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EVALUATING THE EFFECTIVENESS OF CO-TEACHING PRACTICES AS A PEDAGOGICAL LEADERSHIP STRATEGY

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ABSTRACT

This study evaluated the effectiveness of co-teaching as a pedagogical leadership strategy in improving student learning outcomes in grade 8 Science and grade 10 Mathematics at Drukjegang Central School, Bhutan. The study was conducted in response to persistent underperformance in these subjects over three consecutive years (2022–2024), with mid-term examination 2025 scores of 33.5% for Science and 32.0% for Mathematics—substantially below the national mean—necessitating an evidence-based intervention. Applying an action research approach that utilizes mixed-methods and is grounded in Distributed Leadership Theory (Spillane, 2006), a total of 130 participants (students, $n=126$; teachers, $n=4$) participated in the study over a course of an eight-week intervention period and comprised three phases: preparation; implementation; and evaluation. Quantitative data were collected through pre- and post-intervention examination scores and Likert-scale surveys, which were analyzed using descriptive statistics. Qualitative data were gathered through student reflections, semi-structured interviews, focus group discussions, and a research diary, which were analyzed using thematic analysis. Results revealed significant improvements: Science scores increased from 33.5% to 44.6% (+11.1 percentage points), and Mathematics scores from 32.0% to 48.7% (+16.7 percentage points). Survey data showed 84% of students agreed that co-teaching improved access to teacher help, 76% found lessons more engaging, and 80% reported increased confidence. Teacher responses were unanimously positive. Qualitative themes confirmed enhanced interaction, support, and comprehension. Limitations include no control group, potential researcher bias, short intervention duration, and non-board-standard marking. The study concludes that co-teaching is a viable pedagogical strategy, recommending structured planning, role clarification, and professional development for sustained effectiveness. The findings contribute empirical evidence to the limited research on co-teaching in the Bhutanese context and offer practical implications for school leaders and policymakers.

KEYWORDS: co-teaching, pedagogical leadership, distributed leadership theory, student engagement, academic performance, action research, Bhutan

I. INTRODUCTION

The interest of human society in education dates back to the dawn of civilization in ancient Greece, when Plato spoke about the importance of education in the development of the state. In ancient Greece, education was not valued as a luxury for a small number of people in society, but as a right of all citizens. However, to achieve the practical goals of education, human society needs to regard it as the most important tool for its development (Baça, F. 2023). Globally, education improvement aims to address the critical area of quality teaching and learning (DeJaeghere et al., 2023). Academic performance and the quality of learning outcomes depend on the quality of teaching and learning experiences created in the classroom by the teachers.

Pedagogical leadership describes the styles of leadership in education that are deeply focused on the improvement of teaching and learning, rather than just managing administrative tasks. Not only teachers but also principals are held accountable for school results, which increases the expectations of principals to work to enhance student learning and improve outcomes. In Sweden, a principal's work with a given school's core mission is labeled as pedagogical leadership, a concept that includes diverse activities related to national goals and school results. Aspects of pedagogical leadership include principals' classroom observations and communication about teaching and learning issues (Ärlestig & Törnsen, 2014).

Co-teaching is a service delivery model employed to establish inclusion (Eaton, 2021). The support of school administrators plays a crucial role in transforming the culture of an educational environment. With many strategies to help students understand and learn science more effectively, school leaders, in collaboration with the teaching faculty, implement different ways of delivering lessons. Despite the increasing practice and evidence of its potential, co-teaching has not yet become a widespread practice in schools. Research shows the need to help teachers become aware of co-teaching as a good mechanism for peer learning among teachers (Duran et al., 2021).

Context of the Study

Drukjegang Central School, located in Dagana District, is a higher secondary school established in 1962. The school currently offers grades from 7 to 12, catering to a diverse student population from a vast catchment area. In pursuit of academic excellence, teachers across all domains use different teaching styles to make learning simpler and more effective.

However, for the past three consecutive years (2022–2024), the school's performance in science and mathematics has been a cause for concern. The school's mean scores in grade 8 Science and grade 10 Mathematics have consistently fallen below the national mean, except for marginal achievements in 2024 when the school barely met the national benchmark. While there have been marginal improvements, the inconsistency in performance and the failure to consistently meet national standards indicate that learning challenges persist. These academic struggles have implications for students' future educational opportunities and career prospects.

Compounding the concern, the mid-term results of 2025 in both subjects were substantially below the national mean. This recent evidence indicates that the learning challenges are not merely historical but remain persistent and urgent. Despite the school's efforts to improve teaching and learning, students continue to struggle, suggesting that current instructional approaches may be inadequate for meeting the diverse learning needs of students.

Problem Statement

Despite strategizing and implementing various teaching approaches, models, and designs appropriate to the learners' interests and levels, the overall performance for the last three consecutive years across all the domains isn't promising.

The situation has become even more concerning with the 2025 mid-term results, which show that both subjects scored substantially below the national mean. This recent evidence indicates that the learning challenges are not improving despite the school's efforts, and current teaching strategies may be failing to meet students' learning needs effectively. The persistent underperformance in these critical subjects threatens students' future academic success and career opportunities.

Co-teaching has been introduced informally at the school as a collaborative teaching model where two teachers work together in the same classroom to deliver instruction. Anecdotal feedback from teachers and students suggests that co-teaching may benefit student learning by providing additional support, clarification, and varied instructional approaches. However, the effectiveness of co-teaching has never been systematically evaluated at the school. Without empirical evidence, the school cannot make informed decisions about whether to continue, modify, or scale up this pedagogical strategy.

Therefore, this study seeks to address the following problem: Does co-teaching as a pedagogical leadership strategy significantly improve student learning outcomes in grade 8 Science and grade 10 Mathematics, and what are the perceptions of students and teachers regarding its effectiveness? These subjects, though not the main subjects, are given importance in the country by the Centre for School Curriculum Development (CSCD) of the Ministry of Education and Skills Development, Bhutan. By evaluating the co-teaching model through various platforms with the student participants and its influence on student performance, this study aims to provide valuable insights into how co-teaching can be streamlined to foster a more impactful educational environment. The findings of this research will also contribute to enhancing the quality of education and ensuring that students are empowered to actualize their potential.

Rationale for Co-Teaching as an Intervention

Co-teaching is a service delivery model employed to establish inclusion and collaborative learning (Eaton, 2021). It involves a general education teacher and a special education teacher—or two general education teachers—working together to provide academic and behavioral support to students (Jones-Taylor, 2024). Co-teaching has been shown to enhance student engagement, comprehension, and academic performance when implemented effectively (Rönn-Liljenfeldt et al., 2024; Colwell, 2024).

At Drukjegang Central School, co-teaching is being considered as a pedagogical leadership strategy to address the persistent learning challenges in science and mathematics. The school principal, as a pedagogical leader, is responsible for improving teaching and learning outcomes (Ärlestig & Törnsten, 2014). By implementing and evaluating co-teaching, the school aims to enhance the quality of instruction and improve student performance in these critical subjects.

Research Gap

While existing research has explored the benefits of co-teaching in various educational settings, studies have focused primarily on inclusion classrooms for students with disabilities (Jones-Taylor, 2024; Murphy & Christle, 2024) or general education contexts (Rönn-Liljenfeldt et al., 2024). Moreover, there is limited research on the effectiveness of co-teaching in specific subject areas such as science and mathematics at the secondary level.

Furthermore, no studies have been conducted in the Bhutanese educational context to systematically evaluate the impact of co-teaching on student learning outcomes. This study addresses this gap by examining the effectiveness of co-teaching in grade 8 Science and grade 10 Mathematics at Drukjegang Central School.

