

Chalk and Talk Method vs. Peer Learning: Its Effectiveness in Teaching Statistics

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Abstract. This study compared the effectiveness of the Chalk and Talk Method and Peer Learning in teaching Statistics among first-year Bachelor of Science in Tourism Management students at Zamboanga State College of Marine Sciences and Technology. Statistics is often regarded as a difficult subject because it requires students to apply mathematical concepts, interpret data, and develop analytical thinking skills. As a result, many students experience challenges in understanding statistical concepts and solving related problems. In response to these difficulties, the study aimed to determine which instructional method was more effective in improving students' academic performance and understanding of Statistics. The study utilized a quasi-experimental research design involving two intact classes. One group received instruction through the traditional Chalk-and-Talk Method, where the teacher delivered lessons primarily through lectures, explanations, and board work. The other group was taught using Peer Learning, an instructional approach that encourages students to work collaboratively, share ideas, and assist one another in understanding lessons and solving problems. Researcher-made pre-tests and post-tests consisting of multiple-choice questions on Measures of Central Tendency were administered to assess students' knowledge before and after the implementation of the teaching interventions. The collected data were analyzed using descriptive statistics and t-test through IBM SPSS Statistics. The findings revealed that both instructional methods contributed to improvements in students' academic performance in Statistics. However, students who participated in Peer Learning demonstrated greater improvement in understanding statistical concepts and applying their knowledge compared to those who experienced the traditional Chalk-and-Talk Method. The study concludes that Peer Learning is a more effective strategy for teaching Statistics and may be adopted by educators to promote active participation, collaboration, critical thinking, and meaningful learning experiences in the classroom.

Keywords: Chalk and Talk Method; Peer Learning; Pre-test; Post-test; Quasi-Experiment; Teaching Effectiveness

Introduction

Teaching Statistics is often challenging because of its numerical and most of the concepts are abstract which require analytical thinking. For many years, most of the teachers relied on Chalk and Talk Method, a traditional instructional approach in teaching wherein lessons are presented through direct explanation, discussion, and demonstrations using a board. This method allows teachers to organize information systematically and guide students through the learning process. Nonetheless, because the teacher serves as the primary source of information, the opportunities for students' interaction and active participation may be limited. As educational practices continue to evolve, teachers are increasingly exploring instructional approaches that encourage greater student involvement and engagement in learning. (Reddi et al., 2025; Pretorius, 2025).

One instructional strategy that promotes active participation is Peer Learning. In this approach, students work together to exchange ideas, discuss lessons, and assist one another in understanding concepts. Through collaboration, learners become more involved in classroom activities and are encouraged to take responsibility for their own learning. Research has shown that peer interaction can strengthen critical thinking, improve academic achievement, and create a more meaningful learning experience for students (Secomb, 2008; Burgess et al., 2021; Keerthirathne, 2020).

In this study, teaching effectiveness is measured through students' academic achievement and their level of participation during classroom activities. Academic achievement is reflected in the students' performance on the pre-test and post-test, while participation refers to their involvement in discussions, activities, and interactions throughout the learning process. A teaching method may be considered effective when it contributes to improved understanding of concepts and encourages students to become active learners in the classroom.

Furthermore, this study also examines whether there is a significant difference between the pre-test and post-test scores of students exposed to the Chalk and Talk Method and those taught through Peer Learning. This comparison is essential in determining whether either instructional strategy produces statistically meaningful improvements in student learning outcomes. As highlighted by Reddi et al. (2025), differences in teaching approaches can lead to variations in student comprehension and performance, particularly in subjects that require analytical reasoning such as Statistics.

This research will be conducted at Zamboanga State College of Marine Sciences and Technology (ZSCMST), involving first-year Bachelor of Science in Tourism Management students from Sections A and B. These sections were formed through heterogeneous grouping, meaning students have varied academic abilities, backgrounds, and learning styles. Based on informal classroom observations, some students tend to watch only and participate less during lecture-based instruction, while others demonstrate higher engagement in the classroom when working collaboratively with peers. This aligns with findings from The Conversation (2025), which emphasized that active learning strategies often address diverse learner needs more effectively than traditional methods.

