

Knowledge and Challenges of Grade 11 Students in Learning Basic Business Math

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Abstract. The study aimed to identify students' perceived knowledge of Basic Business Math topics, the challenges they encountered, and the relationship between these factors. The researchers employed a descriptive-correlational design and utilized a stratified sampling technique. The respondents were 245 Grade 11 students. A validated questionnaire was used to collect data, which was analysed using mean, percentage, and Spearman's rho. The results revealed that, in general, students perceived their knowledge of Basic Business Math as very satisfactory in the following topics: simple and compound interest, simple and general annuities, stocks and bonds, and business and consumer loans. However, approximately 10% of students rated their knowledge as only satisfactory. The study further indicated that students experienced moderate challenges related to basic knowledge, learning interest, lesson retention, and time allocation. On average, around 20% of students reported facing these challenges to a high or very high extent. Moreover, the data showed a significant relationship between students' overall level of knowledge and the challenges related to basic knowledge and time allocation. Conversely, no significant relationship was found between students' overall knowledge level and the challenges associated with learning interest and lesson retention.

Keywords: Basic Business Math; General Math; Mathematics education; Financial literacy.

1.0 Introduction

The decline in student learning outcomes in Mathematics has become a significant challenge for academic institutions worldwide (Bennett, 2023). The latest findings from the Program for International Student Assessment (PISA) 2022 indicate a concerning trend: the average international math score has dropped by 15 points compared to 2018. The most significant declines were observed in Albania, Jordan, Iceland, Norway, and Malaysia, with each country experiencing a decrease of over 30 points. Additionally, significant drops of more than 20 points were noted in Baku (Azerbaijan), Denmark, Finland, France, Germany, Greece, Montenegro, the Netherlands, Poland, Portugal, the Slovak Republic, Slovenia, Sweden, and Thailand (Organization for Economic Co-operation and Development [OECD], 2023). Research conducted in Malaysia also revealed that students still struggle with selecting and applying appropriate problem-solving strategies (Abdullah et al., 2019). This issue is not confined to one region; for instance, U.S. students continue to perform below the global average in mathematics, a concern shared by many countries worldwide (Camera, 2019).

The Philippines reflects this global trend of declining math performance, as evidenced by PISA results from 2018 and 2022. Despite a slight improvement in math scores—from 353 in 2018 to 355 in 2022—the Philippines still ranked sixth lowest in mathematics among 81 countries (Chi, 2023). Consequently, the effectiveness of the spiral

progression approach in the K to 12 curriculum (DepEdPH, 2024) has been questioned due to persistent low achievement scores and implementation challenges (Perez et al., 2020). Additionally, Jaudinez (2019) found that students demonstrate weak performance in content and procedural knowledge, computational skills, visualization, and problem-solving. These deficiencies are largely attributed to a lack of mastery in fundamental skills, persistent stigma, and language barriers. These findings highlight the urgent need to address the underlying issues in mathematics education to improve student outcomes.

Senior high school students are required to take all core subjects, including General Mathematics in Grade 11. However, math lessons in Grades 7–10 primarily focus on Patterns and Algebra, Geometry, and Statistics and Probability. As a result, students may struggle with learning gap when encountering new concepts and terminologies in Basic Business Math topics under General Mathematics. This misalignment makes it challenging for them to connect their prior knowledge with the new material. Futralan and Mamhot (2018) found that this disconnect contributes to increased mathematical anxiety among learners. Similarly, Alvarez (2022) affirmed that learning gaps emerge when concepts are not adequately pre-spiraled. Additionally, Yap (2019) noted that students' inability to grasp foundational concepts hinders their ability to master subsequent competencies, making learning gaps inevitable.

Previous studies have primarily focused on the difficulties associated with teaching General Mathematics. In contrast, the current study examines students' knowledge and the challenges they encounter in learning General Mathematics, particularly in Basic Business Math topics, which are relatively new to them. Identifying students' knowledge levels and learning challenges could serve as a foundation for addressing existing learning gaps. Furthermore, this study aligns with several Sustainable Development Goals (SDGs). Specifically, SDG 4 (Quality Education) is addressed by identifying gaps in students' knowledge and learning experiences, while SDG 8 (Decent Work and Economic Growth) is supported by fostering financial literacy, empowering students to make informed financial decisions, and contributing to future economic development.

