International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 9 Issue 3, May-Jun 2025 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Exploring the Contribution of Teacher-Related Factors to the Decline in Academic Performance Among Lower Secondary School Students in Bamako, Mali: Insights from China's Rigorous Teacher Education Programs

Kante Drissa[1], Wang Zhanjun[2], Ibrahim Mariam Rajabu[3]

[1,3]Ph.D. Student, [2]Professor,
[1,2,3]ZJNU, Zhejiang, China

ABSTRACT

This study explores how teacher-related factors contribute to declining academic performance among lower secondary students in Bamako, Mali. It also draws lessons from China's teacher education and CPD programs to suggest relevant reforms. The research aims to: how teacher content knowledge, teaching strategies, and access to in-service training affect student achievement. Using a mixed-methods approach, data from 100 teachers, 200 students, and 4 administrators across four schools revealed a strong link between teacher qualifications and student success. Teachers with formal training and interactive methods improved outcomes, while traditional lectures and limited CPD hindered progress. A comparison with China's system highlighted gaps in Mali's teacher training, mentorship, and CPD access. To enhance education, Mali should adopt standardized pedagogical training, structured CPD, and active learning techniques, inspired by China's model, to improve teacher quality and student performance.

KEYWORDS: *Academic Performance Decline, China's Teacher Education, Lower Secondary Education, Pedagogical Training, Teacher-Related Factors*

How to cite this paper: Kante Drissa | Wang Zhanjun | Ibrahim Mariam Rajabu "Exploring the Contribution of Teacher-Related Factors to the Decline in Academic Performance Among Lower Secondary School Students in Bamako, Mali: Insights from China's Rigorous Teacher Education Programs" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-9 | Issue-3, June 2025, pp.1320-1330, URL: www.ijtsrd.com/papers/ijtsrd97141.pdf

IJTSRD97141

1. INTRODUCTION

Education is a fundamental driver of socio-economic development, and the quality of teaching plays a critical role in shaping student outcomes (Hanushek & Woessmann, 2019). In Mali, particularly in Bamako, the declining academic performance of lower secondary school students has become a growing concern. Research suggests that teacher-related factors, including subject-matter knowledge, pedagogical practices, and professional development opportunities, significantly influence students' learning outcomes (Darling-Hammond, 2020; Rockoff, 2023). Despite ongoing efforts to enhance teacher preparation and instructional quality, Mali's education system continues to face significant challenges. Many teachers enter classrooms with inadequate subject-matter expertise and limited exposure to effective pedagogical techniques (World Bank, 2021). Additionally, access to in-service training and professional development remains insufficient, limiting teachers' ability to adapt to evolving educational needs (UNESCO, 2022). Given these challenges, it is essential to examine the extent to which teacher-related factors contribute to declining student performance and explore strategies for improving teacher effectiveness.

China's rigorous teacher education programs offer valuable insights in this regard. The country has implemented structured and continuous teacher training programs that have contributed to significant improvements in student achievement (Jensen et al., 2019). By analyzing the key components of China's

teacher preparation and professional development systems, this study seeks to identify lessons that could inform policy interventions aimed at enhancing teacher quality in Bamako. This research aims to investigate the impact of teacher-related factors on the academic performance of lower secondary school students in Bamako. More specifically, it seeks to: (1) Analyze the level of content knowledge acquired during teacher preparation influences students' academic performance (2) Investigate teaching strategies and classroom instructional methods affect learning outcomes (3) Explore the accessibility and impact of in-service training programs on teaching effectiveness and student achievement (4) Analyze the core components of China's rigorous teacher education and professional development system and assess their applicability to improving teacher quality in Bamako.

This research holds significant implications for educational policy and practice. First, it provides an in-depth analysis of the challenges facing teachers in lower secondary schools in Bamako and their impact on student learning outcomes. Second, by drawing on China's successful teacher training models, it offers evidence-based recommendations for strengthening teacher education and professional development in Mali. Findings from this study could inform policymakers, education administrators, and teacher training institutions in designing strategies to enhance teaching quality. Given the crucial role of teachers in student success, improving teacher preparation and ongoing training could contribute to broader educational reforms that align with 21st-century learning demands (Schleicher, 2018).

The following sections will outline the theoretical framework and research methods before presenting the key findings from the quantitative survey and interviews. These results will then be analyzed and discussed in relation to relevant theories and existing literature.

2. Theoretical Framework

This study is based on well-established theories in teacher education, pedagogy, and professional development, which provide a lens for analyzing how teacher-related factors influence student academic performance. The framework integrates Shulman's Pedagogical Content Knowledge (PCK) Theory**,** Vygotsky's Socio-Cultural Theory, Desimone's Theory of Effective Professional Development, CPD programs and insights from China's teacher education system to guide the investigation.

