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Research Article

Innovation in Mission-Based Statistics Learning through Student Cooperative Partnership at MTsN 4 Mojokerto

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Abstract

This study aims to describe the implementation and outcomes of mission-based statistics learning innovation through student cooperative partnerships as a contextual learning medium in the eighth grade at MTs Negeri 4 Mojokerto during the 2024–2025 academic year. This innovation is designed to enhance students' understanding of statistical concepts and data literacy by utilizing authentic data from the student cooperative. The mission-based learning model, which includes the phases of Observation, Investigation, Simulation, and Interpretation, is applied to create a more active, meaningful, and student-centered learning experience. The findings of this study show that student cooperative-based learning is effective in improving students' learning outcomes in cognitive, skill, and attitude aspects. A significant improvement was observed in post-test scores compared to pre-test scores. Students became more proficient in constructing tables and graphs, and there was an increase in group collaboration and engagement during the learning process. Additionally, this approach also enhanced students' mathematical communication skills, boosted their confidence in presenting data, and sparked an interest in economic activities and entrepreneurship. Overall, this innovation proves effective in creating contextual and relevant learning experiences, while supporting the strengthening of students' numerical literacy. This approach can be applied as an alternative model for learning that involves real data in the school environment.

Keywords: Statistics Learning, Mission-Based Learning, Student Cooperative, Contextual Learning, Data Literacy, Learning Outcomes, Mathematical Skills.

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INTRODUCTION

21st-century mathematics education emphasizes not only mastering concepts but also developing critical thinking, problem-solving, collaboration, and data literacy skills (Chiasson & Freiman, 2022). These competencies are essential in preparing students to face the increasingly complex challenges of the evolving world (Hosnan, 2014). One subject with significant potential to develop these competencies is statistics, particularly in the context of data analysis and information presentation (Gushchına & Anıkına, 2021). However, statistics education in many schools, including madrasahs, often remains abstract and disconnected from students' real-life experiences, leading to a limited understanding of the practical applications of statistics in everyday life (Dahar, 1989).

This issue highlights a research gap in statistics education, where current teaching methods do not sufficiently address students' need to understand statistical concepts through data that is relevant to their lives. Previous studies have shown that contextual learning, which connects the material to students' real-world experiences, can significantly enhance motivation and deepen conceptual understanding (Trianto, 2009; Zulkardi, 2002). However, the integration of real-life contexts, particularly through mission-based learning involving partnerships with student cooperatives, remains limited, especially in madrasah settings.

The urgency of this research lies in the need for innovation in statistics education that can improve students' understanding of what has traditionally been seen as an abstract subject. One approach that addresses this challenge is Mission-Based Learning, which places students in real-world contexts and encourages them to complete tasks that are relevant to their everyday lives (Kwangmuang et al., 2025). Supported by contextual and constructivist learning theories, this approach provides a more meaningful learning experience (Slavin, 2008).

Relevant previous research, such as studies by Sujatha and Vinayakan, highlights the importance of integrating mathematics education with real-life contexts (Sujatha & Vinayakan, 2023). However, there is still limited research specifically applying mission-based learning using student cooperatives as a contextual learning medium. The novelty of this study lies in applying mission-based statistics learning with a student cooperative partnership as an authentic data source, which is expected to provide a concrete solution to the problem of abstract and irrelevant statistics education.

The purpose of this study is to describe the implementation of the mission-based statistics learning model through student cooperative partnerships at MTs Negeri 4 Mojokerto, and to identify its impact on improving students' understanding and skills in statistics, particularly in terms of mode, mean, and presenting data in tables and graphs. This study also aims to evaluate student learning outcomes after participating in mission-based learning and to measure the improvement in motivation and active student engagement during the learning process.

The benefits of this research can be felt by various parties. For students, this research is expected to improve their understanding of basic statistical concepts, develop critical and analytical thinking skills, and encourage active student participation in learning through activities relevant to their lives. For teachers, this

research provides new insights into the application of mission-based learning models, which can serve as an alternative approach in mathematics education. Furthermore, this model can enrich the learning experiences within the madrasah environment by utilizing student cooperatives as an authentic learning resource (Arikunto, 2010).