Given this premise, the researchers aimed to assess students' perceived knowledge levels in key Basic Business Math topics, including simple and compound interest, simple and general annuities, stocks and bonds, and business and consumer loans. Additionally, the study sought to examine the challenges students face in terms of basic knowledge, learning interest, lesson retention, and time allocation. Moreover, it aimed to explore the relationship between students' basic knowledge and the learning challenges they encounter.

2.0 Methodology

2.1 Research Design

The study utilized a descriptive-correlational design to comprehensively examine the learning dynamics of Grade 11 students. It utilized a descriptive approach to determine the level of knowledge in learning Basic Business Math topics within General Mathematics and to assess the challenges encountered. Additionally, it employed a correlational design to explore potential relationships between students' level of knowledge and the challenges they encounter while mastering these topics during the Second Quarter of General Mathematics.

2.2 Research Participants

The respondents in this study are the Grade 11 students from Bais City National High School-Senior High School for School Year 2024-2025. Using Yamane's formula with a 0.05 degree of error, 245 out of 629 students were randomly selected from the 18 organized sections in BCNHS-SHS. One section was used for the reliability test ($n=30$). The respondents were selected using a stratified random sampling technique to ensure that the sample represents the entire Grade 11 population at BCNHS-SHS.

2.3 Research Instrument

The study utilized a validated survey questionnaire composed of three parts. The first part presented the Disclosure Statement, which outlined the study's objectives, emphasized the voluntary nature of participation, and assured respondents of the confidentiality of their responses. The second part assessed students' perceived levels of knowledge across Basic Business Math topics, based on the General Mathematics Curriculum Guide (SHS Core Subjects MELCs, n.d.). These topics included simple and compound interest, simple and general annuities, stocks and bonds, and business and consumer loans. Participants were instructed to evaluate their knowledge by selecting a corresponding percentage range that best reflected their perceived proficiency.

The third part measured the extent of challenges students encountered while learning Basic Business Math. The items were derived from feedback gathered from both students and teachers, as well as a review of relevant literature and publications. These inputs were considered in refining the questionnaire. This section employed a five-point Likert scale, where 1 corresponded to "Very Low" and 5 to "Very High," to assess challenges in four key areas: basic knowledge, learning interest, lesson retention, and time allocation.

The entire questionnaire was evaluated by three Mathematics experts to ensure content validity and alignment with the specific objectives of the study. Feedback from these experts was carefully considered to refine the questionnaire items. Subsequently, a trial run was conducted with a sample of 30 Grade 11 students to assess item reliability. The reliability of the items was tested using Cronbach's alpha, chosen for its suitability in survey research where responses may vary. Cronbach's alpha gauges the internal consistency reliability of the items, with values ranging from 0 to 1, where higher values indicate greater reliability. A value of 0.70 or higher is considered acceptable. The results of the reliability testing indicate that all values are equal to or greater than 0.70, confirming that the items are statistically reliable.

2.4 Data Gathering Procedure

Following the design hearing, the researchers meticulously incorporated all corrections and suggestions provided by the panel members. Subsequently, a formal request to conduct the study was submitted to the Schools Division Superintendent of Bais City, endorsed by the Dean of the Graduate School at Foundation University. Upon receiving signed approval, the researchers presented the authorization to the school principal of Bais City National High School - Senior High School through the assistant school principal assigned in the Senior High School curriculum. During questionnaire distribution, the researchers provided the students with a clear explanation of the research's purpose and significance. Questionnaire retrieval occurred immediately after completion by students. The data collected were tallied using MS Excel, followed by thorough analysis and interpretation.

2.5 Data Analysis Procedure

The researchers employed several tools for data analysis, including the use of mean in getting the perceived level of knowledge and the extent of the challenges experienced by the students in learning Basic Business Math topics in the General Mathematics subject. The percentage was used in getting the portion of students who rated their perceived level of knowledge in Basic Business Math as Fairly Satisfactory, and the portion of students who experienced High to Very High challenges in learning Basic Business Math topics. Spearman's Rank Order Correlation Coefficient. This was utilized to identify the degree of relationship between the perceived level of knowledge and the extent of the challenges experienced by the students in learning Basic Business Math topics in Gen Mathematics subject. This test was selected since the data are on an ordinary scale.

2.6 Ethical Considerations

Research ethics are rigorously upheld during the study's execution. Before commencement, ethical approval was sought from the Ethical Committee of the Foundation University Research Office. Furthermore, all individual respondents were provided with comprehensive information about the study and asked to provide informed consent before participation. Key ethical principles, including the right to self-determination, confidentiality, and anonymity, as well as the potential benefits and risks of participation, were emphasized and respected throughout the research process.

