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Study Habits and Mathematics Performance Among Grade 10 Students in Bhutan: A Case Study of Tang Central School

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Abstract

This study examined the relationship between study habits and academic performance in mathematics among Grade 10 students at Tang Central School, Bumthang, Bhutan. A cross-sectional mixed-methods design was used. Quantitative data were collected from n=93 students using a structured questionnaire that measured time management, revision practices, note-taking skills, homework practices, and study environment. Mathematics performance was measured using students' mid-term examination scores. Qualitative data were collected through semi-structured interviews with 15 purposively selected students. Descriptive statistics, Pearson correlation, and thematic analysis were used to analyse the data. On a 4-point scale, students reported a high overall level of study habits (M = 3.35, SD = 0.789), with study environment recording the highest mean (M = 3.63, SD = 0.714) and revision practices the lowest mean (M = 2.81, SD = 0.963). More than half of the students (51.6%) achieved a high level of mathematics performance. Time management (r = 0.829, p = 0.001), revision practices (r = 0.824, p = 0.001), and homework practices (r = 0.807, p = 0.001) showed strong, positive, and statistically significant relationships with mathematics performance. Note-taking skills and study environment showed weak but statistically significant positive relationships. Qualitative findings further indicated that structured study routines, regular revision, active homework engagement, peer support, and quiet study spaces supported students' mathematics learning. The findings provide practical evidence for teachers and school leaders to strengthen mathematics learning through explicit study-skills instruction, structured revision routines, meaningful homework with feedback, and support for effective time management. However, as the study was conducted at a single school, the findings should be interpreted within the context of Tang Central School and should not be generalized to all Bhutanese secondary schools. Further research involving multiple schools is recommended to establish broader evidence on the relationship between study habits and mathematics performance.

Keywords

Study habits, Mathematics performance, Time management, Revision practices, Homework management

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Introduction

Mathematics plays a central role in students' academic progress and future learning opportunities. In Bhutan, Grade 10 mathematics performance is especially important because it influences board examination outcomes, subject choices at the higher secondary level, and access to future academic pathways (Dorji & Subba, 2023a; Kencho and Mishra, 2024; Neema, 2025; Wangdi & Wangdi, 2022; Wangdi, 2023; Wangdi, 2025). However, many students continue to experience difficulty in mathematics because the subject requires regular practice, conceptual understanding, and disciplined study routines.

Study habits refer to the learning behaviours that students use to plan, practise, revise, organise information, complete homework, and manage their learning environment. These habits include time management, revision practices, note-taking skills, homework practices, and study environment (Benzer et al., 2022; Sahu et al., 2023). Effective study habits support comprehension, retention, confidence, and independent learning. In mathematics, where concepts are cumulative and problem-solving skills develop through repeated practice, consistent study habits are particularly important.

Previous studies have shown that organised study behaviour, regular revision, homework completion, motivation, attitude, and metacognitive skills are associated with mathematics achievement (Dorji & Subba, 2023a; Gembo, 2024; Kencho & Mishra, 2024; Pem, 2025; Pizon & Ytoc, 2021; Wangchuk and Dorji, 2022; Wangdi & Wangdi, 2022). In the Bhutanese context, existing research has examined motivation, metacognition, attitudes, and homework practices, but limited empirical evidence is available on how different dimensions of study habits relate to mathematics performance among Grade 10 students. This gap is important because teachers need specific evidence on which study behaviours are most strongly linked with achievement.

Therefore, this study investigated the relationship between study habits and mathematics performance among Grade 10 students at Tang Central School, Bumthang. The study aimed to identify students' common study habits, examine their mathematics performance level, analyse the relationship between selected study habit dimensions and mathematics performance, and suggest practical ways to improve students' study practices. The findings are expected to support students, teachers, parents, and school leaders in strengthening evidence-based study support for mathematics learning.

Methodology

The study used a cross-sectional mixed-methods design. The quantitative component measured students' study habits and mathematics performance, while the qualitative component explored students' experiences through semi-structured interviews. This design allowed the researcher to compare statistical patterns with students' explanations and learning experiences.

