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Research Article

# Correlation Between Peer Learning Practices and Mathematics Achievement of Secondary Level Students in Bhaktapur District, Nepal

Prem Prasad Dahal

Department of Mathematics Education, Sanothimi Campus, Bhaktapur, Nepal

**Author e-mail:** dahalprem2000@gmail.com

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## Abstract

Mathematics achievement at the secondary level is still of great educational concern in Nepal. The traditional approaches to mathematics instruction, which are based on a teacher-centered learning environment, often restrain student engagement and deeper conceptual understanding. This study was conducted for testing a relationship between peer learning practice and mathematics achievement of secondary level students in Bhaktapur District of Nepal. A quantitative correlational research design was adopted, and the data was collected from 384 Grade 9 and 10 students from community and institutional schools. Peer learning practices were measured by using a structured five Likert scale questionnaire comprising ten questions and mathematics achievement was determined by using students' most recent officially recorded mathematics examination marks. Descriptive statistics, reliability analysis, Pearson's correlation and simple linear regression were adopted for statistical data analysis. The results showed very strong, positive and statistically significant relationship between the practices of peer learning and mathematics achievement ($r = 0.785$, $p < .001$). The regression analysis further suggested that mathematics achievement was significantly predicted by peer learning practices ($B = 8.06$, $P < .001$) and was explained by 61.7% variance ($R^2 = .617$) of the mathematics achievement of the students. The results indicate that structured peer learning practices play an important role for improving mathematics achievement and student engagement at the secondary level.

**Keywords:** Peer learning, cooperative learning, correlation, mathematics achievement, secondary education

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## Introduction

Mathematics is a key subject in the secondary school curriculum and is integral to the academic development of students, as well as their cognitive and future career opportunities. Competence in mathematics is not only necessary for study in science and technology at an advanced level but is also required for problem-solving and logic in real life. Despite its importance, mathematics is seen as a hard and anxiety-inducing subject by the students, especially at the secondary level. Several studies on secondary education have systematically reported difficulties with low mathematics achievement and negative student attitudes to the subject (Roseth et al., 2008). In the Nepalese context, issues on mathematics achievement have also been pointed out in the recent school-based research (Roka & Khatri, 2024).

Traditional teacher-centered instructional approaches that involve lecturing and rote memorization continue to dominate in the majority of the Math classrooms. Such approaches often limit the participation of students; reduce the opportunities for interaction and may not adequately address individual learning needs and/or conceptual understanding. In response to these limitations, instructional strategies that encourage active engagement and collaboration and are learner-centered have been stressed by educational researchers. Among these, peer learning practices such as cooperative learning, peer tutoring, group discussion and collaborative problem-solving practices are widely recommended as effective alternatives to conventional teaching methods (Slavin, 2014).

Peer learning is founded on the belief that students learn better when they interact with each other, explain ideas and ask questions, and co-construct understanding through

the process of shared problem-solving. This perspective is heavily based on the theory of social constructivist learning, which states that learning is an active and social process that is mediated by dialogue, explanation, questioning and negotiation of meaning (Slavin, 2014). In collaborative learning environments, student thinking is made external to each student, misconceptions are uncovered and student understanding is honed by the interaction. Such environments foster shared responsibility for learning and learners to take active roles in their learning instead of relying on teacher instruction.

Slavin (2014) offers a detailed theoretical explanation to the effectiveness of cooperative learning by pointing out four interconnected mechanisms in which group work contributes to academic achievement: motivation, social cohesion, cognitive development, and cognitive elaboration. Motivation and individual accountability in group goals are especially important for increased achievement since students are more active and persistent when their success is tied to the success of their group. Cognitive elaboration takes place when students are asked to explain concepts to their peers, receive feedback, re-organize their concepts, and consequently build greater conceptual understanding.