The main purpose of this study is to determine which between the Chalk and Talk Method and Peer Learning is more effective in improving students' academic performance in Statistics. Specifically, it aims to assess students' pre-test and post-test scores, examine significant differences between the two instructional methods, and identify which approach yields higher learning outcomes. The findings of this study may provide valuable insights for educators in selecting appropriate teaching strategies that enhance both student achievement and engagement, as supported by evidence on active and collaborative learning approaches (Secomb, 2021; Burgess et al., 2021).

Research Questions

This study aims to compare the effectiveness of the Chalk and Talk Method and Peer Learning in improving students' academic performance and engagement in the classroom.

1. What are the students' pre-test scores on Chalk and Talk and Peer Learning?
2. What are the students' post-test scores on Chalk and Talk and Peer Learning?
3. Is there a significant difference in the pre-test and post-test scores of students taught through Chalk and Talk Method and taught through Peer Learning?
4. Is there a significant difference in the post test of both group?

Scope and Limitation of the Study

This study focuses on comparing the effectiveness of the Chalk and Talk Method and Peer Learning in improving students' academic performance in Statistics and their classroom engagement. It will be conducted in Zamboanga State College of Marine Sciences and Technology (ZSCMST), involving the entire class of Bachelor of Science in Tourism Management 1-A and 1-B. The respondents will be selected using a total enumeration sampling design, since all students in the identified sections will participate in the study. The study will cover the pre-test and post-test scores of students, instructional methods (Chalk and Talk Method and Peer Learning), and students' academic performance in Statistics within the specified period of implementation of the teaching strategies. However, it will not include other year levels, other academic programs, or sections outside BSTM 1-A and BSTM 1-B. It will also not consider other subjects aside from Statistics, nor will it include external factors such as students' socioeconomic background, personal learning environment outside the classroom, or psychological conditions that may affect performance. By setting these boundaries, the study ensures that findings are feasible and focused while providing insights into the effectiveness of Chalk-and-Talk Method and Peer Learning in improving students' academic performance in Statistics.

Literature Review

Instructional Approach, Strategy, and Method

In education, the terms approach, strategy, and method are often used interchangeably, although they refer to different aspects of instruction. An instructional approach refers to the general philosophy or theory that guides teaching and learning practices. It reflects the teacher's beliefs about how students learn



best and serves as the foundation for selecting classroom activities and techniques. An instructional strategy, on the other hand, is a planned set of actions or techniques designed to help learners achieve specific learning objectives. Strategies are flexible and may vary depending on the needs of students and the nature of the lesson. A teaching method is the specific procedure or manner in which instruction is delivered in the classroom. Methods represent the actual implementation of an approach through selected strategies and classroom activities.

Chalk and Talk Method

The Chalk and Talk Method is a teacher-centered teaching method in which the instructor explains concepts, demonstrates examples, and solves problems on the board while students listen, observe, and take notes. This method follows a structured and sequential presentation of lessons, making it suitable for subjects such as Statistics where concepts are introduced step by step. The method is commonly associated with traditional instructional approaches that emphasize direct instruction and teacher guidance. Research has shown that teacher-led instruction helps students develop a strong understanding of foundational knowledge and procedures. However, because learning activities are primarily directed by the teacher, students may have fewer opportunities for active participation, discussion, and collaborative learning.

Peer Learning Strategy

Peer Learning is commonly regarded as an instructional strategy rather than a teaching method because it focuses on how students interact and support one another during the learning process. It is grounded in student-centered and social constructivist approaches to learning, particularly Lev Vygotsky's Social Development Theory, which emphasizes the role of social interaction in knowledge construction. Through peer learning, students discuss concepts, explain ideas, share experiences, and work collaboratively to solve problems. Research has shown that this strategy can increase student engagement, confidence, communication skills, and academic performance by encouraging active participation and meaningful interaction among learners.