LITERATURE REVIEW

21st-Century Mathematics Education

21st-century mathematics education requires an approach that focuses not only on mastering concepts but also on developing higher-order thinking skills, such as problem-solving, critical thinking, collaboration, and data literacy (NCTM, 2014). These skills are essential in preparing students to face the increasingly complex challenges of a rapidly evolving world. The characteristics of 21st-century mathematics education emphasize the importance of students' active engagement in observing, analyzing, and representing mathematical concepts in various forms, such as tables and graphs (Hosnan, 2014). Contextual learning that connects mathematical material with real-life situations helps students understand mathematical concepts more deeply and makes the learning process more meaningful (Hidayana & Lianingsih, 2025; Trianto, 2009).

Basic Concepts of Statistics

Statistics, as a branch of mathematics, studies the processes of collecting, organizing, analyzing, and presenting data to generate information that can be used to understand particular phenomena (Kumar & Lal, 2025). In an educational context, statistics plays a vital role in helping both teachers and students interpret data more objectively, supporting evidence-based learning (Zulkardi, 2002). Basic statistical concepts such as mode, mean, and data presentation in tables and graphs are essential skills that students need to master in order to effectively use statistics in their everyday lives (Almutairi, 2025).

The mode is the value that appears most frequently in a dataset, which helps identify the dominant trend in the data, such as the most popular product or the most common score (Dahar, 1989). The mean provides an overview of the data center and is frequently used in various contexts, such as exam scores or the time required for an activity. Presenting data in tables or graphs offers a clearer and more accessible way to analyze data, and it is crucial in helping students identify patterns or differences in the data (Arikunto, 2010).

Mission-Based Learning

Mission-Based Learning is an approach that focuses on completing a mission or goal directly related to students' real-life experiences (Bakhronova, 2025). This approach, grounded in constructivist theory, emphasizes meaningful and authentic learning experiences where students not only learn content but also apply knowledge and skills to solve real-world challenges (Al Abri et al., 2024). This model is highly relevant in mathematics education as it encourages students to develop critical

thinking, collaboration, and problem-solving skills, all of which are essential in a complex, data-driven world.

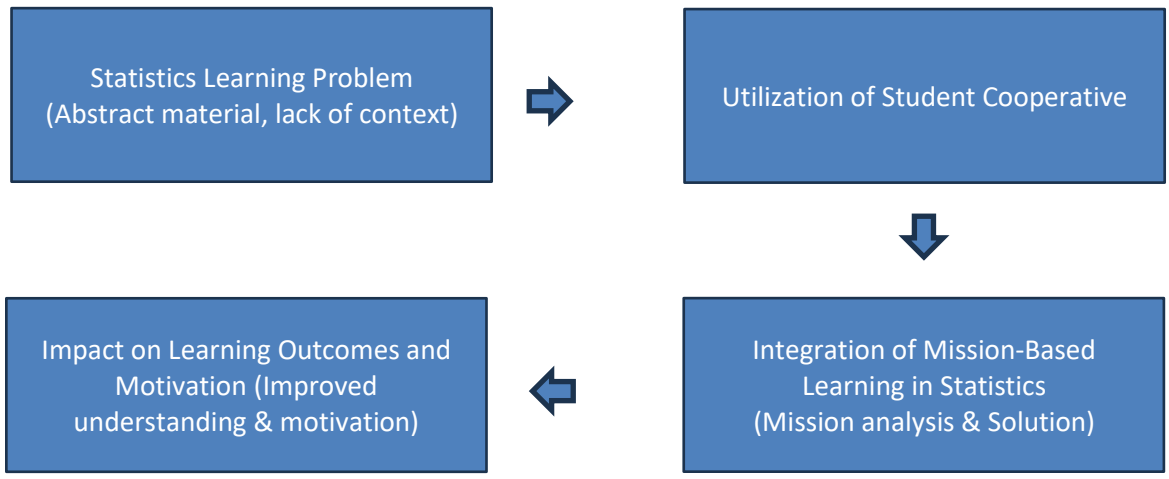
The key principles of mission-based learning include: (1) a clear and meaningful goal for students, (2) student engagement as the central element of the learning process, (3) collaborative learning, and (4) integration of knowledge and skills (Slavin, 2008). In the context of statistics learning, a mission could involve analyzing real data, such as sales data from a student cooperative, which allows students to apply statistical concepts they have learned in a relevant and authentic setting.