Social interdependence theory provides further information on why peer learning is effective, with the emphasis on positive goal interdependence and promotive interaction. Roseth et al. (2008) state that cooperative goal structures foster mutual support, sharing of resources, and trust between learners. Their meta-analysis of 148 studies found that cooperative learning environments are linked to higher levels of academic achievement as well as more positive peer relationships than are found in competitive or individualistic learning structures, especially among early adolescents. This framework emphasizes the role of social interaction and shared goals in supporting academic as well as social development.

There is also strong empirical evidence of the positive effect of peer learning on mathematical achievement. Meta-analytic evidence is a very compelling one. Alegre-Ansuategui et al. (2018), in a meta-analysis of peer tutoring programs, showed significant increases in mathematics achievement from studies all finding a positive overall effect size. Similarly, Capar and Tarim's (2015) study revealed that cooperative learning had a medium, positive, and statistically significant effect on mathematics achievement, and a small but significant effect on the students' attitude towards mathematics. These benefits are also confirmed in reviews of face-to-face cooperative learning research. Kyndt et al. (2013) concluded that cooperative learning usually has positive effects on academic outcomes, although the magnitude of effects may differ as a function of instructional design and classroom conditions.

Several studies that focus on specific peer learning practices also provide the evidence of the value of peer interaction in mathematics education. Byiringiro (2023) discussed students who used discussion-based instructional methods at the secondary level, and he reported that there is a strong positive relationship between discussion-based learning and mathematics performance. Peer tutoring has also been found to increase mathematics achievement repeatedly. Sarabjeet and Nagra (2022) found that secondary school students who are taught using peer tutoring had significantly higher scores of mathematics compared to students who are taught using conventional lecture methods. Likewise, Awofala and Agbolade (2024) found that structured peer tutoring strategies resulted in significant improvements on mathematics achievement of students. These findings indicate that peer tutoring can be used to provide individual support, immediate feedback, and increased learner confidence.

Collaborative approaches to learning have also produced positive results in mathematics. Siller and Ahmad (2024) showed that collaborative learning not only enhanced the mathematics achievement of the learners but also fostered a more positive attitude towards the subject, suggesting that the structured interaction between peers can be beneficial, both in terms of cognitive and affective issues. Research shows further that social relations play a part in the success of peer learning. Klang et al. (2021) stressed the importance of peer acceptance and friendship in cooperative learning contexts wherein positive peer relations foster engagement and willingness to participate in learning, as this enhances the strength of peer learning in mathematics classrooms.

In Nepal, peer learning strategies show educational value for emerging evidence. Roka and Khatri (2024) carried out a quasi-experimental study amongst Grade 9 Mathematics students and found that cooperative learning significantly enhanced the achievement of Mathematics as compared with traditional instruction. Their study also found higher levels of motivation, engagement, cooperation, and accountability for the students who took part in the cooperative learning group and thus showed the feasibility and potential benefits of using peer learning strategies in secondary classrooms in Nepal.

However, peer learning outcomes could differ in terms of the structure of peer learning. Following Pons et al. (2014), the concept of "equality parameter" of cooperative learning is highlighted, consisting of the balance of the roles of the members within the group. They differentiate peer tutoring (asymmetric roles) and collaboration (more equal participation) and conclude that group composition and cognitive proximity among learners have an influence on learning outcomes. This implies that peer learning is best when societal interactions and roles are structured with a goal in mind.

Motivation has also been found to be an important mechanism that bridges the gap between peer learning and academic achievement. Asare et al. (2025) found that the effect of peer teaching on mathematics achievement is directly and indirectly through student motivation. Motivated students are more likely to persevere in learning tasks and are more likely to engage in depth with the mathematical ideas, and benefit from peer interaction. Although the measure of motivation was not taken in this study, these

findings offer a reasonable theoretical explanation for the association that may exist between stronger peer learning practices and higher mathematics achievement.