Teaching Effectiveness and Academic Performance

The effectiveness of instructional methods and strategies is often assessed through students' academic achievement and classroom participation. Academic performance is commonly measured using pre-tests and post-tests to determine the knowledge and skills students gain after instruction. Classroom engagement is reflected in students' participation in discussions, learning activities, and problem-solving tasks. According to Hattie (2009), instructional practices that actively involve students in the learning process tend to produce better academic outcomes and higher levels of engagement. Similarly, Freeman et al. (2014) reported that active learning strategies significantly improve student performance compared with traditional lecture-based instruction. These findings indicate that while traditional teaching methods provide a structured learning environment, student-centered strategies often promote deeper understanding and greater participation.

The literature suggests that both the Chalk-and-Talk Method and Peer Learning contribute positively to the teaching of Statistics, although they function at different instructional levels. The Chalk-and-Talk Method serves as a teaching method that provides clear and organized delivery of content, whereas Peer Learning functions as an instructional strategy that promotes collaboration, communication, and critical thinking. Understanding these distinctions provides a stronger theoretical basis for examining the effectiveness of both instructional practices among first-year college students studying Statistics.

Methodology

Research Design

This study employed a quasi-experimental research design to examine the effectiveness of the Chalk and Talk Method and Peer Learning in teaching Statistics. The design was selected because the participants were already assigned to existing class sections, making random assignment impractical. According to Creswell (2014), quasi-experimental research allows investigators to compare groups and evaluate the effects of different interventions in natural educational settings. Through this design, the researcher was able to determine which teaching method produced better learning outcomes among the participants. This design is appropriate for the study because students are already grouped into classes, making it more practical and realistic to apply different teaching methods in a classroom setting. It allows the researcher to observe and measure the actual impact of each method on students' learning outcomes. By comparing test scores and performance between the two groups, the study can clearly determine which teaching approach is more

effective. In this way, the research design helps address the problem by providing concrete data on students' achievement, guiding teachers in choosing more effective strategies for teaching Statistics.

Sampling Design

A total enumeration sampling technique was utilized in this study. All students who were officially enrolled in the two intact classes involved in the study were included as respondents. This approach ensured that every student within the selected classes participated in the research, providing a more complete representation of the groups being compared. Since the study was conducted in a classroom setting, total enumeration was considered more appropriate than selecting only available or present students, as it minimizes selection bias and allows for a fair comparison between the two instructional groups. This sampling design also strengthens the validity of the findings by ensuring that all members of the identified population were included in the analysis.

Research Locale

The study was conducted at the Zamboanga State College of Marine Sciences and Technology (ZSCMST), a public higher education institution located in Barangay Rio Hondo, Zamboanga City. The college offers various undergraduate programs, including the Bachelor of Science in Tourism Management, which served as the focus of this study. This program includes Statistics as part of its curriculum, a subject that is often considered challenging by many students due to its analytical and problem-solving nature. ZSCMST provides a structured academic environment that supports both traditional and innovative teaching methods. Classrooms and instructional facilities are available to facilitate effective teaching and learning processes. The institution serves a diverse student population, including first-year students enrolled in the BS Tourism Management program who were the respondents of this study. The college's learning environment, which encourages both teacher-centered and student-centered instructional approaches, made it suitable for comparing the effectiveness of the Chalk-and-Talk Method and Peer Learning in teaching Statistics. This setting allowed the researchers to observe how different instructional strategies influence students' academic performance in a real classroom context.

Research Participants

The participants of this study were first year Bachelor of Science in Tourism Management students enrolled in Sections A and B. These students were selected because they were currently taking Statistics during the conduct of the research.

