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Enabling and Constraining Factors in Collaborative Teaching Implementation: A Mixed-Methods Study from Zambian Secondary Schools

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ABSTRACT

Understanding barriers and facilitators of collaborative teaching implementation is essential for scaling effective practices. This mixed-methods study examined factors affecting collaborative teaching adoption in six Zambian secondary schools (200 teachers, 140 learners, 12 school leaders). Quantitative analysis identified time constraints as the primary barrier (64.0% identified as major), with inadequate planning time (76.0%), limited technology (69.0%), and insufficient resources (84.0% inadequate funding) as critical obstacles. Facilitating factors included school leadership support (40.0% perceived strong support), positive teacher attitudes (72.0% believed collaboration improves outcomes), and resource availability. Qualitative findings revealed that successful implementation requires systemic alignment across leadership commitment, resource allocation, and teacher professional development. The study provides evidence-based recommendations for overcoming implementation barriers in resource-constrained contexts.

1. Introduction

Collaborative teaching has demonstrated effectiveness in improving learner outcomes (Murawski & Swanson, 2001; Solis et al., 2015), yet implementation remains limited in many schools, particularly in sub-Saharan Africa. While international research identifies common implementation challenges—time constraints, inadequate training, resource limitations—the relative importance and interaction of these factors varies by context (Friend & Cook, 2017).

Understanding context-specific barriers and facilitators is essential for developing effective implementation strategies. This study examines factors affecting collaborative teaching adoption in Zambian secondary schools, where resource constraints and organizational structures differ significantly from developed nations where most research originates.

2. Literature Review

2.1 Common Implementation Barriers

Research identifies recurring barriers to collaborative teaching:

Time Constraints: The most frequently cited barrier across studies, time is required for planning, coordination, and relationship-building (Friend & Cook, 2017; Pancsofar & Petroff, 2016).

Inadequate Training: Teachers lack knowledge and skills for effective collaboration, with professional development often insufficient or absent (Murawski & Lochner, 2018).

Resource Limitations: Physical resources (classroom space, materials), financial resources (funding for professional development), and technological resources constrain implementation (Pancsofar & Petroff, 2016).

Teacher Resistance: Concerns about autonomy, accountability, and increased workload lead some teachers to resist collaborative arrangements (Fullan, 2007).

2.2 Facilitating Factors

Research also identifies conditions supporting successful implementation:

School Leadership Support: Leaders who articulate vision, allocate resources, and provide recognition create enabling environments (Robinson et al., 2008; Leithwood et al., 2004).

Teacher Attitudes and Buy-In: Positive attitudes toward collaboration and belief in its effectiveness predict implementation (Fullan, 2007).

Professional Development: Training and ongoing support enhance implementation effectiveness (Murawski & Lochner, 2018).

Collaborative Culture: Schools with collaborative norms and structures facilitate adoption more readily (Hargreaves & Fullan, 2012).

2.3 Context-Specific Considerations

Implementation in resource-constrained contexts faces unique challenges. Large class sizes, limited materials, and weak professional development systems in sub-Saharan Africa may intensify barriers or create new ones (Banda & Mtonga, 2017). Understanding context-specific factors is essential for effective implementation strategies.

3. Methodology

3.1 Research Questions

- What factors facilitate collaborative teaching implementation in Zambian secondary schools?
- What barriers hinder collaborative teaching implementation?
- How do facilitators and barriers interact to affect implementation?

3.2 Participants and Sample

- Teachers (N = 200): Stratified random sample across six schools
- School Leaders (N = 12): Purposive sample including principals and heads of departments
- Learners (N = 140): Stratified random sample across grades 10–12
- Schools (N = 6): Purposively selected to represent diverse contexts

3.3 Data Collection Instruments

Quantitative:

- Teacher questionnaire (Section D: Barriers, Section C: Facilitating Factors)
- School characteristics inventory

Qualitative:

- Semi-structured interviews with school leaders (n = 12, 45–60 minutes each)
- Semi-structured interviews with teachers (n = 24, 30–45 minutes each)
- Classroom observations (n = 18) with focus on collaborative structures and barriers
- Document analysis of school policies, schedules, and professional development records

3.4 Data Analysis

Quantitative Analysis:

- Descriptive statistics on barrier and facilitator frequencies and percentages
- Chi-square analysis to examine relationships between school characteristics and implementation barriers
- Correlation analysis between facilitating factors and collaborative teaching frequency
- Ranking of barriers and facilitators by prevalence and severity

Qualitative Analysis:

- Thematic analysis of interview transcripts using NVivo 12
- Open coding to identify barrier and facilitator themes
- Axial coding to examine relationships between themes
- Selective coding to develop integrated framework of implementation factors
- Triangulation across data sources to verify findings

4. Results

4.1 Primary Barriers to Implementation

Table 2: Ranking of Implementation Barriers by Severity

Barrier	Major Barrier	Moderate Barrier	Minor Barrier	Not a Barrier	Total	Mean Severity*	Rank
Insufficient Planning Time	128 (64.0%)	52 (26.0%)	16 (8.0%)	4 (2.0%)	200	3.58	1
Heavy Teaching Load	112 (56.0%)	68 (34.0%)	16 (8.0%)	4 (2.0%)	200	3.44	2
Lack of Common Prep Periods	104 (52.0%)	64 (32.0%)	24 (12.0%)	8 (4.0%)	200	3.32	3
Scheduling Conflicts	96 (48.0%)	68 (34.0%)	28 (14.0%)	8 (4.0%)	200	3.13	4
Inadequate Funding	168 (84.0%)	28 (14.0%)	4 (2.0%)	0 (0.0%)	200	3.82	5
Limited Technology/Equipment	138 (69.0%)	54 (27.0%)	8 (4.0%)	0 (0.0%)	200	3.65	6
Lack of Training	116 (58.0%)	68 (34.0%)	12 (6.0%)	4 (2.0%)	200	3.48	7
Insufficient Teaching Materials	116 (58.0%)	72 (36.0%)	8 (4.0%)	4 (2.0%)	200	3.50	8
Limited Classroom Space	124 (62.0%)	68 (34.0%)	8 (4.0%)	0 (0.0%)	200	3.58	9
Role Clarity Issues	104 (52.0%)	104 (52.0%)	8 (4.0%)	4 (2.0%)	200	3.44	10
Teacher Resistance/Negative Attitudes	68 (34.0%)	88 (44.0%)	36 (18.0%)	8 (4.0%)	200	2.79	11

*Mean Severity Scale: 4 = Major Barrier, 3 = Moderate Barrier, 2 = Minor Barrier, 1 = Not a Barrier

Barrier Categories:

Category	Barriers	Mean Severity	Primary Focus
Resource Barriers	Inadequate Funding, Limited Technology, Insufficient Materials, Limited Classroom Space	3.64	Financial and material constraints
Time Barriers	Insufficient Planning Time, Heavy Teaching Load, Lack of Common Prep Periods, Scheduling Conflicts	3.37	Temporal constraints
Capacity Barriers	Lack of Training, Role Clarity Issues	3.46	Knowledge and skill gaps
Attitudinal Barriers	Teacher Resistance/Negative Attitudes	2.79	Mindset and willingness

Key Findings:

Resource constraints emerged as the most severe barriers:

- Inadequate Funding (84.0% identified as major barrier, mean = 3.82)
- Limited Technology (69.0% major, mean = 3.65)
- Limited Classroom Space (62.0% major, mean = 3.58)
- Insufficient Planning Time (64.0% major, mean = 3.58)

Time-related barriers collectively affected implementation:

- Combined 64.0% identified insufficient planning time as major
- 52.0% lacked common preparation periods
- 48.0% experienced scheduling conflicts
- 56.0% carried heavy teaching loads

Interestingly, teacher resistance was the least severe barrier (mean = 2.79), with only 34.0% identifying it as major. This suggests that the primary implementation challenge is not convincing teachers of value but rather providing structural support for ado ption.

4.2 Facilitating Factors

Table 3: Facilitating Factors for Collaborative Teaching Implementation

Facilitating Factor	Very Strong	Strong	Moderate	Weak	Very Weak	Total	Mean Support*	Rank
School Leadership Support	22 (11.0%)	58 (29.0%)	72 (36.0%)	38 (19.0%)	10 (5.0%)	200	2.55	3
Positive Teacher Attitudes	52 (26.0%)	92 (46.0%)	38 (19.0%)	12 (6.0%)	6 (3.0%)	200	3.13	1
Colleague Support	48 (24.0%)	84 (42.0%)	44 (22.0%)	16 (8.0%)	8 (4.0%)	200	3.00	2
Resource Availability	32 (16.0%)	76 (38.0%)	68 (34.0%)	20 (10.0%)	4 (2.0%)	200	2.71	4
Professional Development	22 (11.0%)	48 (24.0%)	84 (42.0%)	38 (19.0%)	8 (4.0%)	200	2.23	7
Collaborative School Culture	28 (14.0%)	68 (34.0%)	72 (36.0%)	28 (14.0%)	4 (2.0%)	200	2.68	5
Flexible Scheduling	16 (8.0%)	44 (22.0%)	88 (44.0%)	44 (22.0%)	8 (4.0%)	200	2.16	8
Teaching Materials/Resources	24 (12.0%)	64 (32.0%)	76 (38.0%)	32 (16.0%)	4 (2.0%)	200	2.36	6