2.1. Shulman's Pedagogical Content Knowledge (PCK) Theory

Shulman (1986) introduced the concept of Pedagogical Content Knowledge (PCK), which emphasizes that effective teaching requires both deep content knowledge and the ability to transform this knowledge into accessible learning experiences for students. This theory is relevant to the study's first objective, which examines how the level of content mastery among teachers influences student academic performance. Teachers with strong PCK can better adapt their instruction, use appropriate examples, and address misconceptions, thereby improving learning outcomes.

2.2. Vygotsky's Socio-Cultural Theory of Learning

Vygotsky (1978) posits that learning is a social process, heavily influenced by teacher-student interactions. His concept of the Zone of Proximal Development (ZPD) highlights the importance of scaffolding—where teachers provide structured support to help students move from their current level of understanding to a higher level. This theory underpins the second research objective, which investigates how teaching strategies and instructional methods affect learning outcomes. Effective teacher guidance and the use of interactive, student-centered pedagogies are essential for enhancing academic achievement.

2.3. Desimone's Theory of Effective Professional Development, CPD programs

Research on Continuous Professional Development (CPD) suggests that ongoing in-service training is critical for improving teaching quality (Desimone, 2009). Effective CPD programs focus on content-specific training, active learning, and long-term engagement, which align with the third research objective on the accessibility and impact of professional development programs in Bamako. The study will assess whether existing CPD opportunities effectively equip teachers with modern pedagogical skills and strategies.

2.4. China's Rigorous Teacher Education and Development System

China's teacher education system is known for its rigorous pre-service training, structured mentorship programs, and continuous professional development (Wang & Li, 2019). Key components include:

- Selective teacher recruitment and high academic standards
- Comprehensive pedagogical training with practical teaching internships
- Strong mentoring systems for novice teachers

- Mandatory continuous training and professional learning communities

This study explores the applicability of these practices to Bamako's teacher education system to determine whether similar strategies could enhance teacher quality and student performance.

2.5. Conceptual Model

Based on these theoretical perspectives, the study adopts the following conceptual model:

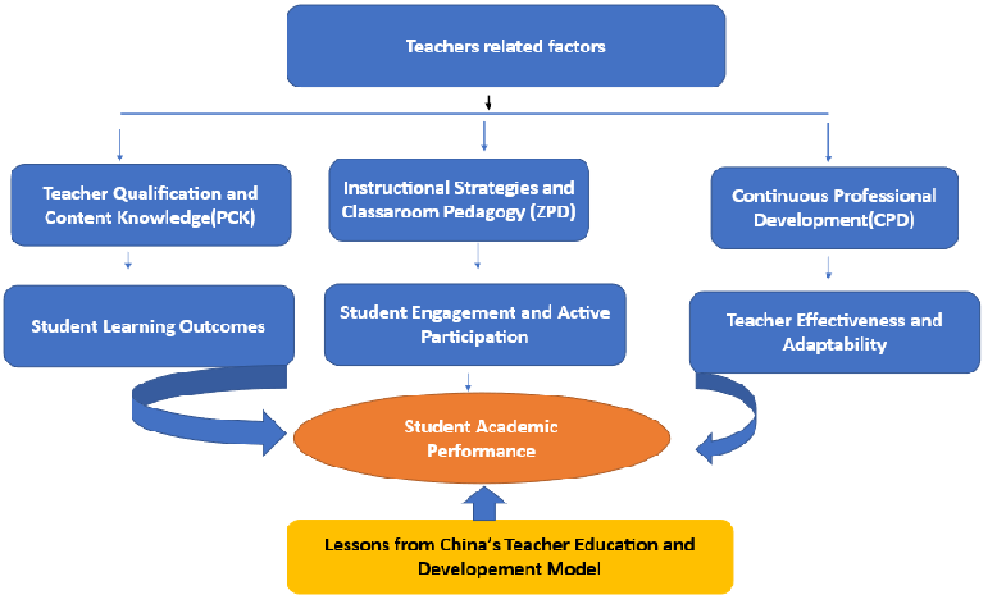
A. Teacher Content Knowledge (Shulman's PCK) → Student Learning Outcomes

B. Instructional Strategies (Vygotsky's ZPD) → Student Engagement & Achievement

C. Continuous Professional Development (CPD) → Teacher Effectiveness → Academic Performance

D. China's Teacher Education Model → Policy and Practice Implications for Bamako and Mali education system

Figure 1: Conceptual Framework of the Study



Source: Inspired by the literature on teacher education and the improvement of academic performance (Darling-Hammond, 2000; Shulman, 1986; Wang et al., 2003; OECD, 2018). Adapted by the author.

This framework provides a structured approach to analyzing how teacher-related factors contribute to student performance and how best practices from China's teacher education system can inform reforms in Mali.