3.0 Results and Discussion

3.1 Knowledge of Students in Basic Business Math Topics

Table 1 presents that students generally have a very satisfactory perceived knowledge of simple and compound interest, as reflected in the composite rating of 89.06%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 9.90% of students rated their competency as only fairly satisfactory. This finding aligns with Tañola and Lomibao (2024), who found that students generally grasp complex mathematical concepts. Nevertheless, despite the overall positive perception, some students still rate their competency as fairly satisfactory, indicating room for improvement. Moreno et al. (2021) emphasize that understanding simple interest is crucial in financial mathematics, as it serves as the foundation for more advanced concepts. However, students often encounter difficulties in mastering this topic. Supporting this,

Cavalcante et al. (2024) highlight that many secondary teachers struggle to explain simple and compound interest beyond standard formulas. Since students' understanding is influenced by their teachers' knowledge and instructional methods, this may contribute to the learning challenges observed.

Table 1. *Level of Knowledge of the Students in Basic Business Math Topics (n = 245)*

Competencies	$\bar{x}$	VD	SD	% (FS Rating)
Simple and Compound Interests				
1. illustrate simple and compound interests.	89.54	O	6.09	10.20
2. distinguish between simple & compound interests.	88.90	VS	6.04	10.20
3. compute interest, maturity value, future value, and present value in simple interest and compound interest environment.	89.05	VS	5.88	9.39
4. solve problems involving simple and compound interests.	88.74	VS	5.91	9.80
Composite	89.06	VS	5.98	9.90
Simple and General Annuities				
1. illustrate simple and general annuities.	89.23	VS	5.77	8.57
2. distinguish between simple and general annuities.	88.54	VS	5.79	10.61
3. find the future value and present value of both simple annuities and general annuities	88.82	VS	5.79	9.80
4. calculate the present value and period of deferral of a deferred annuity.	88.62	VS	5.87	9.80
Composite	88.81	VS	5.80	9.69
Stocks and Bonds				
1. illustrate stocks and bonds.	89.06	VS	5.82	6.94
2. distinguish between stocks and bonds.	88.69	VS	5.83	10.20
3. describe the different markets for stocks & bonds.	88.92	VS	5.85	8.98
4. analyze the different market indices for stocks & bonds.	88.53	VS	5.60	8.98
Composite	88.80	VS	5.77	8.78
Business and Consumers Loans				
1. illustrate business and consumer loans.	88.72	VS	5.96	8.16
2. distinguish between business and consumer loans.	88.50	VS	5.84	8.57
3. solve problems involving business and consumer loans (amortization, mortgage).	88.21	VS	5.84	10.61
Composite	88.47	VS	5.88	9.12

90% - 100% (Outstanding, O), 85% - 89% (Very Satisfactory, VS), 80% - 84% (Satisfactory, S), 75% - 79% (Fairly Satisfactory, FS)

Table 1 also reveals that, collectively, students rated their perceived knowledge as very satisfactory in simple and general annuities as reflected in the composite rating of 88.81%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 9.69% of students rated their competency as only fairly satisfactory. These results are consistent with the study by Farm Bureau Financial Services (2023), which highlights that the inherent complexity of annuities poses a challenge for some individuals, including students. A study published by Lusardi (2019) highlights the complexity of financial products, including annuities, and the challenges they pose for individuals' financial literacy. Additionally, research by Meadows and Mejri (2021) found that a significant portion of students lacked knowledge in personal finance, including understanding financial products like annuities.

Table 1 also shows that, in general, students rated their perceived knowledge as very satisfactory in stocks and bonds, as reflected in the composite rating of 88.80%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 8.78% of students rated their competency as only fairly satisfactory. These findings align with the study conducted by Arena et al. (2023) emphasized that students often struggle with understanding different types of securities, such as stocks and bonds. However, they also identified that financial knowledge significantly impacts students' stock market investing behaviors. On the contrary, Gupta et al. (2023) found that students who have knowledge and experience about the stock market tend to make smarter financial decisions and have a better understanding of personal finance.

Lastly, Table 1 exhibits that most of the students also rated their perceived knowledge as very satisfactory in business and consumer loans, as reflected in the composite rating of 88.47%. This indicates that students have developed fundamental knowledge and skills in these areas. However, on average, 9.12% of students rated their competency as only fairly satisfactory. These findings support Moschini and Phelan (2024), who found that some students have low levels of financial literacy, particularly regarding business and consumer loans. However, financial education courses can improve students' understanding and management of loans (Zhang & Fan, 2022). This improvement is beneficial as students' financial literacy significantly impacts their financial behaviors and decision-making (Robb & Chy, 2023).