Research Instrument

This study utilized a self-made pre-test and post-test questionnaire designed to measure the students' understanding of Measures of Central Tendency in both ungrouped and grouped data. The instrument consists of two parts: pre-test and post-test. Both tests contain ten (10) multiple-choice questions covering the topics on mean, median, mode, midpoint, and measures of central tendency for grouped and ungrouped data. The test items also include problem-solving questions that require students to analyze and solve statistical problems carefully. Part A focuses on Measures of Central Tendency for Ungrouped Data, including solving for the mean, median, and mode of given data sets. Part B covers Measures of Central Tendency for Grouped Data, such as computing the mean, identifying the median and mode, and determining the midpoint or class mark of class intervals. To ensure validity, the instrument was reviewed by subject matter experts. It was also pilot-tested to determine reliability before its actual use in the study. The pre-test was administered before the implementation of the teaching methods to determine the students' prior knowledge and understanding of the topic. Meanwhile, the post-test was conducted after the implementation of the teaching methods to measure the students' learning progress and performance improvement. The instrument was written in simple and clear English to ensure that the students could easily understand and answer the questions. The respondents were given enough time to complete the test and were instructed to solve each problem carefully and encircle the letter of the correct answer.

Data Gathering Procedure

The researchers followed a step-by-step process in gathering data for the study comparing the Chalk and Talk Method and Peer Learning in improving students' academic performance in Statistics. First, the researchers secured approval from the college dean and the program chairperson of the Bachelor of Science in Tourism Management before the conduct of the study. This approval ensured that the research complied with institutional policies and ethical standards. After approval was granted, the researchers explained to the students the purpose, procedures, and objectives of the study. Since the participants were the researchers' own students, they were informed that participation was voluntary. The students were asked to read and sign an informed consent form before the start of the study. The researchers assured the participants that all their

responses and personal information would remain confidential and would be used solely for research purposes. Once consent forms were collected, the researchers identified the participants from the two intact sections handled by the researchers. One section was assigned to the Chalk-and-Talk Method, while the other section was assigned to Peer Learning. Before the implementation of the teaching methods, both groups were given a pre-test to assess their prior knowledge of Statistics. The same test was administered to ensure fairness and consistency in measurement. After the pre-test, the instructional intervention was conducted. The Chalk-and-Talk group received teacher-centered instruction involving lectures, explanations, and board work, while the Peer Learning group engaged in collaborative activities, discussions, and peer-assisted learning under the guidance of the teacher. After the intervention period, both groups were given a post-test using similar test items to measure their learning gains. The results were used to determine the improvement in students' academic performance. Lastly, the researchers collected, organized, and analyzed the data using appropriate statistical tools. The pre-test and post-test scores were compared within and between groups to determine significant differences and to identify which instructional method was more effective in improving students' performance in Statistics.

Results and Discussions

Research Question 1: What is the students' pre-test scores on Chalk and Talk and Peer Learning?

Table 1. Students' pre-test scores on Chalk and Talk Method and Peer Learning

Pre - test	Mean	Descriptive
Chalk and Talk Method	67.67	Poor
Peer Learning	71.50	Fair

Table 1 shows the Students' Pre-test scores on Chalk and Talk Method and Peer Learning. The results shows that Chalk-and-Talk group obtained a mean score of 67.67, interpreted as "Poor", while the Peer Learning group obtained a mean score of 71.50, interpreted as "Fair". The findings indicate that students from both groups had insufficient prior knowledge of Measures of Central Tendency before the instructional intervention. The low pre-test scores may be attributed to the abstract and analytical nature of Statistics, which many students find difficult to understand without proper instructional support. Recent studies have emphasized that students entering Statistics courses often experience difficulties in interpreting data and applying statistical concepts, making structured learning experiences essential for improving comprehension. Tan et al. (2023) found that students without strong mathematical backgrounds require systematic instructional support to develop statistical understanding and confidence in problem solving. Similarly, Douglas (2024) reported that introductory Statistics courses remain challenging for many college students because of the abstract nature of statistical reasoning and data interpretation. These findings suggest that both groups started with comparable learning needs, providing an appropriate basis for evaluating the effectiveness of the two instructional approaches.

Research Question 2: What is the students' post-test scores on Chalk and Talk and Peer Learning?