Student Cooperative as a Learning Medium

Student cooperatives serve as an important learning resource in statistics education because they provide real data that can be used to teach concepts such as data processing, inventory management, and profit calculation. Using data from the student cooperative makes mathematics education more contextual and meaningful, which in turn enhances students' understanding of statistical concepts (Slavin, 2008). The use of authentic data not only helps students understand the application of statistics in everyday life but also enhances their data literacy, a key competence for the 21st century.

Theoretical Framework

The theoretical framework of this study connects the problem of abstract and disconnected statistics learning with a solution based on mission-based learning that incorporates student cooperatives as a source of authentic data. By using data from the student cooperative, students are expected to gain a more direct understanding of statistical concepts, thereby improving their learning outcomes and motivation. Below is the framework that illustrates the relationship between the existing problem, the use of the student cooperative, and its impact on students' learning outcomes and motivation (see the figure below):



METHODS

This study employs a mixed-methods approach, combining both qualitative and quantitative methods to provide a more comprehensive understanding of the effectiveness and implementation of the mission-based statistics learning innovation through student cooperative partnerships (Kurtaliqi et al., 2024). The qualitative approach is used to deeply describe the implementation process, student responses, interactions during the learning activities, and the role of the student cooperative as a contextual learning medium. This qualitative data offers a phenomenological perspective on challenges and successes that may not be measurable through quantitative methods (Slavin, 2008).

On the other hand, the quantitative approach is applied to measure students' cognitive learning outcomes in statistics and changes in their learning motivation before and after the implementation of the learning innovation, using measurable statistical analysis. This is done through pre-test and post-test assessments, which are designed to evaluate improvements in students' understanding of basic statistical concepts such as mode, mean, and data presentation in tables and graphs. The use of a mixed-methods approach allows the data collected to be richer and complementary, thereby increasing the validity and reliability of the research findings (Arikunto, 2010).

This research was conducted at MTsN 4 Mojokerto in the second semester of the 2024–2025 academic year, specifically in May 2025. The research subjects consisted of 29 students from class VIII E. The selection of this group was based on the relevance of the class's characteristics to the research objectives, namely a class currently studying statistics within a more applied and contextual context (Dahar, 1989).

The study was carried out in two cycles, with each cycle consisting of four interconnected stages: Planning, Acting, Observing, and Reflecting (Nazari, 2022). The first cycle was used to implement mission-based learning, while the second cycle aimed to improve or refine stages that did not achieve optimal results. In each cycle, a mission-based teaching module was developed, incorporating the student cooperative as a source of authentic data to analyze the cooperative's sales data relevant to the statistical material being taught (Trianto, 2009).

The instruments used in this study included observations, interviews, tests, and documentation. Observations were conducted to monitor student interactions during the learning activities and the teacher’s role in facilitating mission-based learning. Tests were administered in the form of pre-tests and post-tests to measure students' understanding of statistical concepts and their data processing skills. Interviews were conducted in a semi-structured format to gain deeper insights into students' experiences during the learning process, as well as the challenges and successes they encountered while applying statistical concepts using real data from the student cooperative (Hosnan, 2014). Documentation, such as photos, videos, and activity reports, was used to provide physical evidence supporting the implementation and outcomes of the learning process.

The data collected were analyzed using descriptive analysis techniques, which involved systematically collecting, grouping, and presenting data (Mbanaso et al., 2023). The first step in the analysis was data reduction, which included editing, organizing, and summarizing the data according to relevant themes and categories. The data were then presented descriptively to illustrate the results achieved and identify emerging patterns throughout the learning process. Conclusion drawing was performed by linking the results from observations, interviews, tests, and documentation to provide a deeper understanding of the impact of mission-based learning on improving students' learning outcomes and motivation (Zulkardi, 2002).

The success of this study was measured by the established indicators, which included the improvement in cognitive learning outcomes reflected by the comparison of pre-test and post-test scores (Fox et al., 2023). Another indicator of success was students' learning motivation, evaluated based on their active engagement during the learning activities and the improvements observed in each cycle (Arikunto, 2010). Learning was considered successful if at least 80% of the students surpassed the Minimum Mastery Criteria (KKM), which is a score of 75, on the post-test administered after the implementation of the learning innovation.