Overall, the results suggest that while the majority of students feel confident in their understanding of these topics, a significant portion of students continue to struggle. This generalization emphasizes the need for specialized instructional methods to support students who face challenges in financial mathematics. Teachers should employ more interactive and application-based teaching approaches to strengthen students' comprehension and practical application of these concepts. Addressing this problem will ensure that all students, regardless of their initial competency levels, develop a solid foundation in financial literacy, which is essential for real-world decision-making.

The table further displays the standard deviation (SD) of students' knowledge levels. SD measures the amount of variation or dispersion in a dataset. The SD values for the four Basic Business Math topics range from 5.60 to 5.98, indicating a similar level of variability in students' knowledge across the topics. These figures suggest that students' scores are somewhat spread out from the mean, reflecting differences in individual performance. These findings have important implications for educational practice. The differences in performance suggest that some students need extra support to catch up. This is where regular check-ins, like short quizzes or class discussions, can help spot where students are struggling. Teachers might also benefit from using tools that adjust to each student's learning pace. Making financial literacy part of everyday lessons—not just in math, but across other subjects too—can show students why these skills matter in real life. When lessons are more relatable and personalized, students are more likely to stay engaged and remember what they've learned.

3.2 Challenges that Students Experienced in Learning Basic Business Math Topics

In Basic Knowledge

Table 2 reflects that students generally experience moderate challenges in their basic knowledge of Basic Business Math, as indicated by the composite mean of 2.89, with 18.53% experiencing high to very high levels of difficulty on average. This suggests that students occasionally struggle with grasping key concepts, aligning with the studies of Ross (2022) and Junaid et al. (2023), which highlight deficiencies in foundational math skills as a common challenge in learning mathematics.

Table 2. *Challenges in Basic Knowledge that Students Experienced in Learning Basic Business Math Topics (n = 245)*

Basic Knowledge Indicators		$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Incomplete mastery of number facts: My understanding and fluency with basic arithmetic operations are not fully developed or mastered.	3.04	M	0.81	20.00
2.	Incomplete understanding of math language: I don't fully understand all the words and phrases used in math.	2.88	M	0.85	20.00
3.	Computational weakness: I struggle performing mathematical calculations efficiently or accurately.	2.91	M	0.87	18.78
4.	Difficulty transferring knowledge: I find it difficult to apply what I've learned to different situations.	2.85	M	0.87	17.14
5.	Inadequate learning resources: I don't have enough helpful materials to learn from.	2.76	M	0.88	16.73
Composite		2.89	M	0.85	18.53

4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

Specifically, students face moderate challenges in mastering number facts ($\bar{x}$ =3.04), with 20% experiencing high to very high levels of difficulty. This indicates that while most students have some difficulty understanding basic math concepts, a significant portion struggles considerably, requiring repeated instruction and guidance. Their fluency in fundamental arithmetic operations remains underdeveloped, which is a key factor affecting performance in higher-level mathematics (Opitz, 2016; Jandayan et al., 2021). Additionally, students report moderate challenges in understanding mathematical language ($\bar{x}$ =2.88), with 20% experiencing high to very high difficulties. This means that while most students have some difficulty interpreting mathematical phrases and sentences, one-fifth frequently struggle and require extensive support in translating words into mathematical expressions. This finding is consistent with Carey and Jacobson (2020), who emphasized that understanding word problems involves linking language to mathematical symbols, a process that many students find challenging.

Furthermore, the data depict moderate difficulties in (a) computation ($\bar{x}$ =2.91), (b) transferring knowledge ($\bar{x}$ =2.85), and (c) adequacy of learning resources ($\bar{x}$ =2.76). This suggests that students occasionally struggle with performing mathematical calculations, applying learned concepts, and accessing sufficient learning materials. Notably, around 18% of students experience high to very high levels of difficulty in these areas, underlining the

need for extensive support and guidance. These results support the findings of Moore and Hatten-Roberts (2024), who reported that students often struggle with mathematical fluency, particularly in quick and accurate recall of math facts. They also align with Tanudjaya and Doorman (2020), who found that many students struggle to apply their knowledge in different contexts and demonstrate information literacy skills. Additionally, the findings affirm Waswa and Al-Kassab (2023), who identified insufficient educational resources as a major barrier to mathematics learning.