Although there is a large body of work on peer learning across the international context, relatively few studies in Nepal have explored the link between naturally occurring peer learning practices and mathematics achievement in secondary schools using correlational designs. The existing Nepal-based studies are mostly intervention-focused and are proven to be effective under controlled or quasi-experimental settings (Roka & Khatri, 2024). Consequently, there is still little empirical evidence regarding the relationship between peer learning practices operating in regular classroom environments and the level of mathematics achievement of students. With community and institutional schools having different instructional environments, Bhaktapur District provides a meaningful context for exploring this relation. Understanding the workings of peer learning practices in these types of settings can help to inform practical strategies for enhancing mathematics achievement in secondary settings.

The objectives of the study were two-fold: to examine the relationship between peer learning practices and mathematics achievement among secondary level students in Bhaktapur District; and to identify the predictive effect of peer learning practices on the mathematics achievement. Likewise, it was based on two hypotheses: there is a significant positive relationship between peer learning practices and mathematics achievement ($H_1$), and peer learning practices significantly predict mathematics achievement (H2).

## Methods

The present study adopted a quantitative correlational research design in order to investigate the correlation between peer learning practices and mathematics achievement of the secondary school students of Bhaktapur District, Nepal. This design was thought to be appropriate as the study did not involve the manipulation of instructional variables or implementation of an intervention and instead focused on identifying the strength and direction of the relationship between naturally occurring peer learning practices and students' mathematics achievement in the context of real classrooms. The correlational approach was possible with meaningful statistical analysis and without any loss of ecological validity.

The study population consisted of Grade 9 and 10 students studying in the community and institution-based secondary schools of Bhaktapur district. These grade levels were chosen because the students at this stage are exposed to more advanced mathematical concepts and often engage themselves in peer interaction in their learning activities. A sample of 384 students was taken, representing both school types (public and private) and grade levels. The sample size was deemed adequate for correlation and regression analyses so as to have reasonable statistical power and ensure a reasonable representation of the target population. The participation was voluntary and the respondents were informed about the academic purpose of the study, and were assured of confidentiality.

The data were gathered from a structured questionnaire designed to measure the practices of peer learning in mathematics of students. The instrument comprised of ten items which were measured using a five-point Likert scale of Never (1) to Very Often (5). The items reflected important dimensions of peer learning that have been identified in the literature such as group study, help-seeking from peers, explaining mathematical solutions, receiving peer explanations, working together to solve problems, peer feedback, active participation in the discussion, and leadership roles in group activities. Two items with negatively worded items were included and reverse coded to minimize response bias and increase the reliability of the scale. Mathematics achievement was assessed using the most recent officially recorded mathematics examination score from students, which was provided on a scale of 0 to 100 giving an objective measure of student academic achievement consistent with school assessment practices.

Prior to the statistical analysis, the internal consistency of the peer learning practices scale was determined using Cronbach's alpha. The analysis showed a high degree of internal consistency and the coefficient of more than 0.80, which suggests that the instrument was reliable in measuring the underlying construct of peer learning practices and can be used for further analysis.

The data analysis included descriptive and inferential statistics. Descriptive statistics, such as mean and SD of each item on peer learning questionnaire and similarly mean and SD were used to summarize the levels of peer learning practices and mathematics achievement. Pearson's product-moment correlation coefficient was used to analyze the relationship of peer learning practices and mathematics achievement. In addition, simple linear regression analysis was carried out to determine the predictive effect of the peer learning practices on the mathematics achievement. All analyses were done using a suitable degree of statistical significance, and results were interpreted following the study objectives.

## Results

This section presents the findings of the study. The results are reported according to the objectives of the research and the research hypothesis.

Descriptive statistics were calculated to investigate the student engagement in specific educational practices of peer learning via the ten-item Likert scale questionnaire. The item-wise mean, standard deviation, minimum and maximum scores of each learning practice on peer learning are given in Table 1. The mean scores of the items were found to range from 2.85 - 3.20, implying that there was an overall moderate level of engagement in peer learning activities among the secondary school students. Items relating to asking peers for help, receiving explanations, and

participating in discussions registered relatively higher mean values, implying that students often used peer interaction to assist their learning of mathematics. In contrast, the leadership-related activities showed relative mean scores indicating lesser frequency of assuming leadership roles during group work. The standard deviation values indicate that there are some notable deviations between students with respect to their engagement in different peer learning practices.