Significance of the Study

This study holds significant value for multiple stakeholders. For Drukjegang Central School, the findings will provide empirical evidence to make data-driven decisions about whether to continue, modify, or scale up co-teaching as a pedagogical leadership strategy in science and mathematics. For teachers, the study will offer practical insights into effective co-teaching models and strategies, highlighting professional growth opportunities through peer learning and collaborative problem-solving. Students stand to benefit from improved instructional quality and better academic outcomes, while their perceptions will inform future teaching practices. At the Dzongkhag and Ministry levels, the evidence generated will inform policy decisions on pedagogical leadership and serve as a reference for other schools. Additionally, this study will contribute to the growing body of literature on co-teaching, particularly in the South Asian and Bhutanese contexts, providing a foundation for future research in diverse educational settings.

Aims and Objectives of the Study

Aim

This study aims to examine the effectiveness of co-teaching as a pedagogical leadership strategy for science and mathematics and its impact on enhancing student learning outcomes.

Objectives

- A. To assess the impact of co-teaching as a pedagogical leadership strategy on students' academic performance in grade 8 Science and grade 10 Mathematics.
- B. To evaluate student and teacher perceptions of co-teaching as a pedagogical leadership strategy in improving engagement and comprehension.

II. LITERATURE REVIEW

What is Co-teaching?

Focusing on the relationship between teachers, Dieker and Murawski (2003) described co-teaching as two or more teachers who are equal in status, located in the classroom together, working together, and providing instruction. Furthermore, Bouck's (2007) definition is similar: a method of instruction that brings together two teachers of equal status to create a learning community with shared planning, instruction, and student assessment.

Importance of Pedagogical Leadership Strategy for Student Achievement

Pedagogical leadership (PL) has been regarded as the best leadership style in the education sector (Berhanu, 6 February 2025). MacNeill et al. (2003) argued that pedagogical leadership is presented as an alternative to instructional leadership, focusing on fostering students' learning and intellectual development rather than merely delivering curriculum. It emphasizes teachers' understanding of how students learn and grants them the autonomy to create and evaluate educational activities tailored to diverse student needs. Pedagogical leaders support informed teaching practices and reflection, empowering teachers to take professional responsibility and demonstrate deep knowledge of learning and teaching processes.

Contreras (2016) examined the theoretical foundations of pedagogical leadership and its impact on school improvement. He stated that the educational demands of the 21st century make it indispensable to re-evaluate the traditional models of management and leadership in schools and focus on pedagogical aspects, distributed leadership, participative school development, and teachers' professional growth. Pedagogical leadership includes these aspects, and it is emerging within the educational research field as the most effective model to achieve sustained improvements in schools.

Pedagogical leadership has been defined as a mutually transformative learning relationship that improves both teachers' and principals' repertoires of pedagogic practices within a culture of school improvement, resulting in improved student learning (MacNeill & Cavanagh, 2007, as cited in Peng and Vašátková, 2016).

Impact of Co-teaching as a Pedagogical Leadership Strategy

Researchers have noted that co-teaching provides extensive benefits to students. Jones-Taylor (2024) emphasizes strong stakeholder support and measurable academic gains in English Language Arts (ELA) and mathematics, suggesting that co-teaching is a key factor in student success.

Rönn-Liljenfeldt et al. (2024) examined how Finnish primary school students perceive teachers' roles and responsibilities, their learning and participation, and the social climate during co-taught lessons. They found that students without special educational needs were more positive about co-teaching the more co-taught lessons they received per week, while students with special educational needs were most positive when they received four to five lessons weekly. Within inclusive classrooms, co-teaching

has been shown to benefit special learners. Petit (2017) noted the opportunities for differentiation of instruction when there was a specialist who could aid students needing accommodations.

In addition to the advantages for students, co-teaching has been shown to benefit teachers. Colleagues can learn from each other (Shibley, 2006) and acquire broader teaching strategies (Roth et al., 2004), so that co-teaching functions as professional development. These mentoring opportunities have been shown to benefit both experienced teachers (Darragh et al., 2011) and novice teachers (Nilsson & Van Driel, 2010).

A study was conducted to investigate the effectiveness of virtual co-teaching in primary and secondary schools, with a focus on new digital technologies and artificial intelligence. The results show that virtual co-teaching supported by the use of artificial intelligence is an effective alternative to traditional teaching methods that increases both the efficiency and flexibility of the learning process. Artificial Intelligence assistants should be involved to support teachers and pupils. Virtual co-teaching has a strong potential to contribute to future innovations in education, especially when combined with artificial intelligence to enable more personalized learning. It extends the pedagogical space with a virtual component - a virtual teacher or subject matter expert (Svobodová et al., 2024).

Researchers also identified shortcomings of the co-teaching models, though it is not co-teaching. However, the co-teaching models are directly related to this action research, since the teacher participants used it for co-teaching. Murphy & Christle (2024) caution that despite its popularity and some evidence of narrowing achievement gaps, the general effectiveness of co-teaching remains uncertain. Furthermore, students can sometimes be confused when presented with different styles and approaches (Gerber & Popp, 1999), especially when teachers disagree (White et al., 1998).

Influence of Co-teaching on Student Engagement and Comprehension

Co-teaching in inclusion classrooms is a collaborative effort, with a general education teacher and a special education teacher to provide academic and behavioral support to students with disabilities alongside their non-disabled peers (Jones-Taylor, 2024). Co-teaching has been brought forth as an inclusive teaching approach in research and the Finnish core curriculum (Rönn-Liljenfeldt et al., 2024).

Harter & Jacobi (2021) conducted a case study to explore the co-teaching model's utility with a veteran-novice instructor pair and to consider student perceptions. Twelve undergraduates in a communication course completed surveys, and the instructors kept reflexive journals. The findings confirm the utility of the model. Student perceptions of the benefits and drawbacks of co-teaching suggest that a fourth model component, including an expansion or refinement of an existing co-teaching framework, proposing an additional instructional approach or dynamic beyond the traditional models, may enhance the understanding of co-teaching.

Colwell (2024) conducted a study to specifically address the perceptions of co-teaching, the impact of collaborative practices on effectiveness, the effect of weekly collaboration sessions on Elementary Learners' (ELs') academic performance, and obstacles hindering collaborative co-teaching. The

findings underscored the effectiveness of collaboration and co-teaching in enhancing ELs' academic performance and fostering a professional environment in elementary classrooms. Nonetheless, support and resources are crucial to facilitate effective collaboration and co-teaching among educators throughout the school day.

The benefit of increased student engagement is a well-documented outcome of co-teaching, observed across both K-12 (Cook & Friend, 1995) and higher education settings (Shibley, 2006).

From the above works of literature, it is understood that co-teaching promotes academic success for diverse students and can contribute positively to inclusive education. Co-teaching in both virtual and non-virtual settings has a positive impact on the students' learning, engagement, and comprehension, which would ultimately enhance academic performance, though none of the literature measured the academic performance of the students in specific subjects in specified classes. Moreover, it is said that if the teacher carries out co-teaching consistently with thorough preparation, co-teaching functions best. Some of the research suggests implementing other innovative teaching strategies or using artificial intelligence (AI), since it is beneficial. However, this requires constant support from teachers. Notwithstanding the advantages of co-teaching, additional research on co-teaching is required to determine how effective co-teaching could be for a specific subject in a different setting like ours. Thus, this study will close that gap as it will concentrate on two subjects of different classes of our country's higher secondary educational system.