The study was conducted at Tang Central School in Bumthang, Bhutan. The participants were 93 Grade 10 students from the 2025 academic year. A census sampling approach was used for the questionnaire because all Grade 10 students participated. Of the participants, 40 students

(43%) were male and 53 students (57%) were female. For the qualitative component, 15 students were selected purposively from high, average, and low mathematics performance groups to obtain varied views on study habits and learning behaviour.

Three instruments were used. First, a structured questionnaire collected quantitative data on five study habit dimensions: time management, revision practices, note-taking skills, homework practices, and study environment. Students' responses were measured using a four-point Likert scale ranging from 1 = Never to 4 = Always**.** The mean scores were interpreted using the following classification criteria: high level (mean score = 3.00–4.00), moderate level (mean score = 2.00–2.99), and low level (mean score = 1.00–1.99). Second, semi-structured interview questions explored students' study routines, revision strategies, note-taking practices, homework engagement, and study environment. Third, students' mid-term mathematics examination scores were used as the measure of academic performance. The examination comprised 15 multiple-choice questions carrying 30 marks and problem-solving questions carrying 70 marks, for a total of 100 marks. The examination was administered over a duration of three hours.

Content validity of the questionnaire was established through review by three mathematics teachers. A pilot test with 50 students was conducted to check item clarity and suitability. Internal consistency was assessed using Cronbach's alpha, and the overall reliability of the study habits scale was $\alpha = 0.87$, indicating good reliability. Permission for data collection was obtained from the school administration, and students were informed about the purpose of the study. Participation was voluntary, and all responses and performance data were treated confidentially.

Quantitative data were analysed using descriptive statistics, including means, standard deviations, frequencies, and percentages. Pearson correlation analysis was used to examine the relationship between each study habit dimension and mathematics performance. Qualitative interview data were analysed thematically to identify patterns that explained and supported the quantitative findings.

Results and Discussion

The results are presented according to the study objectives and are discussed in relation to previous research. The analysis focused on students' study habits, mathematics performance, the relationship between study habits and performance, and qualitative explanations from student interviews.

Table 1. Descriptive statistics of students' study habits (n = 93)

Study Habit Component	Mean (M)	SD	Interpretation
Time management	3.52	0.685	High
Revision practices	2.81	0.963	Moderate
Note-taking skills	3.43	0.799	High
Homework practices	3.37	0.786	High
Study environment	3.63	0.714	High
Overall study habits	3.35	0.789	High

Table 1 shows the overall level of study habits was high (M = 3.35, SD = 0.789). Study environment recorded the highest mean score (M = 3.63, SD = 0.714), suggesting that most students had suitable places and conditions for learning mathematics. Time management, note-taking skills, and homework practices were also high. However, revision practices recorded the lowest mean score (M = 2.81, SD = 0.963), indicating that regular and advance revision remained an area needing improvement. This finding supports Sahu et al. (2023), who emphasised that organised and consistent study behaviour contributes to stronger learning outcomes.

Table 2. Distribution of mathematics performance levels (n = 93)

Performance Level	Score Range	Frequency	Percentage (%)
Low	Below 50	21	22.6
Average	50-60	24	25.8
High	61 and above	48	51.6

Table 2 shows 51.6% of the students scored at the high-performance level, 25.8% at the average level, and 22.6% at the low level. The mean mathematics score was 62.98 with a standard deviation of 16.32. Although many students performed well, the distribution indicates that a considerable number still remained in the low and average categories. This variation suggests the need to strengthen learning habits that directly support mathematics practice and problem solving.

Table 3. Correlation between study habits and mathematics performance

Study Habit Component	r-value	p-value	Interpretation
Time management	0.829	0.001	Strong positive; significant
Revision practices	0.824	0.001	Strong positive; significant
Note-taking skills	0.300	0.002	Weak positive; significant
Homework practices	0.807	0.001	Strong positive; significant
Study environment	0.200	0.048	Weak positive; significant

Table 3 shows time management, revision practices, and homework practices had strong, positive, and statistically significant relationships with mathematics performance. Time management had the strongest relationship ($r = 0.829$, $p = 0.001$), followed by revision practices ($r = 0.824$, $p = 0.001$) and homework practices ($r = 0.807$, $p = 0.001$). This indicates that students who planned their study time, revised regularly, and completed homework meaningfully tended to achieve better mathematics results. These findings are consistent with Sahu et al. (2023), Gembo (2024), and Pizon and Ytoc (2021), who reported that disciplined study routines and active learning behaviours contribute to academic achievement.