**Table 1:** *Descriptive Statistics of Individual Peer Learning Practice Items (n = 384)*

| Code | Peer Learning Practice Item | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|---|
| PL1 | I study mathematics with classmates in a group. | 2.87 | 1.47 | 1 | 5 |
| PL2 | I ask my classmates for help when I do not understand a math topic. | 3.05 | 1.44 | 1 | 5 |
| PL3 | I explain mathematics solutions to my classmates. | 2.96 | 1.48 | 1 | 5 |
| PL4 | My classmates explain mathematics solutions to me when I am confused. | 3.03 | 1.49 | 1 | 5 |
| PL5 | I solve mathematics practice problems together with friends. | 2.88 | 1.49 | 1 | 5 |
| PL6 | I receive helpful feedback from classmates on my mathematics work. | 3.00 | 1.46 | 1 | 5 |
| PL7 | I actively participate in peer discussions during mathematics learning. | 3.00 | 1.50 | 1 | 5 |
| PL8 | I take a leadership role during group mathematics activities. | 2.85 | 1.50 | 1 | 5 |
| PL9 (R) | Learning mathematics with peers distracts me from serious study. | 3.20 | 1.47 | 1 | 5 |
| PL10 (R) | I understand mathematics better when I study alone than with peers. | 3.01 | 1.41 | 1 | 5 |

Note. Items PL9 and PL10 were reverse coded prior to analysis. Scale: 1 = Never, 5 = Very Often.

In addition, another descriptive statistic were calculated in order to summarize the levels of peer learning practices and mathematics achievement among secondary school students of Bhaktapur District. As shown in table 2, the average score for peer learning practices was 2.98 (SD = 1.17), which was at a moderate level of engagement in peer learning activities such as group study, peer discussion, explaining the mathematical concepts, and collaborative problem-solving. The relatively high standard deviation indicates that there is substantial variation in the practice of peer learning in students. Mathematics achievement scores varied from 26.0 to 83.5 and had a mean achievement score of 56.15 (SD = 12.00), which indicated moderate overall achievement while there was sufficient variation to allow inferential statistical analysis.

**Table 2:** *Descriptive Statistics of Peer Learning Practices and Mathematics Achievement (n = 384)*

| Variable | Mean | SD | Minimum | Maximum |
|---|---|---|---|---|
| Peer Learning Practices | 2.98 | 1.17 | 1.00 | 5.00 |
| Mathematics Achievement | 56.15 | 12.00 | 26.0 | 83.5 |

To test the first hypothesis ($H_1$), Pearson's product-moment correlation coefficient was used to investigate the correlation between peer learning practices and mathematics achievement. As shown in Table 2, the results suggest a strong, positive and statistically significant correlation, $r(382) = .785$, $p < .001$. This suggests that those students who reported using peer learning practices at higher levels tended to achieve higher scores in mathematics. Therefore, H1 was accepted.

**Table 3:** *Pearson Correlation between Peer Learning Practices and Mathematics Achievement*

| Variables | 1 | 2 |
|---|---|---|
| 1. Peer Learning Practices | 1 | .785** |
| 2. Mathematics Achievement | .785** | 1 |

Note. $p < .001$.

In order to examine the second hypothesis (H2) the simple linear regression analysis was performed with mathematics achievement as dependent variable and peer learning practices as independent variable. The statistical significance of the regression model was determined with the results $F(1, 382) = 615.1$, $p < .001$ that shows that peer learning practices was found to be significantly related to mathematics achievement. As can be seen in Table 4, the results of peer learning practices significantly influenced the mathematics achievement ($B = 8.06$, $SE = 0.32$, $t = 24.80$, $p < .001$). This means that for every one unit increase in the peer learning practices, there was an increase in mathematics achievement of about 8.06 marks.