In summary, the results suggest that even when students encounter only moderate difficulties, these challenges can accumulate over time and negatively impact their overall understanding of the material. This emphasizes the need for teachers to move beyond traditional lecture-based instruction and adopt more engaging, student-centered strategies, such as group activities, real-life financial scenarios, and hands-on tasks. Simple formative assessments—like short quizzes or classroom reflections—can help identify areas that require further attention. Encouraging peer collaboration and providing additional support to struggling students can also lead to significant improvements. When instruction is more flexible and tailored to students' actual needs, they are more likely to grasp key concepts and apply them in real-world contexts.

In Learning Interest

Table 3 also points out that students experience moderate challenges in maintaining their learning interest in Basic Business Math, as indicated by the composite mean of 2.73. Additionally, 16.94% of students experience high to very high levels of difficulty on average. To point out, they moderately perceive Math as difficult ($\bar{x}$ = 2.98), meaning they sometimes struggle to understand the concepts of the subject. However, 25.31% of students report high to very high perceptions of difficulty, which diminishes their interest in Business Math. This suggests that a portion of students exhibit low to very little enthusiasm for learning the subject.

Table 3. *Challenges in Learning Interest that Students Experienced in Learning Basic Business Math Topics (n = 245)*

Learning Interest Indicators		$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Perception of difficulty towards math: I feel like math is hard for me to understand.	2.98	M	1.01	25.31
2.	Lack of real-life situation examples: My teacher doesn't have enough examples from real life to help me understand.	2.56	L	0.91	11.43
3.	Limited use of engaging teaching methods: My teacher doesn't use various interesting strategies to teach that keep me engaged.	2.67	M	0.91	13.88
4.	Absence of interactive learning experiences: I don't get to participate in activities where I can learn by doing things myself.	2.72	M	0.93	17.14
Composite		2.73	M	0.94	16.94
4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)					

These findings align with Bacong et al. (2023), who noted that many students perceive mathematics as difficult, obscure, and uninteresting. Additionally, Midlarsky (2024) emphasized that viewing math as challenging can negatively impact motivation and engagement, further complicating the learning experience. Moreover, students' moderate level of interest may be attributed to the limited use of engaging teaching methods ($\bar{x}$ =2.67) and the absence of interactive learning experiences ($\bar{x}$ =2.72). This suggests that while students are sometimes engaged, their motivation fluctuates. According to Robertson and Padesky (2019), interest-based instruction, which considers students' individual and situational interests, can help sustain engagement during lessons.

However, students also acknowledge that their teachers provide real-life examples to aid understanding ($\bar{x}$ =2.56), marking this as the least challenging aspect of their learning experience. This implies that students' challenges are not primarily due to teaching methods but rather stem from foundational knowledge gaps and personal interest. This contradicts Serin (2023), who argued that students often struggle with math due to a lack of real-world applications in instruction. Meanwhile, Hagan et al. (2020) emphasized that, despite its complexity, students recognize their responsibility to learn and understand that math difficulty increases as they progress through higher grade levels.

Generally, these findings highlight the importance of paying closer attention to students' motivation and confidence in the classroom. When students consistently struggle with a subject, it is natural for their interest to decline. Therefore, it is essential to foster a learning environment where students feel safe to make mistakes and ask questions without fear of judgment. Enhancing the engagement level of Business Math can be achieved by connecting lessons to real-life contexts that are meaningful to students, such as budgeting for desired items, understanding utility bills, or planning personal savings. Incorporating varied instructional strategies, such as

educational games, collaborative group projects, and hands-on activities, can help maintain student interest and curiosity. By making lessons more relevant and relatable, educators can increase students' confidence and help them perceive mathematics not as a source of anxiety, but as a practical and valuable life skill.

In Lesson Retention

Table 4 unveils that students experience moderate challenges in lesson retention when learning Basic Business Math, as reflected in the composite mean of 2.94, with 22.20% experiencing high to very high levels of difficulty on average. This indicates that while students occasionally retain lessons, they benefit significantly from review sessions. Specifically, the data show that students struggle with retention due to difficulty connecting new knowledge with prior learning ($\bar{x}$ =3.00), slow comprehension of concepts ($\bar{x}$ =3.08), lack of reinforcement through practice ($\bar{x}$ =2.93), ineffective study strategies ($\bar{x}$ =2.56), and insufficient feedback on performance ($\bar{x}$ =2.82).