III. METHODOLOGY

Introduction

Research methodology acts as the roadmap for the entire action research journey. It directs where to go, how, and what next. Without a clear methodology, there is a high chance that the process is distorted, leading to misinformation rather than providing valid information with wrong data. Ultimately, the conclusion of the study won't be reliable. Contrastingly, with the set methodology, researchers will be able to confidently navigate the research process and make meaningful recommendations for practice.

This chapter presents the research methodology employed in this study. It outlines the research design, the setting and context of the study, the participants involved, the sampling techniques used, and the data collection methods. Additionally, this chapter details the data analysis procedures, measures taken to ensure validity and reliability, and the ethical considerations that guided the research process. The methodology is designed to systematically investigate the effectiveness of co-teaching as a pedagogical leadership strategy in improving student learning outcomes in grade 8 Science and grade 10 Mathematics at Drukjegang Central School.

Research Design

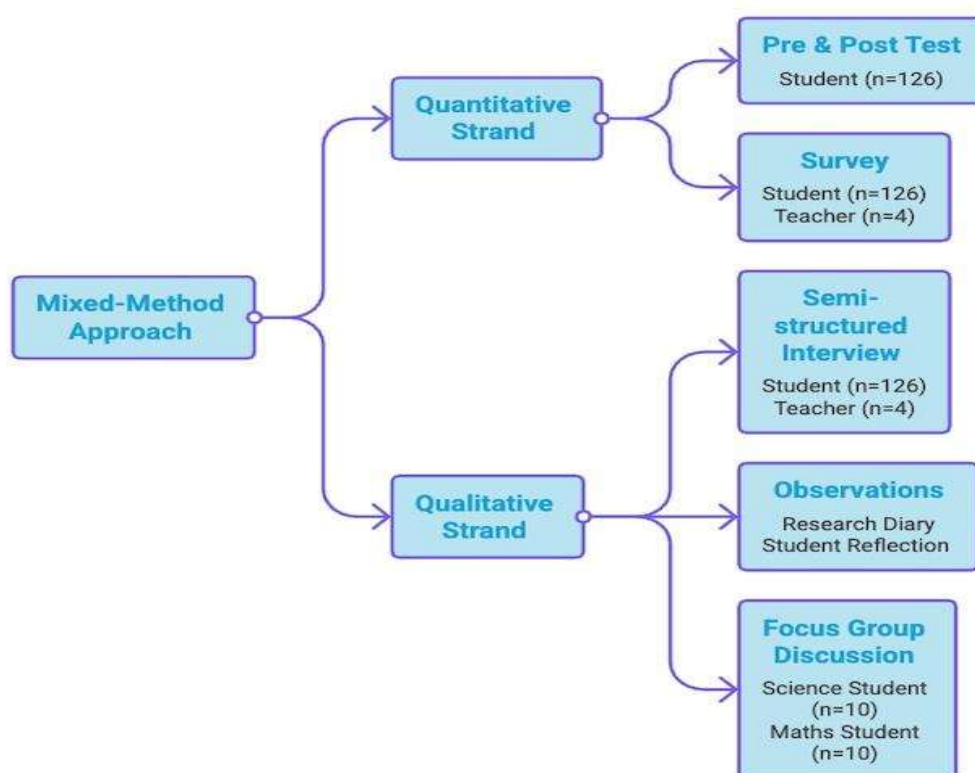
This study employed a Mixed Methods Action Research design. Action Research has been used worldwide as a professional development tool, especially for teachers. The fundamental premise of this work is that the Action Research Framework of Plan-Act-Observe-Reflect aligns with systematic

and structured thinking, lending itself to enquiry, analysis, hypothesising, and problem-solving of organisational issues (Raghavan, 2019).

The mixed-methods approach combines both quantitative and qualitative data collection techniques to provide a comprehensive understanding of the research problem (Creswell & Plano Clark, 2018). The quantitative strand has involved the collection of mid-term examination scores (baseline data) and trial examination scores (post-intervention data) to measure the impact of co-teaching on students' academic performance. Further, a survey questionnaire, consisting of a four-point Likert scale, is used as a data source. The qualitative strand involved student reflections, semi-structured interviews, focus group discussions, and a research diary to explore participants' perceptions of co-teaching.

Figure 1

Summary of Methodology



The researcher chose this because it is appropriate, practical, and one of the most effective ways to answer the research questions. It also helps to understand the processes and experiences that contribute to those outcomes. Moreover, the use of multiple data sources will help in data triangulation, enhancing the validity and reliability of the findings.

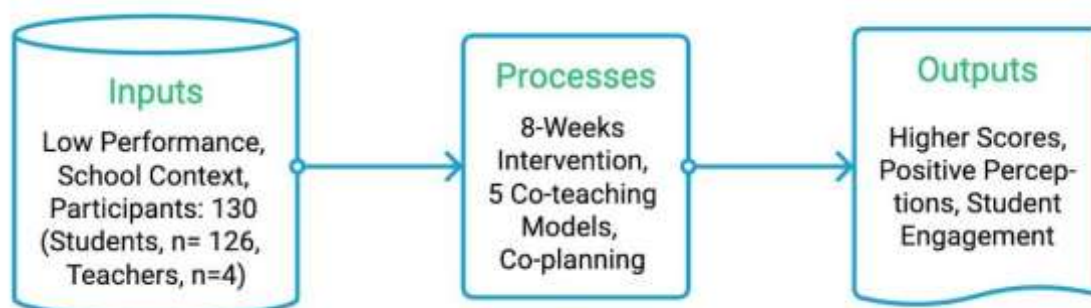
Conceptual Framework

This study employed an Input-Process-Output (IPO) conceptual framework to examine co-teaching as a pedagogical leadership strategy. The Inputs are the persistent low academic performance in Science (33.5%) and Mathematics (32.0%), the school context, and the 126 participating students.

The Process is the eight-week co-teaching intervention, guided by Distributed Leadership Theory (Spillane, 2006), involving five co-teaching models, co-planning, and ongoing observation. This theory provides the primary lens for understanding co-teaching as a pedagogical leadership strategy. In the context of this study, pedagogical leadership is distributed among the principal and co-teaching pairs through collaborative planning, shared decision-making, and mutual accountability for student outcomes.

The Outputs are improved exam scores, positive student/teacher perceptions, and enhanced engagement and confidence, triangulated through quantitative and qualitative data. This framework assumes that structured co-teaching can positively impact student outcomes and that perceptions are valid indicators of effectiveness.

Figure 2 Summary of Conceptual Framework (IPO)



Research Setting and Context

This action research was conducted at Drukjegang Central School, Dagana District, Bhutan. Currently, the school offers grades 7 to 12. The school caters to a diverse student population from a vast catchment area under Dagana District and a few from other districts of the country. The school is also one of the Bhutan Baccalaureate Schools in the country, and it is equipped with all basic amenities.

The school has been facing persistent challenges in student academic performance, particularly in science and mathematics. Over the past three years (2022–2024), the school's mean scores in grade 8 Science and grade 10 Mathematics have consistently fallen below the national mean, with only marginal improvements in 2024. This underperformance has raised concerns among school leaders, teachers, and parents about the effectiveness of current teaching strategies.

The study focused on grade 8 Science and grade 10 Mathematics for several reasons. First, these subjects have shown the most significant performance gaps compared to national standards. Second, both subjects are critical for students' future academic and career opportunities. Third, though science is not a core subject, it is given more importance by the ministry, as is done in the universe today.

Participants/Sample

Purposive sampling involves deliberately selecting participants based on specific characteristics relevant to the study's purpose (Andrade, 2020). A purposive sample is one whose characteristics are defined for a purpose that is relevant to the study. The study employed purposive sampling methods to collect data.