3. Methodology:

3.1. Research Design

This study employs a mixed-methods research design**,** combining quantitative and qualitative approaches to provide a comprehensive understanding of how teacher-related factors contribute to the decline in academic performance among lower secondary school students in Bamako.

- The quantitative aspect involves surveys and standardized assessments to measure teacher subject knowledge, pedagogical effectiveness, and student performance.
- The qualitative component consists of semi-structured interviews to gain deeper insights into teaching practices, professional development opportunities, and challenges faced by teachers.

The mixed-methods approach is chosen to triangulat**e** findings and ensure a more nuanced analysis of the problem. This method is particularly suitable for educational research, where both statistical data and contextual understanding are crucial (Creswell & Plano Clark, 2018).

3.2. Participant Selection

3.2.1. Target Population

The study focuses on lower secondary school teachers, school administrators, and students in Bamako, Mali.

3.2.2. Sampling Strategy

A purposive sampling technique is used to select the respondents. The selection criteria include:

- **Teachers:** Must have at least two years of teaching experience at the lower secondary level.
- **Students:** Enrolled in lower secondary education (grades 7–9) and randomly selected from participating schools.

- **School Administrators:** Selected from schools where participating teachers work, to provide institutional perspectives.

3.2.3. Sample Size

A total of 100 teachers will be selected from 4 schools to participate in the study. These teachers will represent a diverse range of subject areas and experience levels. In addition**,** 200 students will be selected from the same schools to ensure a broad representation of the student population, covering different grade levels and subject areas. Finally, 4 school administrators from the selected institutions will also be included in the study to provide insights into the administrative perspective on teacher education and professional development.

3.3. Data Collection Methods

3.3.1. Quantitative Data Collection

3.3.1.1. Teacher Surveys

A structured questionnaire is administered to assess:

- Teacher qualifications and subject matter knowledge
- Pedagogical and instructional practices
- Professional development experiences

3.3.1.2. Student Performance Assessments

A standardized test is administered to evaluate student achievement in core subjects (Mathematics, Science, and Language). The test included multiple-choice questions, short-answer responses, and problem-solving tasks to measure conceptual understanding, analytical thinking, and the ability to apply knowledge in practical scenarios. This helps establish correlations between teacher characteristics and student performance.

3.3.2. Qualitative Data Collection

3.3.2.1. Semi-Structured Interviews

Semi-structured interviews were conducted with teachers and school administrators to gain deeper insights into their perceptions of teacher effectiveness, pedagogical practices, and professional development.

3.3.2.2. Document Analysis

A comprehensive review of teacher training curricula, professional development programs, and policy documents from Mali and China to compare their teacher education models, identify key differences, and evaluate potential areas for adaptation and improvement.

3.4. Data Analysis Procedures

3.4.1. Quantitative Analysis

Descriptive statistics will be used to summarize key teacher characteristics and student performance trends, providing an overall picture of the dataset. To further examine the impact of teacher-related factors on student academic outcomes, inferential statistical methods, including correlation analysis, will be employed. These analyses will help to identify potential relationships between variables such as teacher qualifications, instructional strategies, and access to professional development, offering deeper insights into their influence on student achievement.

3.4.2. Qualitative Analysis

A thematic analysis following Braun and Clarke's (2006) framework was conducted to identify recurring patterns and themes in interview responses. This involved a systematic process of data familiarization, coding, theme generation, and refinement to ensure a comprehensive understanding of teachers' perspectives and experiences. The analysis focused on emergent themes related to teacher qualification and subject matter knowledge, instructional challenges, and professional development needs, providing deeper insights into the factors influencing teaching effectiveness and student outcomes.

3.5. Ethical Considerations

In conducting this research, ethical standards were rigorously adhered to in order to protect the rights and well-being of all participants. Informed consent was obtained from all participants prior to data collection, ensuring they were fully aware of the nature of the study, their voluntary participation, and their right to withdraw at any time without consequence. To maintain confidentiality, all responses were anonymized, and personal identifiers were removed to protect the privacy of participants. Furthermore, approval from relevant educational authorities was sought and obtained before any research was conducted within the selected schools, ensuring compliance with institutional policies and regulations. These measures upheld the integrity of the study while safeguarding participants' rights.

3.6. Limitations of the Study

This study faced certain limitations that may have impacted the depth and scope of the findings. One key limitation was the lack of direct classroom observations, which could have provided richer insights into actual teaching practices and student engagement. Instead, the study relied primarily on self-reported data from teachers, students, and school administrators, which may introduce biases or gaps in understanding. Additionally, the limited number of participants 100 teachers and 200 students across four schools-restricted the generalizability of the findings to a broader educational context. A larger and more diverse sample could have strengthened the validity of the conclusions and allowed for a more comprehensive analysis of the challenges and best practices in teacher education and professional development.