Table 4. *Challenges on Lesson Retention that Students Experienced in Learning Basic Business Math Topics (n = 245)*

Lesson Retention Indicators		$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Failure to connect new knowledge with prior learning: I find it hard to connect what I'm learning now with what I learned before.	3.00	M	0.90	24.90
2.	Slow in grasping concepts: It takes me some time to understand new concepts.	3.08	M	0.86	26.94
3.	Lack of reinforcement through practice: I don't get enough chances to practice what I learn to remember it better.	2.93	M	0.82	20.41
4.	Ineffective study strategies: I don't have effective ways to study that help me understand better.	2.89	M	0.89	19.59
5.	Insufficient feedback on performance: I don't get enough feedback which can guide me on how to improve my learning.	2.82	M	0.91	19.18
Composite		2.94	M	0.88	22.20

4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

The findings emphasize the importance of foundational skills and prior learning in preparing students for new concepts. This supports Agustiani's (2022) argument that prior learning experiences are crucial in determining a student's readiness to acquire new knowledge. Additionally, the study highlights students' difficulty in understanding new concepts, reinforcing the need for more time to absorb and process information. These results are consistent with Metiksari et al. (2019), who found that some learners, particularly those who struggle with comprehension, require additional study time to recall mathematical ideas and perform arithmetic operations effectively.

Moreover, the findings stress the significance of reinforcement through practice, as students express that their limited time for practice affects their ability to retain lessons. This aligns with Junaid et al. (2023), who identified inconsistent practice habits and unfamiliarity with modern learning tools as challenges in high school mathematics education. Similarly, Pizzie and Kraemer (2023) noted that ineffective study habits hinder students from reaching their full potential in math classes. The results also further stipulate the use of effective study strategies, as students report moderate challenges in this area, suggesting a need for additional reinforcement and support. This finding mirrors Biwer et al. (2020), who emphasized that lasting learning outcomes are best achieved through active strategies such as practice testing and spaced study sessions, yet many students continue to rely on passive techniques like rereading or highlighting.

In addition, the study highlights the role of performance feedback in improving students' learning. These findings support Yang et al. (2021), who argued that effective feedback utilization enhances academic performance. Likewise, Fyfe and Brown (2020) emphasized that basic feedback can be particularly beneficial when instructors help students set clear expectations for success. Although students generally encounter moderate difficulties in lesson retention, 22.20% report high to very high levels of struggle, indicating that a significant portion faces considerable challenges in recalling and applying mathematical concepts. This finding underlines the need for reinforcement activities, personalized learning strategies, and continuous feedback to strengthen students' retention skills. Similarly, Ogoke and Okigbo (2021) emphasized that mathematics retention improves through consistent practice, interactive discussions, hands-on learning, linking new concepts to prior knowledge, addressing misconceptions, and incorporating concrete materials in teaching.

Overall, the results emphasize the importance of being more intentional in helping students retain what they learn. It is not sufficient to cover a topic only once; students need regular opportunities to review and apply their knowledge through brief recaps, practice activities, or by connecting new lessons to previously learned concepts. Teachers also play a vital role in helping students develop effective study habits, such as using visual aids,

summarizing lessons in their own words, or spacing out review sessions over time. Providing timely and specific feedback allows students to recognize both their strengths and areas for improvement. Ultimately, lessons should go beyond rote memorization and aim to foster a deep understanding of core concepts. When learning is well-structured and meaningfully connected, students are far more likely to retain and apply their knowledge over the long term.

In Time Allocation

Table 5 reveals that students experienced moderate challenges in time allocation for learning basic business math topics, as indicated by a composite mean of 3.05, with 19.92% experiencing high to very high levels of difficulty on average. Specifically, students faced moderate difficulties due to their teachers' fast-paced instruction ($\bar{x}$ =2.84), with 17.55% encountering challenges to a high or very high extent. These findings suggest that a fast instructional pace may overwhelm some students, creating gaps in learning, particularly for those who require more time to process new information. This teaching approach can also limit student engagement and retention, as learners may struggle to keep up without sufficient reinforcement or practice.