For the quantitative phase, all students from grade 8 and grade 10. Grade 8 for Science and grade 10 for Mathematics were purposively selected since their mid-term examinations were substantially below the national mean, indicating persistent academic challenges that required intervention. Thus, this consisted of 126 students - 60 from grade 8 (34 boys and 26 girls) and 66 from grade 10 (37 boys and 29 girls). Additionally, four domain teachers - two teachers for each domain participated in the study as co-teaching pairs. These teachers were purposively selected as they were the designated subject teachers responsible for delivering instruction in the target classes. Quantitative data were collected from these participants through two instruments: (1) pre- and post-intervention examination scores to measure academic performance, and (2) Likert-scale survey questionnaires administered to both students and teachers to assess their perceptions of co-teaching in terms of agreement, satisfaction, and effectiveness.

For the qualitative phase, the researcher employed purposive sampling to select the participants for focus group discussions (FGDs) and semi-structured interviews. Two FGDs were conducted (one each for Science and Mathematics), and each FGD consisted of 10 purposively selected students representing a range of academic levels (high, average, and low achievers). The four teachers were also selected for semi-structured interviews to gather in-depth insights into their experiences, challenges, and perceptions of co-teaching as a pedagogical leadership strategy. Further, researchers' diaries and reflections of the students were also used as sources of qualitative data for this study. To ensure anonymity, all students were assigned alphanumeric codes (e.g., STD01 to STD126) for reflections and interviews. These codes were used throughout the research process.

The use of purposive sampling aligns with the action research design of this study, enabling the collection of data from participants who are most relevant to the research problem. The findings of a study based on purposive sampling can only be generalized to the sub-population from which the sample is drawn and not to the entire population (Andrade, 2020).

Research Question

Main Question

How does co-teaching as a pedagogical leadership strategy improve learning outcomes in grade 8 Science and grade 10 Mathematics?

Sub-question

- A. How does co-teaching influence student engagement (e.g., participation, questioning, and collaborative discussions) in grade 8 Science and grade 10 Mathematics?
- B. How does co-teaching affect grade 8 Science and grade 10 Mathematics students' self-efficacy and task persistence, as reflected in surveys, reflections, and teacher observations?

Data Collection Methods

Mixed methods research is a research methodology that combines both qualitative and quantitative research approaches to gain a more comprehensive and nuanced understanding of a research problem. It goes beyond the limitations of using a single method and allows researchers to leverage the strengths of both qualitative and quantitative data in a complementary manner. The core idea behind mixed methods research is to triangulate the data, meaning that researchers use multiple data sources, data types, and research methods to validate and corroborate their findings. By using a mix of qualitative and quantitative methods, researchers can explore different facets of the research question, leading to a more comprehensive and robust analysis (Saraswati & Devi, 2023).

The researcher used a mixed-methods approach to collect both quantitative and qualitative data. Mid-term examination scores were used to establish baseline academic performance.

Quantitative Data Tools

Quantitative data were collected through two primary sources: (1) pre- and post-intervention examination scores, and (2) a Likert-scale survey administered to both students and teachers. The mid-term examination served as the baseline data, while the trial examination served as the post-intervention measure. As shown in Table 01 below, the baseline mean scores for both subjects were substantially below the national mean, confirming the persistent academic challenges that necessitated this intervention.

Table 01 Mean Marks for Two Subjects in Mid-term Examination - 2025

Grade and Subject	Mean Marks
8 Science	33.5
10 Mathematics	32

To further contextualize the findings, a **Likert scale** was used to assess the students' perception of co-teaching. Subscales of the Likert scale, such as agreement, satisfaction, and effectiveness, were monitored to authenticate and validate findings. Each subscale had a minimum of two statements and a maximum of three. Mean scores were calculated from numerically coded responses and identified the trends in participants' attitudes toward co-teaching and its effectiveness.

Qualitative Data Tools

Qualitative data were collected through multiple sources to capture rich, contextual insights into participants' experiences with co-teaching. These sources included student reflections, semi-structured

interviews with both students and teachers, focus group discussions (FDGs), and a research diary maintained by the teacher-researcher.

For reflections from the students, they were prompted to write an unbiased and open-ended reflection in their own words. Their writings were guided by prompts such as: *"What differences did you notice between co-teaching and single-teacher classes? How did the two teachers support your learning? Did you face any challenges? How did you overcome them?"*

Simultaneously, both teachers and students were given a chance to participate in a semi-structured interview. For students, the questions explored their overall experience, teacher coordination, moments of clarity or confusion, and suggestions for improvement. With the teachers, questions examined role division, perceived benefits, challenges in alignment, and indicators of effectiveness.

Using purposive sampling, selected students participated in focus group discussions. FDGs also helped substantiate and validate findings from reflections and interviews.

The teacher-researcher's research diary was used purposefully to note the observations, student participation and engagement levels, teacher interactions, and anything related to the intervention. It was maintained throughout the intervention period, and it served as an ongoing record of the co-teaching process. These were used during the data triangulation and validation of findings.

Intervention

The intervention was implemented in three phases over eight weeks (August to September 2025).

Phase 1: Planning and Capacity Building

Before the intervention, co-teaching pairs were identified for grade 8 Science and grade 10 Mathematics. The school timetable was adjusted to align co-teaching periods, ensuring shared teaching slots. A brief orientation session was conducted to train teachers on five co-teaching models (*refer to Table 2*) out of six co-teaching models of Cook and Friend (1995, as cited in Nápoles, 2024), who are perhaps the most well-known and frequently cited for it. Lesson plan templates were provided to guide collaborative planning with clearly defined roles.

Table 2 Co-teaching Approaches

Model	Description
Team Teaching	Teachers share planning and instruction and take turns teaching.
Station Teaching	Content is divided into stations, with each teacher present at their location.
Parallel teaching	Each teacher delivers instructions independently to heterogeneous groups within the class.

Alternative Teaching	One teacher works with a small group of students while the other teaches the large group.
One Teach, One Assist	Both educators are present, but one takes the lead while the other assists.

Phase 2: Structured Co-teaching Implementation

The intervention was designed to maintain consistency and enhance effectiveness. Co-teaching was implemented over eight weeks, from August to September 2025. Grade 8 Science students received six periods per week, with total of 48 periods, of which 40 were co-teaching periods and eight were dedicated to doubt clearing and feedback for better sessions. Grade 10 Mathematics students received five periods per week, with total of 40 periods, of which 32 were co-teaching periods and eight were dedicated to doubt clearing. Teachers delivered co-taught lessons using five models throughout the intervention period. Co-planning sessions were held to define content delivery and adaptation roles. The researcher observed lessons, provided feedback, and adjusted strategies as needed. A research diary was maintained throughout, and midway assessments were conducted to gather preliminary progress data. A well-organized schedule for the intervention is designed to maintain consistency and enhance effectiveness as follows:

Table 3 August 2025 (Weeks 1–4)

Week	Dates	Science Periods	Mathematics Periods
Week 1	Aug 4–8	6	5
Week 2	Aug 11–15	6	5
Week 3	Aug 18–22	6	5
Week 4	Aug 25–29	6	5

Table 4
September 2025 (Weeks 5–8)

Week	Dates	Science Periods	Mathematics Periods
Week 5	Sept 1–5	6	5
Week 6	Sept 8–12	6	5
Week 7	Sept 15–19	6	5
Week 8	Sept 22–26	6	5

Phase 3: Evaluation and Triangulation

At the end of the intervention, post-intervention examinations were administered to measure academic improvements. Surveys using Likert scales were conducted with both students and teachers to assess perceptions of co-teaching in terms of agreement, satisfaction, and effectiveness. Additionally, student reflections, semi-structured interviews, and focus group discussions were carried out to gather qualitative data. All data sources were triangulated to validate findings, and results were compared against national benchmarks to assess alignment.