4. Results

4.1. Quantitative results

4.1.1. Assessment of student performance in core subjects (Mathematics, Science, and Language).

The test results indicate disparities in student performance across core subjects. Language emerged as the strongest subject with an average of 65%, suggesting that literacy skills are relatively well-developed among students. In contrast, Mathematics had the lowest average (58%), highlighting potential weaknesses in problem-solving and numeracy skills. Science performance (62%) falls between the two, indicating a moderate level of conceptual understanding but still requiring improvement.

Gender differences in performance were notable. Girls outperformed boys in Language (67% vs. 63%), suggesting stronger literacy and verbal skills among female students. Conversely, boys performed better in Mathematics (60% vs. 55%) and Science (64% vs. 60%), which may indicate gendered learning patterns influenced by societal expectations, confidence levels in STEM subjects, or differences in teaching approaches. These findings align with broader trends observed in education research, where girls tend to excel in verbal skills while boys often demonstrate stronger mathematical and scientific reasoning. The details of this above information are presented in Table 1.

Table 1: Student Performance by Subject.

Subjects	Overall Average (%)	Girls (N=90)	Boys (N=110)
Mathematics	58%	55%	60%
Science	62%	60%	64%
Language (French/English)	65%	67%	63%

Note: This test was designed to evaluate student achievement in core subjects-Mathematics, Science, and Language-and to establish correlations between student performance and teacher-related factors. **Test Scoring Breakdown: Mathematics:** 30 points. **Science:** 30 points. **Language (French/English):** 30 points **Total Possible Score:** 90 points.

4.1.2. Correlations between student performance and teacher-related factors

4.1.2.1. Teacher Qualification and Student performance

The results show a direct correlation between teacher qualifications and student achievement. Students taught by teachers with a Teacher Training School Diploma (IFM) performed best (68%), reinforcing the importance of pedagogical training in effective teaching. In contrast, those instructed by teachers with a subject-specific bachelor's degree but no pedagogical training scored lower (62%), indicating that content knowledge alone is insufficient for optimal student outcomes. The lowest performance (54%) was associated with teachers who obtained a Certificate of Alternative Strategy for Recruiting Teaching Staff (SARPE), suggesting that fast-track training programs may not provide adequate pedagogical preparation. These findings emphasize the necessity of structured teacher training programs that integrate both content mastery and instructional strategies. The details of this above information are presented in Table 2.

Table 2: Teacher Qualification and Student performance.

Qualification Level	Frequency (N=100)	Percentage (%)	Average Student Score (%)
Teacher Training school Diploma (IFM)	35	35%	68%
Subject-Specific Bachelor's (No Pedagogical Training)	40	40%	62%
Certificate of Alternative Strategy for Recruiting Teaching Staff**.**	25	25%	54%

4.1.2.2. Teaching Methods and Student Performance

Teaching methodology significantly influenced student performance. Lecture-based (teacher-centered) instruction, the most common approach (50% of teachers), yielded the lowest student performance (58%). This suggests that passive learning methods may not effectively support deep understanding or critical thinking. Interactive teaching methods (group discussions, collaborative learning) were associated with higher performance (67%), indicating that engagement and peer interaction enhance comprehension. Student-centered approaches (project-based, inquiry-driven learning) produced the highest student performance (72%), reinforcing the effectiveness of active learning strategies. These findings support the need for pedagogical reforms that prioritize interactive and student-centered teaching over traditional rote instruction. The details of this above information are presented in Table 3.

Table 3: Teaching Methods and Student Performance.

Teaching Method	Frequency (N=100)	Percentage (%)	Average Student Score (%)
Lecture-Based (Teacher-Centered)	50	50%	58%
Interactive Methods (Discussions, Group Work)	30	30%	67%
Student-Centered Approaches (Projects, Inquiry-Based)	20	20%	72%

4.1.2.3. Teacher Professional Development and student performance

Teacher professional development played a crucial role in student performance. Teachers who attended training within the past year saw a +12% improvement in student scores, demonstrating the positive impact of continuous professional development (CPD). In contrast, students of teachers who had not attended training in three years exhibited a 7% decline, while those taught by teachers who had never received training showed a 12% decline. These results underscore the importance of ongoing training opportunities for teachers to stay updated on best practices, innovative instructional strategies, and evolving curriculum standards. The details of this above information are presented in Table 4.

Table 4: **Teacher Professional Development and student performance.**

Access to Professional Development	Frequency (N=100)	Percentage (%)	Student Score Improvement (%)
Attended Training in the Last Year	45	45%	+12%
No Training in the Last 3 Years	30	30%	-7%
Never Attended Training	25	25%	-12%

4.2. Qualitative results: Teacher-Related Factors and Their Impact on the Decline in Academic Performance Among Lower Secondary School Students in Bamako.