Table 2. Students' Post test scores on Chalk and Talk Method and Peer Learning

Post - test	Mean	Descriptive
Chalk and Talk Method	88.16	Very Satisfactory
Peer Learning	93.00	Outstanding

Table 2 shows the Students' Post test scores on Chalk and Talk Method and Peer Learning. The result shows that the Chalk-and-Talk group obtained a mean score of 88.16, interpreted as "Very Satisfactory", while the Peer Learning group obtained a mean score of 93.00, interpreted as "Outstanding". The findings indicate that both instructional approaches improved students' academic performance in Statistics. The improvement observed in the Chalk-and-Talk group suggests that structured explanations and guided demonstrations remain effective in helping students understand procedural and computational concepts in Statistics. Meanwhile, the superior performance of the Peer Learning group indicates that collaborative learning experiences may provide additional opportunities for students to clarify misconceptions, exchange

ideas, and deepen conceptual understanding through interaction with classmates. Recent evidence supports these findings. Douglas (2024) reported that active learning strategies significantly improve students' success and engagement in introductory Statistics courses. Similarly, Beime et al. (2024) found that increasing the use and variety of active learning methods positively influences students' learning experiences and academic outcomes in higher education settings. Furthermore, Alé-Ruiz et al. (2024) concluded that active participation and collaborative learning environments enhance student engagement and improve learning performance among university students. These findings suggest that although both methods are effective, student-centered approaches such as Peer Learning may produce greater academic gains in Statistics.

Research Question 3: Is there a significant difference in the pre-test and post-test scores of students taught through Chalk and Talk Method and taught through Peer Learning?

Table 3. Significant difference in the Pre-test and Post Test score of students taught through chalk and talk method

Variable	Mean	t - value	p - value	Interpretation
Chalk and Talk Method	Pre - test	67.67	13.462	.000
	Post - test	88.17		

Table 3 shows the significant difference between the pre-test and post-test scores of students taught using the Chalk-and-Talk Method. The significant increase from the pre-test mean score of 67.67 to the post-test mean score of 88.17 indicates that the Chalk-and-Talk Method effectively improved students' understanding of Measures of Central Tendency. The structured delivery of lessons, teacher explanations, and step-by-step demonstrations may have enabled students to understand procedures and computations more clearly. Recent studies continue to recognize the importance of explicit and guided instruction, particularly in mathematics-related subjects that require procedural accuracy and conceptual clarity. Tan et al. (2023) found that students learning Statistics benefit from instructional approaches that provide systematic explanations and repeated guided practice. Likewise, recent findings in mathematics education suggest that structured instructional practices contribute significantly to improved academic performance and conceptual understanding among learners (Vacalares et al., 2024). These findings indicate that traditional instructional approaches remain valuable, particularly when introducing unfamiliar or computationally demanding concepts.

Table 4. Significant difference in the Pre-test and Post-test score of students taught through Peer Learning

Variable	Mean	t - value	p - value	Interpretation
Peer Learning	Pre - test	71.50	14.916	.000
	Post - test	93.00		

Table 4 shows the significant difference between the pre-test and post-test scores of students taught through Peer Learning. The significant increase from the pre-test mean score of 71.50 to the post-test mean score of 93.00 indicates that Peer Learning effectively enhanced students' understanding of Statistics. Through collaborative discussions and peer explanations, students became active participants in constructing knowledge and solving problems. Recent studies support the effectiveness of peer learning and collaborative instructional approaches in higher education. Topping (2023) reported that peer learning improves academic achievement, communication skills, and learner confidence by encouraging interaction and cooperation among students. Similarly, Moon et al. (2024) found that peer interaction promotes deeper learning and greater student engagement through collaborative knowledge construction. In mathematics education, Vozzo et al. (2024) further demonstrated that peer instruction significantly improved student learning outcomes and retention in university mathematics courses. These findings support the view that collaborative learning environments enhance both academic performance and student participation.

Research Question 4: Is there a significant difference in the post test of both group?