RESULT AND DISSCUSSION

Overview of the Implementation of Learning

The implementation of this mission-based statistics learning innovation was conducted in class VIII-F at MTsN 4 Mojokerto, with 29 students participating in the mathematics learning activities. The learning was carried out in a classroom equipped with adequate facilities, such as a whiteboard, a projector, and access to the madrasah cooperative, which served as a source of authentic data. These facilities supported the effectiveness of the learning process and created an enjoyable environment, particularly when students worked in groups to process the statistical data obtained from the cooperative (Slavin, 2008).

This learning model employed mission-based learning, which consists of the phases of Observation, Investigation, Simulation, and Interpretation. Each phase of the learning was designed to connect statistical material with real-life activities within the madrasah. During the introduction phase, the teacher connected statistical concepts with the buying and selling activities in the madrasah cooperative, allowing students to directly observe the relevance of their learning to real-life situations (Anshori, 2021). In the core activity, students observed and processed the cooperative's sales data, calculated measures of central tendency such as the mean, median, and mode, and presented their analysis in tables and graphs. This learning approach aims to provide meaningful and contextual experiences in understanding statistics, while also developing students' numerical literacy skills (Zulkardi, 2002).

Implementation of Mission-Based Learning

Mission-based learning began with the Observation phase, where students were introduced to authentic data from the student cooperative, such as daily sales lists and the most popular products. This observation process aimed to build students' curiosity, enabling them to realize that statistics is closely related to their daily lives

(Trianto, 2009). Next, in the Investigation phase, students processed the collected data, calculated the mean, median, mode, and organized the data into frequency tables. Using authentic data allowed students to directly understand the meaning of statistical calculations, making the learning process more meaningful and relevant (Arikunto, 2010).

In the Simulation phase, students converted the processed data into bar or line graphs, which not only honed their technical skills in creating graphs but also improved their mathematical communication abilities. This phase was essential as students were taught to adjust the scale, provide titles, and properly label each section of the graph, which is crucial for visually communicating information (Slavin, 2008). The final phase, Interpretation, gave students the opportunity to explain the results of their data analysis. They interpreted sales trends and identified the best-selling products based on the mode, which enabled them to not only understand statistical theory but also develop critical thinking skills in making data-driven decisions (Hosnan, 2014).

Student Learning Outcomes

Student learning outcomes showed significant improvement after the implementation of the mission-based statistics learning innovation. This was evident from the comparison of pre-test and post-test scores, which consistently showed an increase in students' understanding of statistical material. In the pre-test, most students struggled with basic statistical concepts such as the mean, median, and mode. However, after participating in mission-based learning, the average post-test score increased significantly, with the majority of students mastering the statistical concepts taught (Dahar, 1989).

This improvement was also reflected in the skills aspect. Students demonstrated positive progress in their ability to construct data tables, create bar graphs, and organize data into more structured formats. The use of authentic data from the student cooperative allowed students to be more meticulous in selecting data and converting numbers into visual formats that were easy to understand. This process not only improved their numerical skills but also enhanced their ability to communicate information through graphs and tables (Zulkardi, 2002). Group work results also showed increased creativity and accuracy compared to when they worked with fictitious data in conventional learning (Arikunto, 2010).

In addition, this mission-based learning approach positively impacted students' attitudes. Students showed improvements in collaboration, engagement, and responsibility throughout the learning process. They were more enthusiastic and actively involved in group discussions, sharing opinions, and working together to complete tasks. This contextual learning approach gave students a greater sense of relevance to the material being taught, as they worked with data they were familiar with and could understand from their daily lives (Slavin, 2008).

Challenges and Solutions

Although the mission-based learning implementation showed positive results, several challenges arose during the learning process. One of the main challenges was

students' difficulty in manually creating graphs, particularly in determining scales, arranging axes, and maintaining the correct proportions to match the data. To address this, the teacher provided a simple graph template to facilitate students in creating accurate graphs with the data they had processed. This template acted as a guide, allowing students to focus on understanding the data content without being burdened by the technicalities of drawing graphs from scratch.