The coefficient of determination showed that a strong predictive relationship existed between mathematics achievement, and the model explained 61.7% of the variance ($R^2 = .617$, Adjusted R2 = .616). Accordingly, $H^2$ was accepted.

**Table 4:** *Regression Analysis Predicting Mathematics Achievement from Peer Learning Practices*

| Predictor | B | SE | t | p |
|---|---|---|---|---|
| Constant | 32.12 | 1.04 | 30.85 | < .001 |
| Peer Learning Practices | 8.06 | 0.32 | 24.80 | < .001 |

Model summary: $R = .785$, $R^2 = .617$, Adjusted $R^2 = .616$
$F(1, 382) = 615.1$, $p < .001$

For clarity, the outcomes of hypothesis testing are summarized in Table 5.

**Table 5:** *Summary of Hypotheses Testing*

| Hypothesis | Statistical Test | Decision |
|---|---|---|
| $H_1$: Significant relationship between peer learning practices and mathematics achievement | Pearson correlation | Accepted |
| $H_2$: Peer learning practices predict mathematics achievement | Regression analysis | Accepted |

Overall, the results show that there is a strong and positive association between the practices of peer learning and mathematics achievement among secondary school students of Bhaktapur District. The magnitude of the correlation and the regression coefficients shows that peer learning has a significant role in the performance of mathematics among the secondary school students; hence, it provides strong empirical evidence that peer learning practices are effective for the achievement of mathematics among secondary schools.

## Discussion

The objective of this research was to investigate the relationship of peer learning practices on mathematics achievement of secondary school students in the district of Bhaktapur. The results showed a strong, positive and statistically significant correlation between peer learning practices and mathematics achievement, as well as a significant predictive impact of peer learning on the student's mathematics performance. These results have produced important empirical evidence for the role of peer learning as an effective pedagogically approach in mathematics education of the secondary school.

The results of the current study show a strong positive correlation ($r=0.785$, $p < 0.001$) that supports $H_1$ which states that the more frequent a student is in a peer learning activity, the more s/he will score in mathematics. This finding is highly consistent with theoretical framework presented by Slavin (2014) who maintained that cooperative learning promotes achievement through motivational processes, social cohesion, cognitive development and cognitive elaboration. In the current research, peer learning practices, like group study, peer explanation, collaborative problem-solving, and feedback, probably led to deeper cognitive processing and greater engagement and contributed to improved mathematics achievement.

The findings are also consistent with social interdependence theory that stresses the importance of positive interdependence among learners that promotes promotive interaction, mutual support, and a sense of shared responsibility for learning outcomes (Roseth et al., 2008). In the context of this study, sharing goal structures, trust and helping each other are all likely to have benefits on academic performance in early adolescence, and students in the peer learning condition may have benefited from all these characteristics. This theoretical alignment is especially pertinent considering that the participants were in the Grade 9 and Grade 10 age-group, an age group in which peer-influence and social interaction play a critical role in learning.

The outcomes of this research also support previous empirical research in diverse educational settings. The positive relation between learning practices among peers and the achievement in mathematics is similar to the result obtained by Byiringiro (2023), which identified very strong positive relation between discussion-based teaching method and performance of mathematics among the secondary school students. Similarly, Sarabjeet and Nagra (2022) also found that peer tutoring was a significant factor in enhancing mathematics achievement over traditional lecture-based instruction, indicating the efficacy of peer-supported learning environments. These studies, along with the present findings, have implications that peer discussion, explanation and tutoring are consistent with better mathematics outcomes regardless of cultural and educational context.