Data Analysis Methods

Quantitative and qualitative data were analyzed to address the research questions.

Quantitative Data Analysis

Quantitative data from examination scores and Likert-scale surveys were analyzed using descriptive statistics. For examination scores, the mean marks of mid-term examination and post-intervention (trial) examinations were calculated for both grade 8 Science and grade 10 Mathematics. Baseline and post-intervention mean scores were compared to determine the extent of improvement. For the Likert-scale surveys, responses were numerically coded (1 = Strongly Disagree, 2 = Disagree, 3 = Agree, 4 = Strongly Agree), and the percentage of respondents selecting each response option was calculated for each statement across the three subscales: Agreement, Satisfaction, and Effectiveness.

Qualitative Data Analysis

Qualitative data from student reflections, semi-structured interviews, focus group discussions, and the research diary were analyzed using thematic analysis (Braun & Clarke, 2006). The analysis followed a systematic process of familiarization with the data, coding, theme identification, and refinement. Themes emerged from the data rather than being pre-specified.

Data triangulation was done in order to enhance the credibility and validity of the findings. Here, the findings from quantitative sources were compared and contrasted with those of qualitative sources. The patterns throughout the data were consistent, which strengthened the conclusions of the action research.

Validity and Reliability

Validity

The examinations used as quantitative data sources (mid-term and trial examinations) were aligned with the national curriculum and assessed the intended learning competencies, ensuring content validity. Both examinations followed the same format and marking scheme, ensuring consistency in measurement. Additionally, data triangulation was employed by comparing quantitative findings with qualitative data from student reflections, interviews, focus group discussions, and the research diary. This cross-validation of findings strengthened the study's overall validity.

Reliability

The reliability of the quantitative data was ensured by using standardized examinations with consistent marking criteria evaluated by the same group of subject teachers. This eliminated evaluator bias and ensured consistency in scoring. For qualitative data, thematic analysis (Braun & Clarke, 2006) was conducted systematically. Two researchers independently coded 30% of the qualitative data, achieving an inter-rater agreement (Cohen's kappa) of 0.82, indicating high reliability. Member checking was also conducted to confirm the accuracy of the findings with participants.

Ethical Considerations

Ethical considerations are fundamental to this research and will be prioritized throughout the process. Approval from the School Action Research Committee (SARC) at Drukjegang Central School was obtained, along with a consent letter from the school administration, before commencing the action research.

Additionally, the consent letters were sent to the parents or guardians of the participants. The participants received a detailed briefing regarding the purpose of the research and their role in it. Upon their agreement to participate, participants were asked to sign consent forms, ensuring their identities were protected. All data collected during the research were securely stored and kept for future reference and clarification purposes. *(Forms and consent letters are available for evidence.)*

IV. DATA ANALYSIS

Introduction

This chapter presents the findings of this action research. The analysis of quantitative data collected from pre/post examination scores and Likert-scale surveys was conducted using descriptive statistics.

For thematic analysis, data were used from reflections, interviews, focus group discussions, and the research diary maintained by the teacher-researcher. Finally, data triangulation helped in strengthening the validity of the findings of this action research.

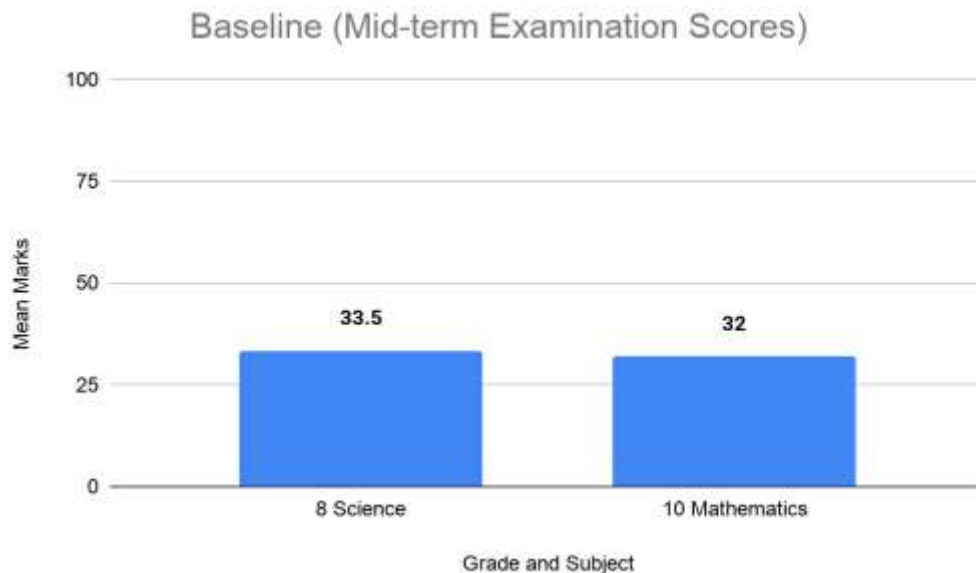
Quantitative Data Analysis

Quantitative data were analyzed using descriptive statistics to assess the impact of co-teaching on students' academic performance. Descriptive statistics are the initial stage of analysis used to describe and summarize data (Sarmiento & Costa, 2017). Descriptive analysis characterizes the world or a phenomenon—answering questions about who, what, where, when, and to what extent. Whether the goal is to identify and describe trends and variation in populations, create new measures of key phenomena, or describe samples in studies aimed at identifying causal effects, description plays a critical role in the scientific process in general and education research in particular (Reardon, 2024). It provides a clear and organized summary of the data, helping researchers identify patterns, trends, and relationships across different data sources. By systematically describing quantitative and qualitative data, researchers can compare and contrast findings to ensure consistency and validity, strengthening the credibility of the results. However, the researchers have used an embedded design where quantitative results are enhanced and emphasized for interpretation and analysis of the data collected through mixed methods.

Baseline Data

Figure 3 below shows the scores in grade 8 Science and grade 10 Mathematics during the mid-term examination of the year 2025. These results served as the baseline data for this action research. Science students scored a mean of 33.5%, while Mathematics is just 33%. Both scores are significantly below the national mean marks of the country, confirming consistent challenges faced by the school.