4.2.1. Teacher Qualifications and Subject Matter Knowledge

The shortage of pedagogically trained teachers significantly impacts instructional quality and student learning outcomes. Many educators express concerns about insufficient preparation before entering the profession, highlighting the need for comprehensive reforms in teacher education programs.

- **Gaps in Training and Preparedness**

While many teachers possess strong subject-matter expertise, they often lack essential pedagogical skills to effectively manage diverse classroom environments. The absence of hands-on training in teacher preparation programs exacerbates this issue, leaving educators ill-equipped to implement interactive and student-centered teaching approaches. As one teacher noted:

"We need more structured training—not just theoretical courses but also hands-on experience."

This statement underscores the inadequacy of existing teacher education programs in bridging the gap between theoretical knowledge and practical classroom application.

- **Weak Instructional Effectiveness**

School administrators recognize that while many teachers hold academic degrees in their respective fields, their lack of training in pedagogical methodologies undermines their effectiveness in delivering engaging lessons. A school leader observed:

"The majority of our teachers hold degrees in their subjects, but many have not received adequate training in teaching methodologies. This impacts classroom delivery, student engagement, and overall performance."

This highlights a systemic issue where instructional quality suffers due to inadequate teacher preparation, ultimately affecting student academic performance.

4.2.2. Pedagogical Practices and Classroom Instruction

A predominant reliance on teacher-centered instruction poses a major barrier to student engagement and learning. This persistence of traditional methods is influenced by ingrained teaching norms, limited pedagogical training, and resource constraints. Three key issues emerged from the thematic analysis:

- **Pedagogical Inertia: Teaching the Way One Was Taught**

Many educators' default to lecture-based methods because it is the approach they experienced as students. Although they acknowledge its limitations, they feel unprepared to implement alternative strategies. One teacher reflected:

"We were taught using lecture-based methods, and it's the approach we are most familiar with. However, I notice that students quickly lose interest. I would love to incorporate more interactive strategies, but I lack the necessary training and resources."

This indicates that while teachers recognize the need for active learning techniques, they require targeted training and professional development to adopt strategies such as group discussions, inquiry-based learning, and cooperative activities.

- **Efficiency vs. Effectiveness: Pressure to Cover the Curriculum Quickly**

School administrators acknowledge that lecture-based instruction is often favored because it enables teachers to cover the curriculum efficiently albeit at the expense of student comprehension. One administrator noted:

"Most of our teachers rely heavily on lecturing because it's seen as the easiest way to cover the curriculum quickly. However, this does not necessarily mean students are learning effectively. We need to encourage more student-centered approaches."

This reveals a fundamental misalignment between curriculum pacing and effective pedagogy, highlighting the need for curriculum reforms that balance content coverage with interactive teaching.

- **Lack of Training and Resources for Interactive Teaching**

Even when teachers express willingness to adopt student-centered approaches, they face challenges such as large class sizes, limited resources, and minimal exposure to alternative methods. To bridge this gap, professional development programs should not only introduce innovative teaching techniques but also provide the necessary tools for implementation. Investments in instructional materials such as projectors, educational software, and collaborative learning kits can enhance classroom engagement and instructional effectiveness.

4.2.3. Continuous Professional Development (CPD) and Teacher Growth

Despite the recognized importance of Continuous Professional Development (CPD) in improving teaching quality, many educators lack access to regular, structured training opportunities. This limitation contributes to pedagogical stagnation, hindering their ability to adopt modern teaching methodologies.

- **Lack of Practical Training Opportunities**

Teachers frequently express frustration over the limited availability and relevance of CPD programs. Many existing workshops focus on administrative policies rather than equipping educators with practical instructional strategies. As one teacher remarked:

"I have been teaching for years, but I rarely get opportunities to attend training sessions that could help me improve. Most workshops focus on policy updates rather than practical teaching strategies."

This highlights two key challenges:

- Limited access to CPD, leaving many teachers without adequate opportunities to refine their teaching methods.
- Misalignment between training content and classroom needs, as most workshops prioritize administrative concerns over practical pedagogy.

- **Inconsistencies in CPD Accessibility**

School leaders acknowledge disparities in access to professional development opportunities, with some teachers benefiting from training while others are left behind. This inconsistency contributes to variations in teaching quality across different schools and regions. A school administrator emphasized:

"Professional development opportunities are inconsistent. Some teachers receive training, while others do not. There needs to be a structured system ensuring that every teacher has access to CPD regularly."

This underscores the urgent need for a coordinated CPD framework, ensuring that professional development is not sporadic but rather an integral component of teachers' careers.