Table 5: Significant difference in the Post test of both groups

X	Y	t - value	p - value	Interpretation
Chalk and Talk Method	Peer Learning	2.866	.008	Significant

Table 5 shows the significant difference in the post-test scores between students taught using the Chalk-and-Talk Method and those taught through Peer Learning. The computed t-value of 2.866 and p-value of .008 indicate a significant difference between the post-test scores of students taught through the Chalk-and-Talk Method and those taught through Peer Learning. Since the p-value is .008 which is lower than the 0.05 level of significance, the null hypothesis is rejected. The findings indicate that although both instructional approaches improved students' performance, Peer Learning produced significantly better outcomes than the traditional Chalk-and-Talk Method. This suggests that students learn more effectively when they actively participate in discussions, explain concepts to peers, and collaboratively solve problems. Recent studies strongly support this result. Douglas (2024) found that active learning approaches improve achievement and course success in Statistics and STEM education. Likewise, Beime et al. (2024) concluded that students exposed to a greater variety of active learning methods demonstrate higher levels of engagement and more positive learning experiences. In addition, Topping (2023) emphasized that peer learning promotes deeper understanding and stronger academic performance because students become active contributors rather than passive recipients of information. Overall, the findings suggest that integrating collaborative learning activities into Statistics instruction can enhance student achievement more effectively than relying solely on lecture-based approaches.

Ethical Considerations

The researchers carefully observed ethical principles throughout the study. Prior to the conduct of the research, approval was secured from the College Dean and the Program Chairperson of the Bachelor of Science in Tourism Management. This ensured that the study complied with institutional policies and was properly authorized before involving any participants. After obtaining institutional approval, the students were informed about the purpose, procedures, and objectives of the study. Participation was completely voluntary, and informed consent was obtained from all participants before the implementation of the research. The students were also informed that they could withdraw from the study at any time without any penalty or effect on their academic performance. To protect the participants' privacy and data, the researchers strictly followed the provisions of Republic Act No. 10173, also known as the Data Privacy Act of 2012. All personal information was kept confidential and was not disclosed to individuals outside the research team. Names and other identifying information were excluded in the presentation and discussion of results. All collected data were used solely for academic and research purposes and were stored securely, accessible only to the researchers. The researchers also ensured that all participants were treated fairly and respectfully throughout the study. No student was subjected to harm, discrimination, or academic disadvantage. Although different instructional methods were implemented, both groups were given equal opportunities to learn and receive appropriate instruction. The study was conducted with honesty, integrity, fairness, and respect for the rights and welfare of all participants.

Conclusion

This study shows that both the Chalk and Talk Method and Peer Learning can improve students' understanding of Statistics. However, Peer Learning demonstrated a stronger effect in enhancing students' academic performance and classroom engagement. This indicates that when students actively participate in discussions, share ideas, and collaborate with their peers, they tend to develop a deeper understanding of the lesson and perform better in assessments. In contrast, the Chalk and Talk Method remains beneficial in providing clear explanations and structured presentation of concepts. However, it tends to promote a more passive learning environment, where students have limited opportunities for interaction and active participation. Generally, the findings suggest that student-centered approaches such as Peer Learning create a more engaging and interactive classroom environment that supports better learning outcomes in Statistics. The results imply that integrating collaborative learning activities may enhance students' confidence, participation, and comprehension of difficult statistical concepts.

Recommendations

Based on the findings of the study, the use of Peer Learning is recommended as an instructional strategy in teaching Statistics because students exposed to this approach obtained significantly higher post-test scores compared to those taught using the Chalk and Talk Method. The findings indicate that collaborative learning activities can contribute to improved academic performance and classroom engagement in Statistics. The Chalk and Talk Method may still be utilized in teaching Statistics, particularly for introducing concepts and providing structured explanations. However, the results suggest that combining direct instruction with collaborative learning activities may further enhance students' understanding and participation in the learning process. Educational institutions may consider supporting the implementation of student-centered instructional approaches through professional development activities that enhance

teachers' competencies in collaborative and active learning strategies. Future studies are recommended to involve larger sample sizes, different academic programs, year levels, and subject areas to further examine the effectiveness of Peer Learning across various educational contexts. Further research may also investigate the long-term effects of Peer Learning on students' academic achievement, retention of knowledge, and classroom engagement.

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