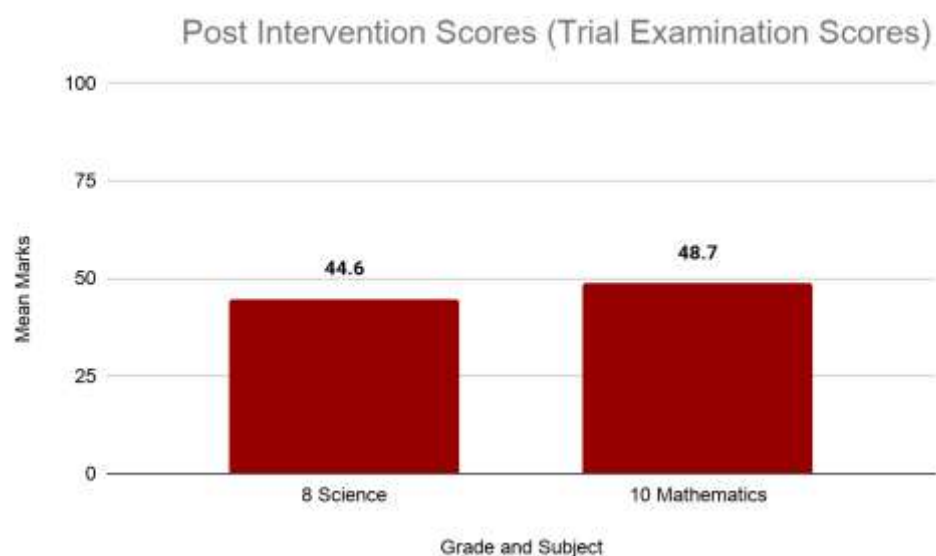
Figure 3 Grade 8 Science and Grade 10 Mathematics - Mid-term Performance Scores



Post-Intervention Data

Figure 3 below shows the scores in grade 8 science and grade 10 mathematics after the intervention schedule. It is the scores of the trial examination 2025. Science students scored a mean of 44.6%, while mathematics is just 48.7%. Both scores are significantly below the national mean marks of the country, confirming consistent challenges faced by the school.

Figure 4 Grade 8 Science and Grade 10 Mathematics - Trial Performance Scores



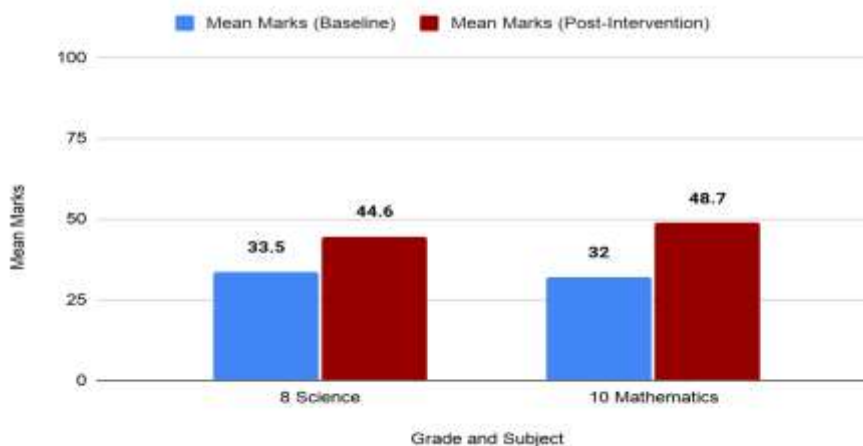
Comparative Data Analysis

The examination scores revealed notable improvements in both subjects following the co-teaching intervention. In grade 8 Science, the mean score increased from 33.5% at baseline to 44.6% in the post-intervention, representing a mean difference of +11.1 percentage points. In grade 10 Mathematics, the mean score increased from 32.0% at baseline to 48.7% in the post-intervention, representing a mean difference of +16.7 percentage points. These findings indicate that co-teaching as a pedagogical leadership strategy had a positive impact on student learning outcomes in both subjects.

Table 6 *Baseline Data and Post-Intervention Data*

Class and Subject	Mean Marks (Baseline)	Mean Marks (Post-Intervention)
8 Science	33.5	44.6
10 Mathematics	32	48.7

Figure 5 *Comparative Bar Graph of Baseline and Post-Intervention Data*



Likert Scale for Teachers

The survey results (Table 7) indicate a highly positive perception of co-teaching among teachers. On the Agreement Scale, all respondents either agreed or strongly agreed that co-teaching enhanced responsibility-sharing (50% A, 50% SA) and lesson planning/delivery (25% A, 75% SA). Similarly, on both the Satisfaction and Effectiveness Scales, 100% of participants agreed with all statements, reflecting unanimous satisfaction with teacher collaboration, meeting student learning needs, enhancing engagement, and improving academic performance. Overall, the findings demonstrate strong teacher endorsement of co-teaching as an effective instructional approach in Science and Mathematics classes.

Table 7 *Likert Scale Used for Teachers*

Type of Scale	STATEMENT	SD	D	A	SA
AGREEMENT SCALE	a) Co-teaching helped grade 8 Science/grade 10 Mathematics teachers share responsibilities effectively.	00	00	50%	50%
	b) Co-teaching improved the planning and delivery of Science/Mathematics lessons.	00	00	25%	75%
SATISFACTION SCALE	a) I am satisfied with the collaboration between co-teachers in Science/Mathematics classes.	00	00	100%	00
	b) Co-teaching met the learning needs of grade 8 and 10 students.	00	00	100%	00
EFFECTIVENESS SCALE	a) Co-teaching enhanced student engagement in Science/Mathematics.	00	00	100%	00
	b) Co-teaching improved academic performance in grade 8 Science and grade 10 Mathematics.	00	00	100%	00

Likert Scale for Students

Students generally value and benefit from co-teaching in Science/Mathematics. They find it engaging, supportive, and effective for learning. However, the data also indicates that co-teaching is not uniformly impactful—about 1 in 5 students still feel less confident or less helped. This suggests that while co-teaching is a strong instructional model, ongoing refinement (e.g., clearer role division, more varied activities, or targeted small-group support) could further enhance its effectiveness for all learners. The following Table 8 shows the survey results of the students.

Table 8 *Likert Scale Used for Students*

Type of Scale	STATEMENT	SD	D	A	SA
AGREEMENT SCALE	a) Two teachers working together helped me understand Science/mathematics better.	4%	32%	60%	4%
	b) Co-teaching made Science/Mathematics lessons more engaging.	4%	28%	76%	0%
SATISFACTION SCALE	a) I liked how my Science/mathematics teachers worked together as a team.	0%	16%	76%	8%
	b) Co-teaching helped me feel more confident in Science/mathematics class.	0%	20%	80%	0%
EFFECTIVENESS SCALE	a) Co-teaching helped me remember Science/mathematics topics easily.	0%	24%	72%	4%
	b) Co-teaching allowed me to ask questions and get better help.	4%	12%	76%	8%

Qualitative Data Analysis

The qualitative data is analyzed thematically. Thematic analysis is a method for identifying, analyzing, and reporting patterns within data. In qualitative analysis, themes emerge from the data rather than being pre-specified: ‘themes are concepts indicated by the data’ (Merriam, 2009). Thematic analysis is a useful and flexible method for qualitative research in and beyond psychology. The goal of a thematic analysis is to identify themes, i.e., patterns in the data that are important or interesting, and

use these themes to address the research question or say something about an issue (Braun & Clarke, 2006).

Thematic Analysis

The qualitative data sources included student reflections, semi-structured interviews with students and teachers, focus group discussions (FGDs), and observations recorded in the research diary. These sources allowed participants to narrate their learning journey in the co-taught classroom and provided rich, contextual insights into their experiences.

The researchers allowed the student participants to write unbiased reflections and let them participate in answering the interview questions. The reflection, as well as the interview questions, prompted them to narrate their learning journey in a co-teaching class. Observations were noted in the research diary, which was maintained throughout the research period. All these data sources strongly support the quantitative results, revealing an overwhelmingly positive perception of co-teaching.

Through thematic analysis, key themes emerged: (1) enhanced interaction and engagement, (2) complementary teacher support, (3) improved conceptual understanding, and (4) challenges in teacher alignment. Students consistently valued having two teachers for increased interaction and individualized support. A few of the reflections are used below for reference.