4.3. Lessons from China's rigorous teacher education programs and professional development system

China's rigorous teacher education programs and professional development (PD) system offer valuable

insights for addressing the key issues identified in the thematic analysis. By drawing on China's successful practices, education systems can improve teacher training, enhance instructional effectiveness, and ensure continuous professional growth for educators. Below are the lessons and their applications to the identified issues, along with targeted and actionable recommendations.

4.3.1. Insufficient Number of Teachers with Strong Pedagogical Training

China ensures that teachers possess both subject knowledge and pedagogical expertise before entering the classroom. Teacher preparation programs are structured to include extensive training in instructional strategies, classroom management, and student engagement techniques (Chen, 2020).

Solution & Recommendations:

➢ **Reform Teacher Education Programs:**

- Implement a standardized teacher preparation curriculum incorporating theoretical knowledge and extensive hands-on training.
- Establish mandatory internship programs in diverse classroom settings for teacher candidates.
- Develop mentorship programs where novice teachers are paired with experienced educators for continuous guidance.

➢ **Pedagogical Training Prior to Employment:**

- Make pedagogical training a prerequisite for obtaining a teaching license.
- Strengthen partnerships between universities and schools to facilitate practice-based learning experiences.
- Introduce certification requirements ensuring mastery of effective teaching methodologies before employment.

4.3.2. Gaps in Training and Preparedness

China's teacher education system integrates classroom-based observations and simulations to ensure teachers are well-prepared for real-world teaching environments (Yuan & Lee, 2024).

Solution & Recommendations:

➢ **Emphasize Practical Training:**

- Increase classroom-based training hours in teacher education programs.
- Require student-teachers to conduct microteaching sessions under supervision.
- Develop school-university collaboration programs where future teachers undergo supervised teaching before graduation.

➢ **Incorporate Peer Learning and Mentorship:**

- Create structured peer-learning networks where novice teachers learn from experienced educators.
- Establish formal mentorship programs that provide ongoing support and coaching for new teachers.
- Facilitate collaborative workshops where teachers share best practices and innovative teaching strategies.

4.3.3. Weak Instructional Effectiveness

Continuous professional development (CPD) in China is linked to teacher evaluation and career progression, ensuring ongoing improvement in instructional quality (Zhou & Lee, 2020).

Solution & Recommendations:

➢ **Integrate Pedagogical Skills into Teacher Evaluations:**

- Develop teacher assessment frameworks that evaluate both subject-matter expertise and instructional effectiveness.
- Implement classroom observation systems where trained evaluators provide constructive feedback.
- Use student learning outcomes as part of teacher performance assessments to gauge instructional impact.

➢ **Offer Specialized Training:**

- Introduce targeted CPD programs focusing on differentiated instruction, classroom management, and formative assessment.
- Provide financial incentives for teachers who pursue additional training and certifications.
- Develop professional learning communities within schools to encourage continuous pedagogical improvement.

4.3.4. Overreliance on Lecture-Based Teaching Methods

Chinese teacher training programs emphasize interactive, student-centered teaching strategies such as group work, inquiry-based learning, and project-based learning (Chen & Yang, 2019).

Solution & Recommendations:

➢ **Train Teachers in Active Learning Strategies:**

- Incorporate student-centered teaching methods into initial teacher training.
- Provide workshops and CPD sessions focused on cooperative learning, problem-solving, and peer-to-peer teaching.
- Develop model classrooms where teachers can observe and practice active learning techniques.

➢ **Integrate Technology into Teaching:**

- Provide training on using digital tools such as smartboards, educational apps, and online collaboration platforms.
- Equip schools with necessary digital infrastructure to facilitate interactive teaching.

- Develop online repositories of teaching resources to support innovative pedagogical approaches.

4.3.5. Gaps in Continuous Professional Development (CPD)

In China, CPD is mandatory for teachers and directly linked to career advancement, ensuring regular access to relevant professional development opportunities (Wu & Liu, 2018).

Solution & Recommendations:

➢ **Establish a Structured CPD Framework:**

- Develop a national policy mandating regular, structured CPD for all teachers.
- Align CPD programs with teachers' specific needs and evolving educational trends.
- Provide CPD credits linked to career progression and salary increments.

➢ **Ensure Equal Access to CPD:**

- Establish regional training centers to reduce geographical disparities in professional development access.
- Develop online CPD platforms offering flexible training opportunities.
- Implement financial support mechanisms to ensure all teachers can participate in professional development activities.

China's approach to teacher education and professional development is comprehensive, emphasizing both initial training and continuous professional growth. By adapting these strategies—such as implementing rigorous teacher education programs, integrating practical training, focusing on interactive teaching, and ensuring continuous access to CPD-education systems can strengthen their teaching workforce and improve overall educational outcomes.