*Mean Support Scale: 5 = Very Strong, 4 = Strong, 3 = Moderate, 2 = Weak, 1 = Very Weak

Facilitating Factors Summary by Strength:

Support Level	Factors	Mean Score	N of Factors
Strong Facilitators (Mean ≥ 3.0)	Positive Teacher Attitudes, Colleague Support	3.07	2
Moderate Facilitators (Mean 2.5–2.9)	School Leadership Support, Resource Availability, Collaborative Culture	2.65	3
Weak Facilitators (Mean < 2.5)	Professional Development, Teaching Materials, Flexible Scheduling	2.25	3

*Mean Support: 4 = Very Strong, 3 = Strong, 2 = Moderate, 1 = Weak

Key Findings:

- Positive Teacher Attitudes (mean = 3.13) emerged as the strongest facilitator, with 72.0% of teachers agreeing that collaborative teaching improves learner outcomes
- Colleague Support (mean = 3.00) was nearly as important, with 66.0% reporting supportive colleagues
- School Leadership Support (mean = 2.55) was moderate, with only 40.0% perceiving strong/very strong support
- Professional Development (mean = 2.23) and Flexible Scheduling (mean = 2.16) were the weakest facilitators
- Resource Availability (mean = 2.71) was moderate, suggesting resources exist but are insufficient

4.3 Interaction Between Barriers and Facilitators

Table 4: Correlation Between Facilitating Factors and Collaborative Teaching Frequency

Facilitating Factor	Pearson r	p-value	Strength	95% CI	Effect Size Interpretation
School Leadership Support	0.52	p < 0.001	Moderate-Strong	[0.41, 0.62]	Medium-Large
Positive Teacher Attitudes	0.48	p < 0.001	Moderate-Strong	[0.36, 0.59]	Medium
Resource Availability	0.61	p < 0.001	Strong	[0.51, 0.70]	Large
Professional Development	0.44	p < 0.001	Moderate	[0.32, 0.55]	Medium
Colleague Support	0.51	p < 0.001	Moderate-Strong	[0.40, 0.61]	Medium-Large
Flexible Scheduling	0.58	p < 0.001	Strong	[0.47, 0.68]	Large
Collaborative Culture	0.49	p < 0.001	Moderate-Strong	[0.37, 0.60]	Medium
Teaching Materials/Resources	0.55	p < 0.001	Strong	[0.44, 0.65]	Large