Note-taking skills showed a weak but statistically significant positive relationship with mathematics performance ($r = 0.300$, $p = 0.002$). This suggests that note-taking supports learning by helping students organise formulas, procedures, and key ideas, but it may not directly influence performance unless students actively use their notes for revision and problem solving. The finding agrees with Benzer et al. (2022), who highlighted the value of note-taking strategies for information organisation and review. Study environment also showed a weak but statistically significant relationship with performance ($r = 0.200$, $p = 0.048$), suggesting that a quiet and suitable environment supports learning but does not guarantee achievement without active engagement.

The qualitative findings strengthened the quantitative results. Students reported that school routines, evening study, night study, and weekend self-study helped them manage time for mathematics. Some students also used lunch breaks and free time to revise formulas and practise problems. For example, S1 explained:

> *Every night I study 30 minutes to practice mathematics. Also, after the class hour I used to practice mathematics that I have learned in the day session… during lunch and interval hours I used to list down the important formula and list my doubts.*

This response tells that productive use of available time helped students build confidence and improve performance.

Revision was mainly examination-oriented. Students revised formulas, solved textbook problems, practised past papers, and focused on difficult chapters. S5 highlighted the importance of revision:

> *My revision methods include regular practice, solving mathematical problems and revising past examination papers. Among these, solving mathematical problems is the most effective method because it helps me understand the concept clearly and helps me remember formulas better. Continuous practice also improves my problem-solving skills and prepares me well for the examinations.*

This explains why revision practices had a strong relationship with mathematics achievement. In mathematics, regular practice and repeated exposure to problem types help students consolidate concepts and improve accuracy.

Homework practices were also strongly linked to performance. Many students tried to understand questions, solve problems independently, check answers, compare solutions with peers, and seek clarification when needed. However, some students admitted that they sometimes copied answers when they felt overwhelmed. This suggests that homework improves achievement only when students engage actively with the task. Meaningful homework, teacher feedback, and peer discussion can therefore strengthen mathematics learning more effectively than homework completion alone. For instance, S3 shared:

> *I complete my homework regularly and compare my answers with my friends. When I find mistakes, I try to understand them and solve the problems again. This practice helps me learn from errors, improve my accuracy, and build better confidence in solving Mathematics questions.*

The findings also show that study environment and note-taking are supportive rather than primary factors. Students preferred quiet classrooms, clean study spaces, and fewer distractions. Some students preferred studying alone for concentration, while others found group study useful for clarifying doubts. Organised notebooks, formula lists, and recorded doubts supported revision, but their impact depended on how actively students used them. Overall, the study indicates that active study behaviours, especially time management, revision, and homework engagement, are stronger predictors of mathematics performance than passive or environmental support alone.

This study was conducted in only one school, Tang Central School, Bumthang, among 93 Grade 10 students. Hence, these findings cannot be generalised to all Grade 10 students in Bhutan. In addition, due to the nature of the research design, causal relationships cannot be established

from this particular study. Nevertheless, the findings provide useful contextual insights and may inform future studies involving larger and more diverse samples across Bhutan.

Conclusion

This study examined the relationship between study habits and academic performance in mathematics among Grade 10 students at Tang Central School, Bumthang. The findings showed generally strong study habits among students, although their revision practices were only moderate. Mathematics performance varied across students, with more than half scoring at the high-performance level but a notable proportion remaining at average and low levels. Time management, revision practices, and homework practices were the strongest study habit factors associated with mathematics performance. Note-taking skills and study environment also supported learning, but their influence was weaker and more indirect. The study concludes that active, consistent, and purposeful study behaviours are important for strengthening mathematics achievement in Bhutanese secondary schools. Students should be encouraged to prepare realistic study schedules, revise regularly, practise past questions, complete homework with understanding, and seek clarification when they face difficulty. Teachers should explicitly teach study strategies, provide meaningful homework with feedback, and support students who struggle with revision and problem solving. Future studies may extend this research to multiple schools and include additional variables such as motivation, metacognitive skills, teacher support, and socio-economic background.

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