Figure 6 Reflection of STD08

STD08

Date: September
Page: 30, 2025

My Reflections

- When I first heard that we would have two teachers in our science class, I was confused. I thought, why do we need two teachers? But after a few weeks, I started to like it. More teachers in the class means more interactions. When there is more interaction, we ask more questions. When we ask more questions, we understand better. I used to be shy to ask questions in front of the whole class, but with two teachers, it felt easier. If one teacher was busy with another student, I could ask the other teacher. This really helped me understand difficult topics like electricity and circuits. I think this is why I did better in my exams. More teachers in the class, more interaction and more interaction means more understanding that ultimately helped in academic excellence.

Figure 7 Reflection of STD89

STD89

Date 30/09/2025
Page Sept 30
2025

My Reflection

Before co-teaching I always struggled with mathematics. I would get stuck on problems and wait for the teacher to come to me, but sometimes I had to wait a long time. With two teachers, I never had to wait. There was always someone to help. I also felt more confident to try harder problems because I knew help was nearby. The two teachers had different ways of explaining things. When one teacher's explanation didn't make sense to me, the other teacher would explain it differently, and then I would understand. This helped me remember formulas and steps more easily. I also noticed that our lessons were more interactive. We did more group work and activities. I liked it because we didn't just sit and listen the whole time. More teachers in the class, more interactions and more interaction means more understanding, and that ultimately ultimately helped me academic excellence.

Figure 8 Reflection of STD29

STD29

CLASSMATE
Date _____
Page _____
Sept 30th 2025

My Reflection

"I really enjoyed the co-teaching classes. Before this, I found science boring sometimes. But with two teachers, the lessons were more fun and engaging. They would take turns teaching, and sometimes they would ask us questions together. It felt like the whole class was more alive and active. We also did group activities where we rotated between the two teachers. Each teacher taught a different part of the topic, and we would switch. This kept us moving and focused. I never felt bored because we were always doing something different. I also liked that both teachers were friendly and approachable. I could ask them anything without feeling scared or shy. More teachers in the class, more interaction and more interactions mean more understanding that ultimately helped in academic excellence."

Teachers acknowledged benefits in shared responsibility while admitting coordination challenges. From the teacher's perspective, a co-teaching setting could be an ideal bridge between student teaching and a teaching position as either a head/lead teacher or the sole teacher in a program. Shaw (2022) noted the potential for mentorship and induction into the profession for a new teacher, and Draves (2008) extended the mentorship possibilities bidirectionally. It stands to reason that both new and experienced music teachers could learn additional strategies from working with another professional, building their tools while also decreasing professional isolation.

Teacher T3 – Reflection

At first, coordinating co-teaching was challenging since both teachers had to be on the same page. However, over time, we gained momentum as expected. I realized that having two teachers in the classroom means providing more individualized support, which children definitely liked. My co-teacher would circulate and help those who needed help while I taught the main lesson. This was an advantage for all the students and gave them a sense that each of them was not left behind. Further, within that session, I got an opportunity to practice new strategies that my co-teacher brought to teach the concepts. It was a time for us to grow professionally. However, we also learned that we need more time for co-planning. It was an essential part of teaching and learning. At times, we faced a problem where we had different explanations that confused the students. Overall, co-teaching was a positive experience, but it requires effort and commitment from both teachers.

A few of the lines above resonate with the interview lines of a different teacher. She said, *"The biggest struggle is making sure we are completely aligned before we enter the classroom. If we are not on the same page, students get confused."* (Interview, Teacher T1)

Additionally, interview sources also have similar wording for every theme from both the students and the teachers. One of the students said, *"When one teacher explained something I didn't understand, the other teacher would explain it differently, and then I got it."* (Interview, STD07)

Findings from the Focus Group Discussion

To further substantiate the findings from student reflections and interviews, two focus group discussions (FGDs) were conducted, one each for Science and Mathematics. Thematic analysis from both groups revealed positive perceptions of co-teaching. It is said that co-teaching enhances access to teacher support: *"In a normal class, if the teacher is busy with one student, others have to wait. But here, if one teacher is helping someone, the other teacher comes to us. We don't waste time"* (FGD, Grade 10, STD87). There were several others with similar sentiments. They also said that the sessions increased their engagement. One of the students remarked, *"Lessons are more interesting now. Before, it was just one teacher talking. Now, two teachers teach... It feels like we are part of a team"* (FGD, Grade 10, STD64). A complementary teaching style was what the students pointed out as of great help to them. STD63 said, *"One teacher explains the formula, and the other teacher gives us real-life examples."* However, the students are occasionally confused about the role of the teachers. This might have happened when there was confusion among teachers when they walked into the class with not

much preparation. *"If both teachers are teaching, they should decide before class who will say what. Sometimes it feels like they are not fully prepared"* (FGD, Grade 10, STD32).

Findings from Research Diary/Observations

The research diary was one of the documents the teacher-researcher maintained for the whole intervention period of eight weeks. He documented a total of 18 different observations during different co-teaching classes. Thematic analysis revealed marked improvements in student participation and reduced wait time for teacher assistance. An early entry noted, *"Only a few students are answering questions"* (RD, Week 2, Science), but by Week 5, the observer recorded, *"Almost half the class raised their hands... Students who never spoke before are now participating"* (RD, Week 5, Science). While initial challenges such as role confusion were documented, these were resolved through ongoing reflection and planning. Overall, the research diary observations complement and validate the quantitative and qualitative findings.

Triangulation of multiple data sources ensures the credibility of these findings. Overall, the qualitative data provide rich insight into *how* co-teaching fosters a supportive and engaging learning environment, while also highlighting the need for teacher compatibility and adequate planning time to maximize its effectiveness.

Summary of Findings

The findings demonstrate that co-teaching positively impacted student learning outcomes. Quantitatively, Science scores increased from 33.5% to 44.6% and Mathematics from 32.0% to 48.7%. Student perceptions were positive, with students agreeing that co-teaching improved access to help, finding lessons more engaging, and reporting increased confidence; teacher responses were unanimously positive. Qualitatively, thematic analysis of reflections, interviews, focus groups, and research diary observations revealed enhanced engagement, complementary teacher support, and better access to individualized assistance, though occasional role confusion was noted. Triangulation across all data sources confirms that co-teaching fostered a supportive learning environment while highlighting the need for continued refinement in role clarification and co-planning.

V. RESULTS AND DISCUSSIONS

Introduction

The final chapter of this paper presents the comprehensive discussion of findings presented in the earlier chapters. It has the interpretation of the results within the context of existing literature and the theoretical framework that guided this study. This chapter also presents the limitations of the study, a few implications for practice, offers suggestions for future research, and concludes with the summary of the study's contributions and final reflections.

DISCUSSION

Based on the research questions and the findings presented in Chapter IV, the findings are discussed by situating them within the existing scholarly works as detailed below:

Impact of Co-teaching on Academic Performance

Researchers have found that co-teaching is a key factor in student success, contributing positively to academic gains in both English Language Arts and Mathematics (Jones-Taylor, 2024; Colwell, 2024). The findings of this study align with this body of research. The improvement in student examination scores is the most significant finding of this action research, following the eight-week intervention. Science scores increased from 33.5% to 44.6% (+11.1 percentage points), and Mathematics scores from 32.0% to 48.7% (+16.7 percentage points). Further, it demonstrates that co-teaching, as a pedagogical leadership strategy, positively influenced student learning outcomes.

Furthermore, this finding supports Shaha et al. (2015), who found that systemic instructional interventions improve performance in both Mathematics and Reading. However, the current study only partially concurs with Song et al. (2021), who found that providing educators with performance feedback had positive impacts on student achievement in mathematics but not in reading. The current study, which focused on Science and Mathematics, is in full agreement with the positive impact on Mathematics achievement.