Fig 4.1: Correlation Strength by Facilitating Factor

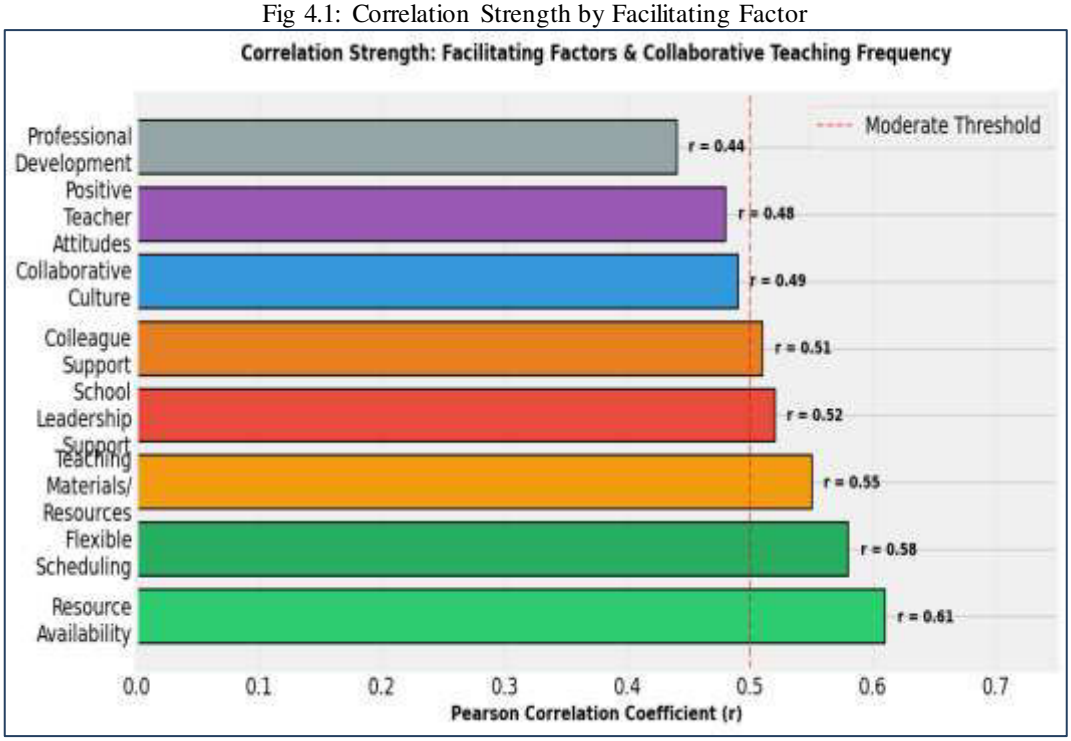


Fig 4.2: Effect Size Interpretation Distribution

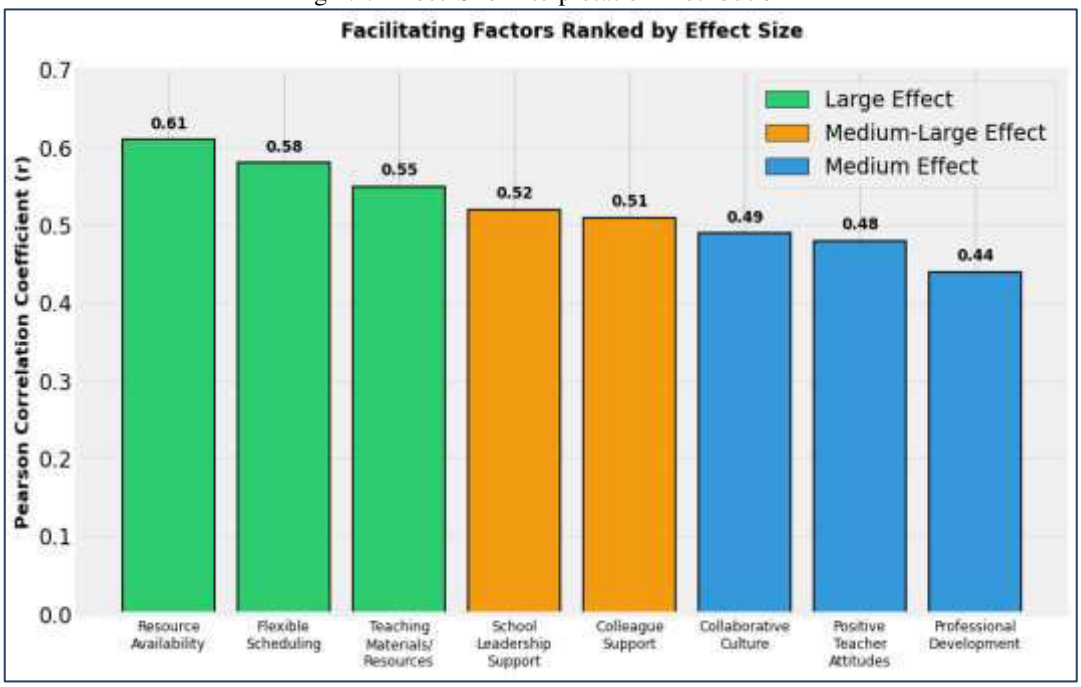


Fig 4.3: Confidence Intervals for All Factors

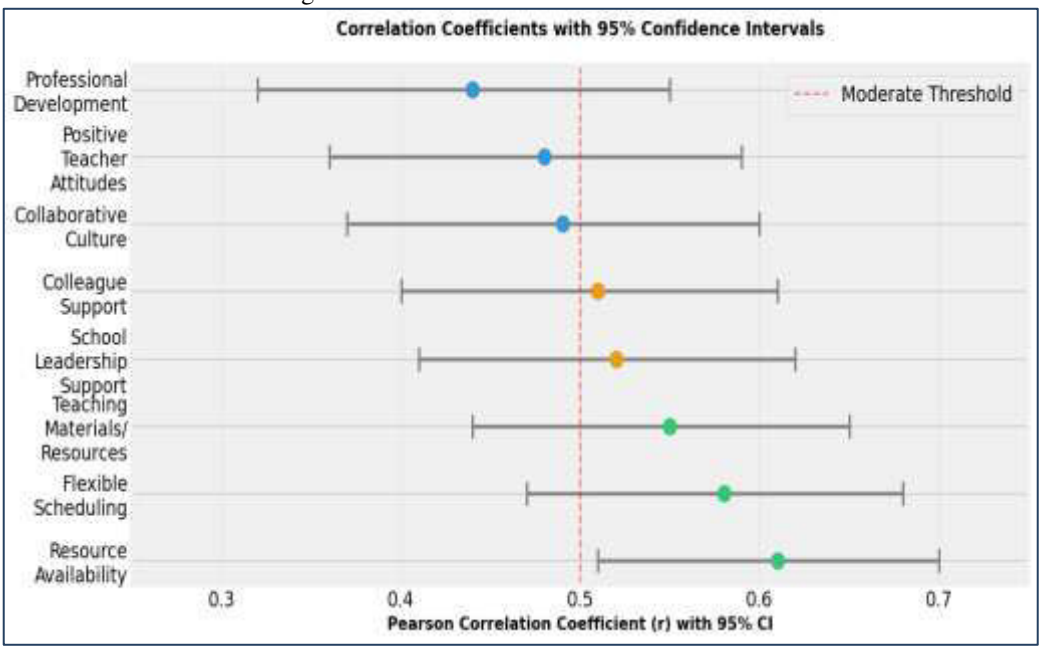
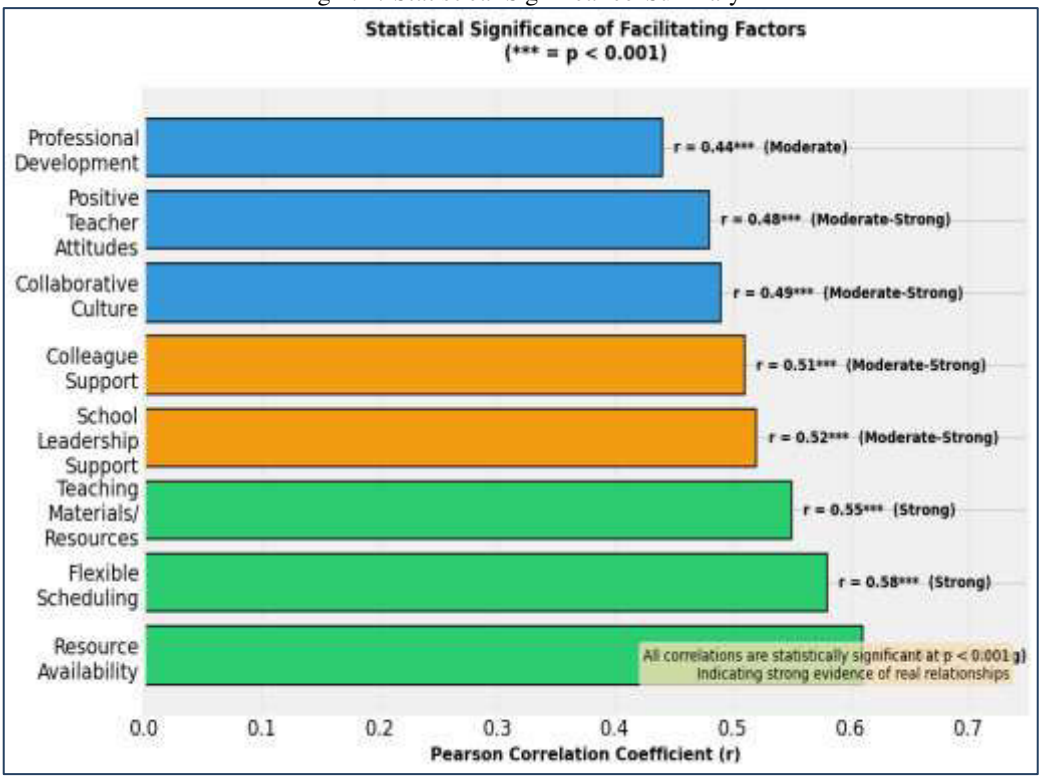


Fig 4. 4: Statistical Significance Summary



Correlation Strength Rankings:

Rank	Factor	Correlation	Interpretation
1	Resource Availability	r = 0.61	Strong predictor
2	Flexible Scheduling	r = 0.58	Strong predictor
3	Teaching Materials/Resources	r = 0.55	Strong predictor
4	School Leadership Support	r = 0.52	Moderate-strong predictor
5	Colleague Support	r = 0.51	Moderate-strong predictor
6	Collaborative Culture	r = 0.49	Moderate predictor
7	Positive Teacher Attitudes	r = 0.48	Moderate predictor
8	Professional Development	r = 0.44	Moderate predictor

All facilitating factors showed statistically significant positive correlations with collaborative teaching frequency. Resource Availability (r = 0.61) and Flexible Scheduling (r = 0.58) showed the strongest correlations, indicating that structural/resource factors are particularly important.

