions, explaining analytical steps to peers, and confidently applying learned procedures to real datasets. These observations suggest that the training not only enhanced technical competencies but also strengthened students' academic self efficacy and motivation.

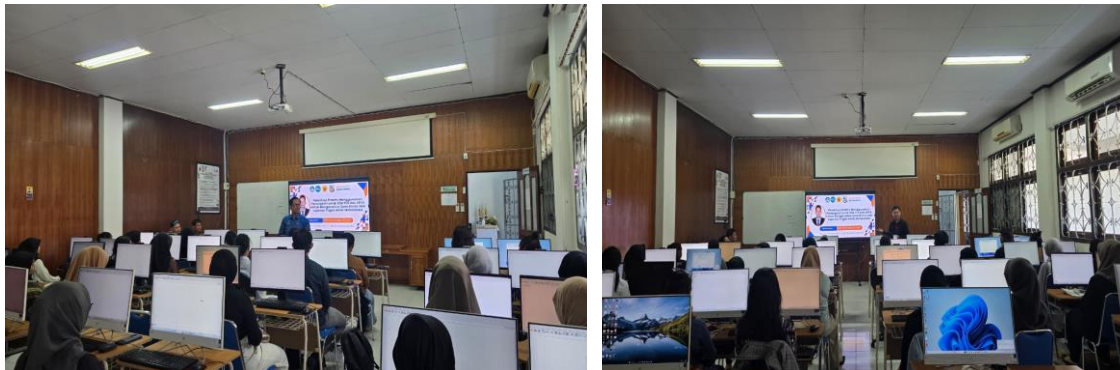


Figure 1. Implementation of the SPSS training program

Evaluation Stage

The evaluation phase aimed to identify challenges encountered during the training and assess the overall outcomes. Some obstacles included varying levels of initial statistical competence among participants, differences in laptop specifications, and limited time for individualized guidance. To address these challenges, the program team provided digital training modules for self study, access to recorded sessions, and follow-up consultation opportunities. Analysis of the pre- and post-test results revealed substantial improvements in technical competency. Most participants successfully constructed regression models, conducted analyses, interpreted SPSS outputs, and drew valid conclusions independently. Qualitative observations also highlighted improvements in academic behavior, including increased responsiveness, active engagement in discussions, and the ability to articulate analytical reasoning. These outcomes indicate that the program effectively bridged the gap between theoretical knowledge and applied statistical practice.

Results and Achievement of Objectives

The training program successfully achieved its primary objectives. Quantitative indicators, derived from pre- and post-test scores, demonstrated a clear enhancement of students' understanding and application of classical assumption testing and regression analysis. Qualitative indicators further confirmed that participants developed increased confidence, engagement, and practical skill application. Students were able to integrate

these competencies into their thesis proposals and ongoing research projects, reflecting the program's effectiveness in preparing them for real-world quantitative research tasks.

Strengths and Limitations

A key strength of the program was its hands on, interactive approach, which emphasized learning by doing rather than passive theory absorption. Open discussion sessions facilitated peer to peer learning, allowing students to identify and correct mistakes in real time, thereby reinforcing understanding. However, limitations were also noted. Time constraints restricted coverage of advanced topics such as robust testing, alternative regression models, or complex multivariate procedures. Additionally, some students required further guidance to interpret more complex SPSS outputs. These limitations provide valuable insights for future program iterations, highlighting areas where content depth and personalized support can be expanded.

Future Opportunities

The outcomes of the program suggest considerable potential for future development and scaling. Future initiatives could adopt a tiered training framework covering basic, intermediate, and advanced levels to gradually build students' statistical competencies. Introducing alternative analytical software such as Jamovi or R could diversify students' technical skillsets and enhance their adaptability. Advanced topics, including mediation and moderation analyses or structural equation modeling, could be incorporated for participants seeking deeper methodological knowledge. Moreover, outputs from the training, including modules and recorded tutorials, can be developed into reusable learning materials. These resources could benefit not only students at Universitas Cenderawasih but also students from other universities in Papua, promoting sustainable statistical literacy and broader academic capacity building. Such initiatives could support the cultivation of independent, evidence-based researchers capable of contributing to the field of management and business studies.

CONCLUSION

This community service initiative has shown a meaningful impact on the advancement of economics and business education by enhancing students' proficiency in statistics, particularly in performing classical assumption tests and multiple linear regression through SPSS. The training resulted in clear improvements in participants' technical skills, confidence, and readiness to conduct quantitative research an essential

component for generating rigorous, data-driven analyses within management studies. While differences in initial skill levels posed some challenges, the hands-on, practical approach of the program effectively strengthened methodological precision and analytical autonomy. Overall, these findings highlight that well-structured statistical training is vital for elevating research quality and equipping future graduates to make informed, evidence-based decisions, thereby contributing to the broader progress of economics and business practices.

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