Perceptions of Co-teaching

The survey results revealed positive perceptions of co-teaching among both the teachers and students. Student participants agreed or strongly agreed that co-teaching enhanced access, built confidence, and they were thoroughly engaged in the sessions. For teachers, they agreed and strongly agreed that co-teaching enhanced responsibility sharing, improved lesson planning and delivery with better collaboration.

These findings are consistent with the work of Rönn-Liljenfeldt et al. (2024), who found that students without special educational needs were more positive about co-teaching the more co-taught lessons they received per week. The qualitative data provided rich insights into why these positive perceptions emerged. Students consistently valued the constant availability of teacher support, the interactive and dynamic nature of co-taught lessons, and the opportunity to receive explanations in multiple ways. The increased engagement reported by students aligns with the research of Cook and Friend (1995) and Shibley (2006), who found that students in co-taught classrooms exhibit higher levels of active participation.

Teachers similarly valued shared responsibility, professional growth through peer learning, and the ability to provide more individualized support to students. This finding aligns with Duran et al. (2021), who found that co-teaching serves as a good mechanism for peer learning among teachers. The evolution of teacher collaboration over the eight weeks—from initial hesitation to natural feedback and confidence—reflects the development of distributed leadership practices (Spillane, 2006).

However, teachers also acknowledged challenges in coordination and co-planning, underscoring the importance of dedicated planning time and role clarification. This challenge aligns with Dieker and Murawski (2003), who emphasized that co-teaching at the secondary level presents unique challenges, including the need for shared planning time and clear role differentiation.

Factors Contributing to the Improvements of Student Learning Outcomes.

Several factors likely contributed to these improvements. First, the reduced student wait time for teacher assistance—documented in the research diary—enabled students to receive immediate support, reducing frustration and increasing task completion. Second, the use of varied co-teaching models, particularly Alternative Teaching, provided targeted support for struggling learners who may have otherwise fallen behind. Third, the complementary teaching styles of the co-teaching pairs offered students multiple explanations and perspectives, enhancing conceptual understanding. These factors collectively created a more supportive and responsive learning environment.

Alignment with Distributed Learning Theory

The findings of this action research align with Distributed Leadership Theory (Spillane, 2006), as pedagogical leadership was distributed among the principal and co-teaching pairs through collaborative planning and shared accountability. This study supports the findings of Jones-Taylor (2024), Colwell (2024), and Rönn-Liljenfeldt et al. (2024), while extending the literature by examining co-teaching in Science and Mathematics at the secondary level in the Bhutanese context, where such research has been limited.

This finding supports the argument of MacNeill et al. (2003) that pedagogical leadership is presented as an alternative to instructional leadership, focusing on fostering students' learning and intellectual development rather than merely delivering curriculum. It also resonates with Contreras (2016), who stated that the educational demands of the 21st century make it indispensable to re-evaluate traditional models of management and leadership in schools and focus on pedagogical aspects, distributed leadership, and participative school development.

Implications of the Study

The findings carry several implications for pedagogical leadership in Bhutanese schools. The principal's role as a pedagogical leader was crucial in creating the conditions for co-teaching to succeed. First, co-teaching should be structured to maximize student access to teachers, particularly during independent practice, as this was the most highly rated benefit. Second, schools should invest in co-planning time and role-clarification protocols to address the minority of students who still reported lower confidence. Third, teacher-researchers should routinely collect student reflections and observational data, not merely as research tools, but as formative feedback mechanisms to adjust co-teaching strategies in real time. Finally, while these results are promising, schools should pilot co-teaching in phases, pairing it with targeted professional development in differentiated instruction and assessment design to bridge the gap between classroom performance and board-examination readiness.

This aligns with the work of Ärlestig and Törnsten (2014), who found that aspects of pedagogical leadership include principals' classroom observations and communication about teaching and learning issues.

Finally, while taking into consideration the above implications, the practitioners, the principal, policy makers, and all other concerned stakeholders need to interpret the findings effectively in the school setting for maximum advantage to the learners, teachers, and the school as a whole.

CONCLUSION

This action research evaluated the effectiveness of co-teaching as a pedagogical leadership strategy in improving student learning outcomes in grade 8 Science and grade 10 Mathematics at Drukjegang Central School. Data were collected through pre- and post-intervention examination scores, Likert-scale surveys, student reflections, semi-structured interviews, focus group discussions, and a research diary maintained throughout the eight-week intervention period. The study was grounded in Distributed Leadership Theory (Spillane, 2006) and employed a mixed-methods approach to provide a comprehensive understanding of the impact of co-teaching. The study involved 126 students and four teachers.

The study demonstrated that co-teaching in Science and Mathematics classrooms is a viable and valued instructional model. It revealed that co-teaching helped in significant academic success. The consistency across quantitative and qualitative data sources provides strong evidence that students appreciate the increased access to teacher support, the enhanced engagement, and the confidence they gain in a co-taught environment.

Some of the key findings are:

- *Better student learning outcomes:* Student performance scores in both Science and Mathematics increased notably, with higher scores in Mathematics.
- *Positive Student Perceptions:* 84% of students agreeing co-teaching improved access to teacher help, 76% found lessons more engaging, and 80% reported increased confidence.
- *Positive Teacher Perceptions:* Teacher perceptions were unanimously positive, with all teachers endorsing co-teaching for enhancing responsibility-sharing.

In conclusion, this research contributes not only to the scholarly conversation on collaborative teaching but also to the daily practice of educators striving to create more responsive, supportive, and effective learning environments for all students. Perhaps the simple statements from the student-participants encapsulate the essence of co-teaching: ensuring that no student is left stuck, and every learner has a pathway to success with co-teaching.

Limitations of the Study

While these findings suggest that the co-teaching intervention was associated with substantial improvements in students' scores in the trial examination within the specific context, several factors likely contributed to the magnitude of the increase in scores.

Hence, before interpreting the findings, readers should note the following limitations: (1) no control group, so improvements cannot be solely attributed to co-teaching. Maturation may have contributed to the results of the action research findings. (2) Teacher-researchers have set both the questions for the mid-term examination and the trial examination. They were also the evaluators in the group evaluation of the papers, introducing potential bias, including expectation bias. (3) Short intervention duration of just 8 weeks, consisting of 40 and 32 periods for science and mathematics, respectively. (4) The marking scheme followed for the evaluation of the papers might not have been up to the standard of the board examinations of the country.

These limitations might have directly or indirectly contributed to the result of the action research. Hence, the researchers acknowledge the possibility of these limitations contributing to the effectiveness of co-teaching practices as a pedagogical leadership strategy.

Recommendations

The study recommends that Drukjegang Central School continue having structured co-teaching as a pedagogical leadership strategy that includes planning and capacity building, structured co-teaching implementation, and evaluation and Triangulation. Regular implementation of these cycles will help maintain consistency in improving teaching and learning practices, ultimately leading to academic successes. School leaders must do their best to implement these types of pedagogical shifts for the betterment of the learners and the school as a whole. Creating opportunities for the fellow teachers to be involved in such co-teaching strategies will not only benefit the students but also the teachers who are carrying out the co-teaching in the classrooms. Teachers, in fact, are also encouraged to take initiatives in engaging in co-teaching the lessons for effectiveness in delivery and for better understanding by the learners.

Suggestions for Future Researchers

The limitations of this action research may be addressed by employing quasi-experimental or randomized controlled designs with control groups to establish causality. Future researchers can extend the intervention period to a full academic year or longer to assess long-term impact and retention. Involvement of external evaluators and evaluating the paper aligning with the national board standards must also be considered to address the limitations.

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