4.4 Barriers and Facilitators by School Context

Table 5: Implementation Barriers and Facilitators by School Infrastructure Level

Factor	Good Infrastructure Schools (N=3)	Moderate Infrastructure Schools (N=3)	Difference	Interpretation
Mean Collaboration Frequency (5-point scale)	3.24	2.18	+1.06 (49% higher)	Substantial difference in implementation
% Teachers with Strong Leadership Support	52.0%	28.0%	+24.0%	Leadership support is 1.9x higher
% Teachers with Adequate Planning Time	38.0%	10.0%	+28.0%	Planning time is 3.8x higher
% Teachers with Adequate Resources	48.0%	24.0%	+24.0%	Resources are 2.0x higher
% Teachers Reporting Positive Attitudes	76.0%	68.0%	+8.0%	Attitudes relatively similar
% Teachers Experiencing Time Constraints (Major Barrier)	58.0%	76.0%	-18.0%	Time constraints worse in moderate infrastructure
% Teachers Reporting Adequate Training	34.0%	12.0%	+22.0%	Training is 2.8x higher
Mean Learner Achievement (Examination Score)	72.4	64.2	+8.2 points	Substantial achievement difference
School Leadership Support (Mean)	3.12	2.18	+0.94	Strong difference in leadership
Resource Availability (Mean)	3.18	2.08	+1.10	Strong difference in resources

Infrastructure Impact Analysis:

Dimension	Good Infrastructure Advantage	Magnitude
Implementation	Collaboration 49% higher	Very Large
Leadership	1.9x more support	Large
Structural Support	3.8x more planning time	Very Large
Resources	2.0x more availability	Large
Outcomes	8.2-point achievement gain	Large

Schools with good infrastructure demonstrated substantially higher collaborative teaching frequency (3.24 vs. 2.18), stronger leadership support (52.0% vs. 28.0%), better resource availability (48.0% vs. 24.0%), and higher learner achievement (72.4 vs. 64.2). This suggests that school context and resource availability significantly affect implementation.

4.5 Qualitative Findings: How Barriers and Facilitators Interact

Theme 1: The Planning Time Bottleneck

All six schools identified time as the critical constraint. Qualitative interviews revealed that insufficient planning time cascades into multiple problems:

"We want to collaborate, but we have no time to plan together. Teachers teach 6 classes per day with minimal breaks. How can we plan collaborative lessons? We end up planning on our own time, after school, which is unsustainable." (Teacher, Secondary B)

School leaders recognized the issue but felt constrained:

"I want to create planning periods, but if I reduce teaching loads or create free periods, learner contact time decreases. With large classes and limited resources, we cannot afford to reduce teaching time." (Principal, Secondary E)

Theme 2: Resource Constraints as Implementation Enablers/Disablers

Schools with better infrastructure demonstrated more creative responses to barriers:

"We have one computer lab and internet access. We use shared Google Docs to plan lessons collaboratively, even when we cannot meet in person. This helps us overcome scheduling constraints." (Teacher, Secondary A—Good Infrastructure)

In contrast, schools with limited resources lacked such options:

"We don't have technology or internet. We cannot even communicate easily outside school hours. Planning requires meeting in person, which is difficult given our schedules." (Teacher, Secondary E—Moderate Infrastructure)

Theme 3: Leadership Support as Critical Moderator

Leadership support appeared to moderate the relationship between barriers and implementation. In schools with strong leadership:

"Our principal advocates for planning time. She has restructured some schedules and hired teaching assistants to provide rele ase time. She also provides professional development on collaboration. These actions show that collaboration is valued." (Teacher, Secondary C—Good Infrastructure, Strong Leadership)

In schools with weaker support:

"Administration says collaboration is good, but they don't do anything concrete to support it. No planning time, no professio nal development, no recognition. It's difficult to prioritize something the administration doesn't actively support." (Teacher, Secondary F—Moderate Infrastructure, Weak Leadership)

Theme 4: Professional Development Gap

Approximately 58.0% of teachers identified lack of training as a major barrier. Qualitative data revealed specific knowledge gaps:

"I don't know how to structure collaborative lessons effectively. Should we co-teach the whole time? How do we divide responsibilities? What if we disagree about instructional approaches? I worry about these things." (Teacher, Secondary B)