Table 5. *Challenges on Time Allocation that Students Experienced in Learning Basic Business Math Topics (n = 245)*

Time Allocation Indicators		$\bar{x}$	VD	SD	% (H-VH Rating)
1.	Fast-paced instruction: My teacher goes through lessons quickly, and sometimes it's hard for me to keep up.	2.84	M	0.90	17.55
2.	School Intervening Activities: I often find that various school activities disrupt our classroom lessons, making it harder for me to focus and learn.	2.91	M	0.85	16.73
3.	Multiple Commitments outside of school: I have many things to do outside of school that take up my time and attention.	2.87	M	0.90	21.63
4.	Overwhelming workload in other subjects: I have too much work to do for my other classes, which makes it hard for me to keep up.	2.87	M	0.89	20.41
5.	Lack of time management skills: I find it difficult to understand the lessons because I struggle with managing my time effectively.	2.90	M	0.95	23.27
Composite		3.05	M	0.90	19.92

4.21 – 5.00 (Very High, VH), 3.41 – 4.20 (High, H), 2.61 – 3.40 (Moderate, M), 1.81 – 2.60 (Low, L), 1.00 – 1.80 (Very Low, VL)

These findings align with Güner (2020), who emphasized that prioritizing curriculum completion over effective instruction poses challenges for high school students. Similarly, Ferlazzo (2021) highlighted the importance of balancing urgency in learning with adequate wait time, ensuring students have enough opportunities to think and process information without experiencing undue anxiety.

The table also signifies that students experienced moderate challenges due to school-intervention activities ($\bar{x}$ =2.91), though 16.73% faced high to very high levels of difficulty in this area. This suggests that various school-related activities interrupt classroom learning, making it harder for some students to stay focused and absorb lessons effectively. These findings support Ordway's (2021) research, which demonstrated that disruptions in education, whether planned or unexpected, can have both immediate and long-term effects on student learning from kindergarten through high school.

Additionally, the data reveal that students encountered moderate difficulties balancing multiple commitments outside school ($\bar{x}$ =2.87) and managing an overwhelming workload in other subjects ($\bar{x}$ =2.87). However, 21.63% of students reported experiencing these challenges to a high or very high degree. This indicates that juggling academic and extracurricular responsibilities often results in time constraints, reduced focus on Business Math, and difficulties in grasping and retaining lessons. The significant proportion of students struggling with these issues suggests that academic fatigue and stress could negatively impact their overall performance. These findings are consistent with Thi and Duong (2024), who identified heavy course loads as a major contributor to academic burnout, leading to emotional exhaustion, depersonalization, and a diminished sense of achievement. Rahmatpour et al. (2019) further noted that students experiencing burnout tend to withdraw from class participation, struggle with learning new material, and feel a lack of motivation and purpose.

Furthermore, the data reflect that students faced moderate challenges in time management ($\bar{x}$ =2.90), with 23.37% experiencing high to very high levels of difficulty in this aspect. This suggests that many students struggle to balance school responsibilities with commitments outside of academics, often leading to overwhelm and inefficiency. Developing effective time management skills is crucial, as poor scheduling can negatively impact both academic performance and overall well-being. These findings align with the study by Murray et al. (2022), which found that students juggling multiple responsibilities often experience high levels of anxiety, making it

difficult to complete academic tasks effectively and maintain a sense of control over their workload.

Reflecting on the results, the findings indicate that teachers should consider adjusting their instructional methods to better match the needs of their students. Slowing down when covering complex topics, checking for understanding more frequently, and providing extra time for practice could help students keep pace with the lessons. Offering recorded lectures, additional practice exercises, or other learning resources would also allow students to review material at their speed. By creating a more flexible and supportive learning environment, teachers can help students build stronger foundations in business math and improve their overall academic performance.

3.6 Relationship between Knowledge and Challenges

Table 7 exposes the correlation between students' overall knowledge and the challenges they experience in learning Basic Business Math topics. Using Spearman's Rank Order Correlation, the findings reveal a significant relationship between the overall level of knowledge and challenges related to basic knowledge ($r_s=0.141$, $p=0.028$) and time allocation ($r_s=0.157$, $p=0.007$). These results suggest that as students' perceived knowledge improves, their difficulties in these areas slightly decrease, or conversely, as their knowledge declines, their challenges intensify. This emphasizes the importance of a strong foundational understanding and adequate time allocation in addressing difficulties when learning basic business math topics. Strengthening students' knowledge and ensuring they have ample time to master the competencies can directly alleviate some of the obstacles they face in their learning experience.