Additionally, time constraints posed another challenge during the mission-based learning process. Activities involving observation, data processing, simulation, and interpretation required a considerable amount of time. To overcome this, the teacher effectively managed group task allocation by assigning clear roles for each member, such as data recorder, number processor, graph creator, and presenter. This arrangement allowed all stages of learning to be carried out effectively despite the limited time available (Hosnan, 2014).

Impact of Learning on Students

The application of the mission-based statistics learning innovation through the student cooperative partnership had a significant impact on students' development in cognitive, skill, and attitude aspects. This learning approach improved students' understanding of the role of statistics in daily life, as students worked directly with data relevant to their environment (Trianto, 2009). Furthermore, this learning approach also boosted students' confidence in presenting and communicating data. When asked to present their analysis, students demonstrated improvements in public speaking skills and clarity in explaining information (Slavin, 2008).

The enhancement of mathematical communication was also reflected in group discussions, where students actively exchanged ideas about how to select data and interpret the generated graphs. This activity showed that students not only mastered statistical concepts but also understood the thought processes behind each step they took. Overall, this innovation successfully improved students' data literacy and prepared them to make more evidence-based decisions using statistics (Zulkardi, 2002).

CONCLUSION

Based on the implementation of the mission-based statistics learning innovation through student cooperative partnerships at MTs Negeri 4 Mojokerto in the 2024–2025 academic year, it can be concluded that this learning model successfully created a more contextual, meaningful, and relevant learning experience for students. The use of real data obtained from the student cooperative made statistical topics, such as calculating measures of central tendency and presenting results in tables and graphs, easier for students to understand. The evaluation results from the pre-test and post-test show a significant improvement in students' cognitive aspects. Additionally, there was an improvement in students' technical skills, such as their ability to construct graphs accurately, as well as in their attitudes, which were reflected in increased activity and cooperation during the learning process.

The mission-based learning model, which includes the phases of Observation, Investigation, Simulation, and Interpretation, provides a clear structure and allows students to actively engage in each learning phase. As a result, students not only understand statistical concepts theoretically but also connect them to real life through the analysis of cooperative data. This learning innovation also brought positive outcomes, including increased data literacy, improved confidence in presenting work, and enhanced mathematical communication skills. Furthermore, students' interest in economic and simple entrepreneurial activities also grew, making this learning more relevant to the need for strengthening numerical literacy and 21st-century skills.

Overall, this learning innovation has proven effective in improving the quality of statistics education and strengthening the relationship between madrasahs and student cooperatives as mutually supportive learning partners. Contextual learning like this is not only relevant for the development of numerical literacy but can also serve as an alternative model that could be expanded to other subjects or higher levels of education.

Suggestions

Based on the findings in this study, several suggestions can be applied to improve the effectiveness of mission-based learning and for further research development. First, context-based learning should be further developed, especially by utilizing existing resources within the school environment, such as cooperatives, canteens, or other activities that directly involve students. By using real data from their surroundings, students will be better able to understand and connect learning material to their everyday lives, which in turn can enhance their engagement and motivation in learning. Contextual learning like this can strengthen students' numerical literacy and 21st-century skills, as well as provide them with more meaningful and relevant learning experiences.

Additionally, to make mission-based learning more effective, it is recommended that teachers prepare structured data and easy-to-use graph templates. Many students still struggle with creating graphs manually, particularly in determining scales and converting data into accurate graphs. Providing templates with clear scales and formats can help students overcome these technical challenges, allowing them to focus more on understanding the data and performing statistical analysis rather than the technicalities of graph creation.

Time constraints also pose a challenge in the implementation of mission-based learning, especially because each mission phase requires a considerable amount of time to complete. Therefore, teachers need to manage time allocation more effectively and efficiently, while also assigning clear roles within each group. Clear role assignments, such as data recorder, number processor, graph maker, and result presenter, can help structure the learning process and maximize the use of available time without sacrificing the quality of learning activities.

For future research, an additional suggestion is to broaden the scope of the study to other levels of education, either in different subjects or at higher educational stages. Further research could also delve deeper into the impact of mission-based

learning on students' critical thinking, creativity, and decision-making skills in the context of mathematics education. By expanding the application of the mission-based learning model, it is hoped that this contextual and applicable learning approach can become a widely implemented model across various schools and educational levels.