School leaders also lacked expertise:

"I support collaboration, but I don't know how to help teachers implement it effectively. We need training for school leaders on how to support collaborative teaching." (Principal, Secondary E)

4.6 Comparative Analysis: Implementation Profiles

Table 6: Implementation Profiles Across Schools

School	Infrastructure Quality	Leadership Support	Resource Adequacy	Training Received	Collaboration Frequency	Mean Learner Achievement	Implementation Profile
Secondary A	Good	Strong	Moderate	34%	High (3.8)	74.2	High Implementation
Secondary B	Moderate	Moderate	Low	Limited	Moderate (2.6)	68.5	Moderate-Low Implementation
Secondary C	Good	Very Strong	Good	42%	Very High (4.2)	76.1	Highest Implementation
Secondary D	Good	Strong	Moderate	36%	High (3.6)	73.8	High Implementation
Secondary E	Moderate	Weak	Low	Limited	Low (1.8)	62.4	Low Implementation
Secondary F	Moderate	Moderate	Low	Limited	Moderate (2.4)	67.3	Moderate-Low Implementation

School Implementation Categories:

Category	Schools	Characteristics	Collaboration Frequency	Achievement
High Implementation	A, C, D	Good infrastructure, strong leadership, moderate-good resources	3.6–4.2	73.8–76.1
Moderate-Low Implementation	B, F	Moderate infrastructure, moderate leadership, low resources	2.4–2.6	67.3–68.5
Low Implementation	E	Moderate infrastructure, weak leadership, low resources	1.8	62.4

Distinguishing Factors:

Factor	High Implementation Schools	Low Implementation Schools
Infrastructure	All good (100%)	All moderate (100%)
Leadership	Strong/Very Strong (	

Key Patterns:

- High Implementation Schools (A, C, D) had good infrastructure, strong leadership, and moderate-to-good resources
- Low Implementation Schools (E) had moderate infrastructure, weak leadership, and low resources
- Mid-Range Schools (B, F) had mixed profiles with moderate resources and leadership

Achievement outcomes closely tracked implementation levels, suggesting that the barrier/facilitator profile significantly affects both implementation and outcomes.

5. Discussion

5.1 Barrier Hierarchy

Barriers are not equally important. The study reveals a clear hierarchy:

Tier 1 (Most Severe): Structural/Resource Barriers

- Inadequate funding (84.0% major)

- Insufficient planning time (64.0% major)
- Limited classroom space (62.0% major)
- Limited technology (69.0% major)

These barriers are largely beyond individual teacher control and require systemic solutions.

Tier 2 (Moderate): Organizational Barriers

- Heavy teaching loads (56.0% major)
- Scheduling conflicts (48.0% major)
- Lack of common preparation periods (52.0% major)
- Inadequate training (58.0% major)

These barriers can be addressed through school and district policies, though they require resource investment.

Tier 3 (Least Severe): Individual/Attitudinal Barriers

- Teacher resistance (34.0% major)
- Role clarity issues (52.0% major, but less severe than resource barriers)

The finding that attitudinal barriers are least severe contradicts assumptions in some implementation literature. Teachers are generally willing to collaborate; the problem is enabling them to do so.

5.2 Facilitators as Necessary but Insufficient Conditions

Interestingly, the presence of facilitating factors does not guarantee implementation. In schools with good facilitators but persistent barriers:

"We have positive attitudes and supportive leadership, but without planning time and resources, we cannot actually implement collaboration effectively." (Teacher, Secondary A)

This suggests that facilitators are necessary but insufficient without removing barriers. Leadership support and positive attitudes create willingness, but structural barriers prevent action.

5.3 The Moderating Role of School Leadership

School leadership emerged as a critical moderator. Strong leaders in resource-constrained schools found creative solutions:

- Restructuring schedules to create planning periods
- Using technology creatively to overcome scheduling constraints
- Providing professional development despite budget limitations
- Creating accountability systems that recognize collaboration

In contrast, weak leaders in better-resourced schools failed to leverage available resources:

"We have resources, but without leadership direction, teachers don't know how to access them or feel empowered to use them for collaboration." (Observation note, Secondary F)

This suggests that leadership is the critical lynch-pin connecting resources to implementation.

5.4 Context-Specific Barrier Severity

The Zambian context creates particular challenges:

Large Class Sizes: With 40–50+ learners per class, teachers carry heavy loads. Creating planning time requires hiring additional staff or reducing teaching loads, which is expensive in resource-constrained systems.

Limited Technology: Without internet or computer access, collaborative planning must occur in person, intensifying time constraints.