Table 7. Relationship between the Perceived Overall Level of Knowledge and the Challenges Experienced by the Students ($n = 245$)

Variables	r_s	p	Decision	Remark
Overall Level of Knowledge and Challenges Experienced in Basic Knowledge	.14	.028	Reject H_0	Significant
Overall Level of Knowledge and Challenges Experienced in Learning Interest	.10	.104	Fail to reject H_0	Not significant
Overall Level of Knowledge and Challenges Experienced in Lesson Retention	.11	.072	Fail to reject H_0	Not significant
Overall Level of Knowledge and Challenges Experienced in Time Allocation	.15	.007	Reject H_0	Significant

Spearman's Rank Order Correlation (r_s) at 0.05 Level of Significance

These findings support the study by Zheng and Gupta (2020), which found that prior knowledge significantly influences cognitive load when solving mathematics problems. A solid grasp of fundamental concepts reduces cognitive strain and enhances learning outcomes. Similarly, Jandayan et al. (2021) affirm that students with weak foundational math skills tend to struggle with more advanced topics. Moreover, recent research highlights the critical role of instructional time in mathematics. Effective management of learning time is widely recognized as a key factor in enhancing students' academic performance (Liu et al., 2023). The TIMSS 2019 report indicates that the amount of instructional time devoted to mathematics significantly impacts student achievement, emphasizing the need for adequate time allocation to improve learning outcomes (Mullis et al., 2020). Additionally, a study by Burgess et al. (2022) found that students achieve higher math scores when more class time is dedicated to individual practice and assessment.

Conversely, no significant relationship was found between the overall level of knowledge and challenges related to learning interest ($r_s=0.104$, $p=0.104$) and lesson retention ($r_s=0.116$, $p=0.072$). This suggests that factors affecting students' interest and ability to retain lessons may be independent of their perceived knowledge. These findings contrast with those of Ogoke and Okigbo (2021), who argued that improved achievement or knowledge supports the retention of mathematical concepts. Valderama and Oligo (2021) also noted that retained mathematical knowledge tends to diminish over time, indicating that retention is more closely linked to how information is processed and reinforced rather than the initial level of knowledge. Recent studies support the importance of learning interest. Herpratiwi and Tohir (2022) found that learning interest significantly influences learning motivation, which is crucial for academic success. Additionally, Kumar (2025) emphasizes that sparking and sustaining interest in learning can transform mundane lessons into engaging experiences, thereby enhancing student engagement and motivation.

In synthesis, the findings suggest that helping students succeed is not just about making sure they understand the material; it is also about keeping them interested and helping them remember what they learn. Since students' interest and ability to retain lessons do not seem to depend only on how much they know, teachers need to find ways to make learning more engaging and meaningful. Using real-world examples, group projects, and regular practice sessions can help students stay motivated and remember important concepts. It is also a

good idea to build in chances for students to revisit and recall what they have learned over time, not just cram everything at once. By focusing on both what students know and how they stay interested and confident, teachers can create a learning environment where students are more likely to succeed and hold onto what they have learned in basic business math.

4.0 Conclusion

Education must uphold the principle that no child is left behind, particularly for students who have only a basic grasp of Basic Business Math or face significant challenges in learning the subject. While many students demonstrated substantial mastery of key financial topics, a notable portion struggled, especially with foundational knowledge and time allocation, both of which were significantly linked to overall knowledge. These students are at greater risk of falling behind, as their limited understanding may intensify the difficulties they encounter.

The challenges faced by this minority of students can lead to decreased confidence and motivation, further widening the learning gap. Ensuring that all students grasp fundamental concepts promotes an inclusive learning environment and reinforces the commitment that no student should be left behind, aligning with SDG 4 on quality education. By addressing these struggles, educators can help students develop not only numerical proficiency but also essential problem-solving skills, supporting their personal and professional growth and contributing to SDG 8 on decent work and economic growth. Recognizing knowledge as a key determinant of learning challenges, educators must take these findings as a call to action. While improving time management and minimizing classroom disruptions can help students stay focused, the goal is to ensure that all students, regardless of their initial proficiency, develop the confidence and skills necessary for academic and financial success.

Based on the findings, it is recommended that teachers integrate real-life financial scenarios into their lessons and emphasize the importance of topics such as stocks and bonds to strengthen students' financial literacy and economic awareness. Teachers are also encouraged to use assessment results as a foundation for designing specific interventions and refining the curriculum. For school administrators, it is recommended to advocate for curriculum updates that make business math topics more practical and engaging. Furthermore, administrators should ensure that teachers receive ongoing professional development in the latest instructional strategies and tools to better support students. Additionally, administrators could explore partnerships with local businesses and organizations to enhance students' financial literacy. Finally, providing parents with resources to support their children's learning at home could further reinforce students' success.

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The authors confirm their equal contribution to every part of this research. All authors reviewed and approved the final version of this paper.

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7.0 Conflict of Interests

This study has no conflict of interest of any sort.

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