5. Discussion

5.1. Student Performance in Core Subjects

The disparities in student performance across core subjects highlight variations in instructional effectiveness and socio-cultural influences on learning. According to Vygotsky's Socio-Cultural Theory (1978), learning is mediated by social interactions, cultural tools, and scaffolding. The observed gender differences in subject performance may stem from deeply rooted societal expectations and the ways in which boys and girls are socialized into academic disciplines. Research suggests that girls tend to excel in verbal and literacy skills due to early exposure to reading activities, in contrast boys often engage more in problem-solving and logic-based tasks, reinforcing their advantage in Mathematics and Science (Nosek et al., 2009).

In addition to socio-cultural factors, Shulman's Pedagogical Content Knowledge (PCK) Theory (1986) provides a lens for examining instructional quality. If students underperform in Mathematics and Science, it may indicate that teachers lack the necessary PCK to effectively translate subject knowledge into accessible, engaging, and developmentally appropriate instruction. Studies have shown that teachers' ability to integrate content knowledge with effective pedagogical strategies significantly impacts student learning outcomes (Ball et al., 2020). Strengthening teachers' PCK-particularly in STEM subjects-could help address these disparities and foster more balanced academic achievement across genders.

5.2. Teacher Qualifications and Subject Mastery

Qualitative findings reveal a concerning gap between teachers' subject-matter expertise and their pedagogical skills, which directly affects instructional effectiveness. Shulman's PCK Theory (1986) emphasizes that effective teaching requires a synthesis of deep content knowledge and the ability to translate that knowledge into meaningful learning experiences for students. While many teachers in this study demonstrated strong subject mastery, their lack of pedagogical expertise hindered their ability to adapt instruction to students' needs, contributing to lower engagement and comprehension.

International best practices highlight the importance of structured teacher education programs. China's teacher education system, for example, integrates extensive practicum experiences and mentorship-based training, ensuring that teachers develop both content expertise and practical pedagogical skills before entering the classroom (Li & Li, 2018). Research by Grossman (1990) underscores that theoretical coursework alone is insufficient; teachers must engage in hands-on, reflective teaching experiences to develop effective instructional strategies. These findings suggest that enhancing teacher preparation programs with field-based learning opportunities and mentorship could improve instructional quality and student engagement.

5.3. Pedagogical Practices and Classroom Instruction

The continued reliance on lecture-based instruction highlights deeply ingrained teaching norms and a lack of exposure to alternative methodologies. Vygotsky's Socio-Cultural Theory advocates for student-centered learning approaches, where cognitive development is enhanced through interaction, collaboration, and guided discovery (Mercer & Howe, 2019). However, many teachers in this study defaulted to teacher-centered methods, despite recognizing their

limitations. This can be attributed to limited professional development opportunities in interactive pedagogies and curriculum constraints that emphasize content coverage over active learning.

To address this issue, Desimone's Theory of Effective Professional Development (2009) underscores that CPD should be content-focused, interactive, and sustained over time. Research shows that teachers who participate in professional development programs that incorporate modeling, coaching, and practice-based strategies significantly improve their instructional effectiveness (Garet et al., 2001). If Bamako's education system aims to shift towards more engaging, research-based teaching methods, structured CPD initiatives that focus on active learning methodologies will be essential.

5.4. Continuous Professional Development (CPD) and Teacher Growth

Despite widespread recognition of CPD's benefits, many teachers in this study reported limited access to training that enhances their pedagogical skills. Desimone's (2009) framework suggests that effective CPD should be:

''a-Content-Specific -Addressing instructional strategies directly related to subject areas, b-Active and Interactive- Encouraging teachers to engage in collaborative learning and hands-on practice, c-Coherent - Aligning with teachers' needs and the broader educational curriculum, d-Sustained Over Time – Moving beyond short-term workshops to provide continuous learning, e-Collaborative-Involving peer interactions, mentoring, and professional learning communities.''

Findings indicate that existing CPD programs in Bamako often prioritize administrative policies over classroom strategies, limiting their impact on teaching practices. By contrast, China's teacher professional development system is structured around long-term training models that emphasize subject-specific pedagogy and collaborative learning (Huang et al., 2019). Structured CPD programs that incorporate mentorship, peer collaboration, and lesson study approaches could significantly enhance teacher growth and classroom instruction.

5.5. China's Teacher Education System performance

China's rigorous approach to teacher education and professional development provides valuable insights for enhancing teacher preparedness and instructional effectiveness. Shulman's PCK Framework aligns with China's emphasis on integrating deep content expertise with effective teaching strategies. Teacher education programs in China require extensive classroom experience, peer collaboration, and mentorship, ensuring that educators develop a strong foundation in both subject matter and pedagogy (Li & Li, 2018).