Weak Professional Development Systems: Teachers lack training in collaborative practices, and building capacity requires sustained investment.

These context-specific factors mean that solutions effective in developed nations may require adaptation.

5.5 The Implementation Barrier-Facilitator Paradox

A critical finding is the paradox: schools most in need of collaboration (those with low achievement and resource constraints) face the highest barriers to implementation.

Schools with good infrastructure, strong leadership, and adequate resources can more easily implement collaboration. Schools with limited resources, weak leadership, and low achievement struggle most to implement—yet these schools would benefit most from collaboration's effects on achievement.

This paradox has important policy implications: targeted support for low-performing schools is essential to break the cycle.

6. Implications

6.1 For Practice: Overcoming Barriers

Addressing Planning Time:

- Restructure Schedules: Create common planning periods by:
  - Hiring teaching assistants to provide coverage
  - Staggering schedules to create synchronized free periods
  - Using technology to enable remote planning

- Reduce Teaching Loads:
  - Provide release time for collaboration
  - Hire additional teachers if possible
  - Use peer teachers or advanced learners for some instruction
- Maximize Existing Time:
  - Use lunch periods or before/after school
  - Utilize technology for asynchronous planning

Addressing Resource Constraints:

- Secure Funding:
  - Advocate to district/national government
  - Seek donor/NGO funding
  - Reallocate existing school budgets to prioritize collaboration
- Leverage Available Resources:
  - Use simple technology (phones, messaging apps) for communication
  - Share existing materials creatively
  - Partner with other schools to pool resources
- Build Capacity Internally:
  - Develop professional learning communities for peer training
  - Use master teachers as trainers
  - Document and share successful practices

Addressing Training Gaps:

- Provide Professional Development:
  - Mandatory training for all teachers on collaborative teaching models
  - Coaching and mentoring for implementation
  - Regular professional learning communities
- Build Leadership Capacity:
  - Training for principals on supporting collaborative teaching
  - District-level support systems
  - Networks of schools implementing collaboration

6.2 For Policy: System-Level Solutions

Policy Recommendation 1: Mandate Planning Time National and district education policies should require:

- Minimum weekly planning time for collaborative teachers
- Flexibility in scheduling to accommodate collaboration
- Accountability for providing planning time

Policy Recommendation 2: Reform Teacher Evaluation Teacher evaluation systems should:

- Recognize and reward collaborative teaching
- Include collaboration in performance standards
- Train evaluators on assessing collaborative teaching

Policy Recommendation 3: Allocate Resources for Collaboration Budgets should include:

- Funding for professional development
- Funding for planning time/substitute teachers
- Technology and materials for collaborative teaching
- Support for low-performing schools

Policy Recommendation 4: Strengthen Leadership Development

- Training for principals on instructional leadership and collaboration
- District support systems for implementing schools
- Networks for peer learning among school leaders

6.3 For Research

Research Gap 1: Implementation Strategies Future research should examine specific strategies for overcoming barriers in resource-constrained contexts. Questions include:

- What scheduling models most effectively create planning time?
- How can technology enable collaboration despite connectivity constraints?
- What professional development approaches are most effective?

Research Gap 2: Barrier Interactions This study examined barriers separately. Research should examine how barriers interact:

- Does strong leadership reduce the impact of resource constraints?
- Can professional development compensate for lack of planning time?
- What is the threshold beyond which barriers cannot be overcome?

Research Gap 3: Implementation Fidelity Research should examine whether collaborative teaching is implemented with sufficient quality to produce benefits. Questions include:

- What characterizes high-quality vs. low-quality collaboration?
- Does collaboration without adequate planning time produce benefits?
- What minimum conditions are necessary for effectiveness?

7. Conclusion

This study reveals that collaborative teaching implementation is constrained by a clear hierarchy of barriers, with structural/resource barriers being most severe. While facilitating factors (leadership support, positive attitudes) are important, they are necessary but insufficient without addressing barriers. School leadership emerges as a critical moderator, capable of leveraging resources and creating enabling structures. The "barrier paradox"—that schools most needing collaboration face highest barriers—suggests that targeted support for low-performing schools is essential. Successful implementation in resource-constrained contexts requires systemic alignment across policy, leadership, resources, and professional development, with particular attention to creating planning time and securing funding. These findings provide evidence-based guidance for scaling collaborative teaching in sub-Saharan African contexts.

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Appendices available on request

Author declaration

We declare that this manuscript is my original work and has not been previously submitted for publication elsewhere.

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Conflict of interest

The authors declare no conflict of interest.