Importantly, the results of the present study are very similar to the research conducted in the context of Nepal. Roka and Khatri (2024) found that students who were taught by using cooperative learning strategies had significantly higher mathematics scores than students who were taught by conventional methods. Their study also showed a higher level of motivation, engagement, and accountability among students involved in cooperative learning. The strong relationship revealed in the current study is further evidence to support the idea that peer learning practices are not only theoretically sound, but they are also effective in the practical level within the Nepalese secondary schools including the secondary school at Bhaktapur District.

The present findings are also in line with the evidence in the classroom regarding collaborative and cooperative learning. Siller and Ahmad in 2024 showed that collaborative learning enhanced the achievement and attitudes of mathematics which supports the interpretation that peer interaction could be a factor that strengthens both cognitive and motivational aspects of learning. Similarly, Tran (2014) found positive results of the effects of cooperative learning on achievement and knowledge retention, indicating that structured peer learning can contribute to sustained learning achievement.

The regression analysis presented in this study further enables more information about the level of the relationship between peer learning practices and mathematics achievement. The result that the peer learning practices were responsible for about 61.7% variance in mathematics achievement supports Hypothesis H2 and hence there is a significant predictive effect. This degree of explanatory power is consistent with the results obtained in meta-analytic studies, such as these mentioned by Capar and Tarim (2015) and Alegre-Ansuategui et al. (2018), which concluded that cooperative learning and peer tutoring have moderate to strong effects on mathematics achievement.

The high predictive value that was found in the current study suggests that practices of peer learning may be central in shaping the performance of students in mathematics, even in non-experimental, naturally occurring classroom settings.

The current results also can be viewed in terms of research focusing on the role of group structure and roles in peer learning. Pons et al. (2014) emphasized the two key factors in the effectiveness of peer learning, which are equality of roles and cognitive proximity among group members. In this study, items associated with leadership, explanation and mutual assistance indicate the presence of both peer-tutoring and collaborative learning roles. This combination of peer learning forms could have contributed to the strong observed relationship in that students were able to benefit from both structured learning by more capable peers and learning as equals on knowledge construction.

Furthermore, the relationship between peer learning practices and mathematics achievement was also found to be strong, a situation that may be explained, in part, by student motivation, although this was not measured directly in this study. Asare et al. (2025) showed the mediating effect of motivation in peer teaching and mathematics achievement, implying that peer learning leads to students having increased intrinsic motivation, persistence and confidence. The results of the current study are in line with this explanation because the students who participated more actively in peer learning are likely to have experienced higher motivation and lower mathematics anxiety, both of which are likely to contribute to their increased achievement.

The findings are also consistent with the results of Klang et al. (2021) that highlighted the role of peer acceptance and positive social relationships in cooperative learning environments. In secondary classrooms, students who are socially supported by peers are more likely to engage actively, ask questions and engage in mathematical reasoning. The high correlation found in this study may therefore represent, not only cognitive benefits, but also social and emotional benefits of peer learning practices.

Despite the strong results, it is important to consider the results in the context of a correlational design. While the study shows a strong relationship and predictive link between peer learning practices and mathematics achievement, it is impossible to demonstrate causality. Other variables such as prior achievement, teacher instructional style, or classroom climate may also affect student engagement in learning from peers and students' academic performance.

Nevertheless, the agreement of the findings with experimental, quasi-experimental and meta-analytical research helps to build confidence in the educational value of peer learning practices.

Overall, the findings of the present study are theoretically grounded, empirically supported, and contextually relevant are stressed. By presenting a positive link between peer learning practices and achievement in mathematics in the case of Bhaktapur District, this research helps in adding meaningful data to the emerging literature that argues in favor of learner-centered and collaborative approaches in secondary mathematics education.

## Conclusion

The present study investigated the relation between peer learning practices and mathematics achievement of secondary school students of Bhaktapur District. The findings of the study clearly show that there is a positive, significant relationship between the practices of peer learning and students' achievements in mathematics. The students who tended to engage often in peer learning activities including group study, peer discussion, explanation of mathematical concepts, collaborative problems solving, and peer feedback tended to score higher in mathematics than those who tended to engage less in such peer learning practices.