Bibliography

Al Abri, M. H., Al Aamri, A. Y., & Elhaj, A. M. A. (2024). Enhancing student learning experiences through integrated constructivist pedagogical models. *European Journal of Contemporary Education and E-Learning*, *2*(1), 130–149.

Almutairi, B. M. (2025). The effectiveness of statistical learning tasks based on Excel software in developing statistical thinking skills related to the labor market among students of the Applied College. *Educational Process: International Journal (EDUPIJ)*, *14*(1), 1–17.

Anshori, I. (2021). Problem-Based Learning Remodelling Using Islamic Values Integration and Sociological Research in Madrasas. *International Journal of Instruction*, *14*(2), 421–442.

Arikunto, S. (2010). Prosedur penelitian suatu pendekatan praktek. *(No Title)*.

Bakhronova, M. (2025). MISSION-BASED TEACHING APPROACH AND ITS ROLE IN TEACHING FOREIGN LANGUAGES. *Mental Enlightenment Scientific-Methodological Journal*, *6*(01), 48–56.

Chiasson, M., & Freiman, V. (2022). Rethinking the 21st-century school: New citizens' skills for the digital era and their interaction with mathematics teaching and learning. In *Mathematics and Its Connections to the Arts and Sciences (MACAS) 15 Years of Interdisciplinary Mathematics Education* (pp. 69–107). Springer.

Dahar, R. W. (1989). *Teori-teori Belajar: Jakarta: Penerbit Erlangga*.

Fox, A., Dulhunty, J., Ballard, E., Fraser, M., Macandrew, M., Taranec, S., Waters, R., Yang, M., Yates, M., & Yelland, C. (2023). The impact of a cognitive impairment support program on patients in an acute care setting: a pre-test post-test intervention study. *BMC Geriatrics*, *23*(1), 260.

Gushchına, O., & Anıkına, O. (2021). VISUALIZATION OF DATA ANALYSIS FOR EVALUATION OF THE LEVEL OF IT-SPECIALISTS COMPETENCIES'CREATION. *Turkish Online Journal of Distance Education*, *22*(4), 254–276.

Hidayana, R. A., & Lianingsih, N. (2025). Contextual Learning as a Means to Improve Elementary School Students' Mathematical Literacy Skills. *International Journal of Ethno-Sciences and Education Research*, *5*(2), 46–50.

Hosnan, M. (2014). *Pendekatan saintifik dan kontekstual dalam pembelajaran abad 21: Kunci sukses implementasi kurikulum 2013*. Ghalia Indonesia.

Kumar, R., & Lal, K. (2025). *BASIC RESEARCH AND STATISTICS IN SPECIAL EDUCATION*. Crown Publishing.

Kurtaliqi, F., Miltgen, C. L., Viglia, G., & Pantin-Sohier, G. (2024). Using advanced mixed methods approaches: Combining PLS-SEM and qualitative studies. *Journal of Business Research*, *172*, 114464.

Kwangmuang, P., Kosum, S., Sarakan, P., & Nguyen, L. T. (2025). Innovative Learning Approaches to Develop Students' Design Thinking Skills through Digital

Technology and Local Wisdom in Border Patrol Police Schools. *Thinking Skills and Creativity*, 102047.

Mbanaso, U. M., Abrahams, L., & Okafor, K. C. (2023). Data collection, presentation and analysis. In *Research Techniques for Computer Science, Information Systems and Cybersecurity* (pp. 115–138). Springer.

Nazari, M. (2022). Plan, act, observe, reflect, identity: exploring teacher identity construction across the stages of action research. *RELC Journal*, *53*(3), 672–685.

Slavin, R. E. (2008). Cooperative Learning: Theory, Research and Practice (Cooperative Learning: Teori, Riset dan Praktik). *Penterjemah: Nurulita. Bandung: Nusa Media*.

Sujatha, S., & Vinayakan, K. (2023). Integrating math and real-world applications: A review of practical approaches to teaching. *International Journal of Computational Research and Development*, *8*(2), 55–60.

Trianto, M. P. (2009). Mendesain model pembelajaran inovatif-progresif. *Jakarta: Kencana*.

Zulkardi, Z. (2002). *Developing a learning environment on realistic mathematics education for Indonesian student teachers*. University of Twente, Enschede.