Additionally, Vygotsky's Socio-Cultural Perspective supports China's use of collaborative professional development models, such as lesson study and peer mentoring, which promote shared learning, ongoing reflection, and instructional refinement (Huang et al., 2019). These findings highlight the need for structured CPD programs that prioritize long-term teacher growth, moving beyond short-term, isolated training sessions to sustained professional learning communities.

6. Conclusion

This study underscores the crucial role of teacher-related factors in the decline of academic performance among lower secondary school students in Bamako. The findings reveal those deficiencies in teacher qualifications, ineffective pedagogical approaches, and limited access to Continuous Professional Development (CPD) significantly hinder student learning. Teachers with strong pedagogical training and subject mastery were linked to better student outcomes, whereas a reliance on traditional lecture-based methods diminished student engagement and comprehension. To address these challenges, this study recommends drawing insights from China's teacher education system, which prioritizes structured and practice-oriented training, mandatory CPD, and the integration of active learning methodologies. Implementing similar strategies in Mali could enhance teaching effectiveness and foster a more dynamic and student-centered learning environment.

A more comprehensive and reform-driven approach to teacher training and development is imperative. By standardizing teacher preparation programs, strengthening CPD frameworks, and promoting interactive pedagogical methods, policymakers can improve instructional quality and student performance. Investing in the professional growth of teachers is not only essential for academic success but also for the long-term advancement of the education system. Future research should assess the long-term effectiveness of these interventions, explore their adaptability to the Malian context, and examine additional factors that may influence student achievement. A sustained commitment to evidence-based reforms will be key to ensuring lasting improvements in educational outcomes.

References

[1] Ball, D. L., Thames, M. H., & Phelps, G. (2020). Content knowledge for teaching: What makes it special? *Journal of Teacher Education, 59*(5), 389-407.

[2] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*(2), 77-101.

[3] Chen, L., & Yang, H. (2019). Teacher Professional Development and Instructional Reform in China. *Educational Review*.

[4] Chen, Z. (2020). The Teacher Qualification Examination System in China: A Model for Teacher Preparation. *Chinese Journal of Education Studies*.

[5] Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Routledge.

[6] Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research*. Sage Publications.

[7] Darling-Hammond, L. (2020). Teacher quality and student achievement: A review of state policy evidence. *Education Policy Analysis Archives, 8*(1), 1-44.

[8] Desimone, L. M. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181-199.

[9] Garet, M. S., Porter, A. C., Desimone, L., Birman, B. F., & Yoon, K. S. (2001). What makes professional development effective? Results from a national sample of teachers. *American Educational Research Journal, 38*(4), 915-945.

[10] Grossman, P. L. (1990). *The making of a teacher: Teacher knowledge and teacher education*. Teachers College Press.

[11] Hanushek, E. A., & Woessmann, L. (2019). Do better schools lead to more growth? *Journal of Economic Growth, 17*(4), 267-321.

[12] Huang, R., Shimizu, Y., & Santagata, R. (2019). Lesson study in teacher professional development: A knowledge base for instructional improvement. *ZDM Mathematics Education, 51*(3), 303-317.

[13] Jensen, B., Hunter, A., Sonnemann, J., & Burns, T. (2019). *Catching up: Learning from the best school systems in East Asia*. Grattan Institute.

[14] Li, Y., & Li, J. (2018). Professional learning through Chinese lesson study: Opportunities and challenges. *International Journal for Lesson and Learning Studies, 7*(4), 250-263.

[15] Mercer, N., & Howe, C. (2019). Explaining the educational effects of dialogue. *British Journal of Educational Psychology, 82*(1), 1-18.

[16] Nosek, B. A., Banaji, M. R., & Greenwald, A. G. (2009). Gender stereotypes influence math performance. *Psychological Science, 13*(2), 105-112.

[17] Pianta, R. C., La Paro, K. M., & Hamre, B. K. (2008). *Classroom Assessment Scoring System (CLASS)*. Paul H. Brookes Publishing.

[18] Rockoff, J. E. (2023). The impact of individual teachers on student achievement: Evidence from panel data. *American Economic Review, 94*(2), 247-252.

[19] Schleicher, A. (2018). *World class: How to build a 21st-century school system*. OECD Publishing.

[20] Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher, 15*(2), 4-14.

[21] UNESCO. (2022). *Global education monitoring report: Transforming education for inclusive development*. UNESCO Publishing.

[22] Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

[23] World Bank. (2021). *The state of education in Africa: Challenges and opportunities*. Washington, DC: World Bank.

[24] Wu, X., & Liu, J. (2018). Continuing Professional Development for Teachers in China: Strategies and Impact. *International Journal of Educational Research*.

[25] Yuan, F., & Lee, Y. (2024). Practical Training in Teacher Education: Lessons from China. *Asian Journal of Education*.

[26] Zhou, X., & Lee, M. (2020). Teacher Professional Development in China: Innovations and Challenges. *Journal of Teacher Education*.