The results further revealed that peer learning practices are a strong predictor of mathematics achievement, which explains a substantial portion of the variance in students' mathematics score. This suggests that peer learning not only is a supplementary activity in the classroom but a meaningful pedagogical factor, and contributes significantly to the academic performance of students. The strong predictive power observed in the study makes it clear that it is important to create structured and purposeful peer interaction in the classroom.

The results of this study are consistent with the known and recognized theoretical perspectives such as the social constructivist theory and the social interdependence theory that emphasize on learning through interaction, joint responsibility, and mutual support. The findings are also consistent with the prior empirical studies undertaken both abroad and in Nepal and strengthen the educational value of peer learning practices in teaching mathematics. In the Nepalese context, where classrooms may often experience difficulties associated with large class sizes and scarce instructional resources, peer learning is a viable and effective approach to be promoted in the educational setting so as to improve student engagement and achievement.

In conclusion, the present study brings forth the empirical evidence that peer learning practices play a significant role for improving the achievement of mathematics among students of secondary school. Encouraging structured peer learning in mathematics classrooms has a potential to improve not only academic performance, but also motivation, confidence and active involvement in learning by students. The findings of this study point out the need for educators and schools to acknowledge the presence of peer learning as a necessary part of successful mathematics teaching and learning at a secondary level.

The implications of the results of this study are of considerable importance in terms of mathematics teaching, school administration and educational policy at the secondary level. Given the powerful positive relationship and predictive power of peer learning practices on mathematics

achievement, mathematics teachers are encouraged to explicitly incorporate structured peer learning approaches in their normal instructional practices. Activities that involve small group problem-solving, peer explanation of solutions, guided peer discussion, and peer feedback are all activities that can be systematically planned to complement the teacher-led instruction. Such practices can help students to construct the mathematical knowledge actively and not passively receiving the information.

Teachers also need to be provided with opportunities for professional development on the effective facilitation of peer learning, including facilitation of the creation of balanced groups, assigning meaningful roles in the group, and maintaining individual accountability when the group is engaged in tasks. As underscored in previous research, peer learning is most successful when teachers facilitate the process with questioning, feedback and monitoring without being dominant in student interaction. Therefore, teachers need help in developing skills to be able to act as facilitator of learning and not be the sole transmitter of knowledge.

At the school level, administrators should create a culture of learning by encouraging instructional practices that encourage cooperation, discussion and support for one another by students. Timetables, classroom arrangements and assessment practices can be changed to provide for peer learning activities. Schools may also encourage peer assisted study sessions, mathematics clubs where students may be engaged in collaborative learning outside of normal classroom hours.

From the point of view of policy, the findings suggest that peer learning strategies ought to be recognized as an important component of effective mathematics teaching as part of secondary education curricula. Curriculum planners and education authorities may need to consider the use of cooperative and peer-based approaches to learning for teacher training programs and instructional guidelines. In contexts like Nepal where the classrooms are often handcuffed with resource constraints, including large class sizes, peer learning is a cost-effective, pedagogically sound strategy for improving students' achievement in mathematics and engagement.

Despite the contributions of the study, the study had certain limitations. The use of a correlational research design restricts the ability to determine causal linkages between the practices of peer learning and mathematics achievement. In addition, peer learning practices were measured with self-reported data; these self-reported data may be prone to response bias. The study was also limited to secondary school students in Bhaktapur District and may have been limited in its generalization of the study findings to the broader context.

Future studies may use experimental or longitudinal methods to determine causal relationships between peer learning and mathematics achievement. Further research could also investigate the mediating or moderating effects of such factors as motivation, attitudes towards mathematics, and peer relationships to get a better understanding of how and why peer learning has an effect on students' academic performance.

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## Conflict of Interest

The author declare that there is no conflict of interest.

## Data Availability

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

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