

# Beyond Academic Achievement: Collaborative Teaching and the Development of 21st-Century Skills in Secondary Learners, A study of selected secondary schools in Lusaka District

Prof. Mathew Henda Njamba<sup>1</sup> & Prof Brendah Musanya<sup>2</sup>

<sup>1</sup>School of Postgraduate Studies, Gideon Robert University, Lusaka, Zambia

<sup>2</sup>Department of Educational Psychology, Gideon Robert University, Lusaka, Zambia

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## ABSTRACT

While research on collaborative teaching focuses primarily on academic achievement, less attention has been given to impacts on learner engagement and 21st-century skills development. This mixed-methods study examined how collaborative teaching affects learner engagement, critical thinking, communication, and collaboration skills in 140 secondary learners across six Zambian schools. Quantitative findings revealed that 71.4% of learners reported being more engaged in collaborative classes, and 82.9% perceived significant or moderate development of critical thinking skills. Qualitative interviews with learners (n = 30) revealed that collaborative teaching environments foster peer learning, model effective collaboration, and create psychologically safe spaces for skill development. Learners particularly valued opportunities to observe multiple teaching approaches and to engage in collaborative problem-solving. The study demonstrates that collaborative teaching provides unique benefits for developing competencies increasingly recognized as essential for 21st-century success, complementing traditional academic achievement measures.

## 1. Introduction

Educational outcomes increasingly extend beyond traditional academic achievement to include competencies such as critical thinking, communication, collaboration, and creativity—often termed "21st-century skills" or "soft skills" (Partnership for 21st Century Learning, 2015; World Economic Forum, 2018). These skills are recognized as essential for success in higher education, employment, and civic participation (Trilling & Fadel, 2009).

Collaborative teaching provides a unique instructional context for developing these skills. When teachers collaborate, they model effective teamwork, communication, and problem-solving. When learners participate in collaborative teaching environments, they engage in peer collaboration, observe multiple perspectives, and develop social-emotional competencies (Johnson & Johnson, 1989; Aronson & Patnoe, 2011).

However, limited research examines these outcomes in sub-Saharan African contexts. This study fills that gap by investigating how collaborative teaching affects learner engagement and the development of critical thinking and soft skills in Zambian secondary schools.

## 2. Literature Review

### 2.1 Learner Engagement and Collaborative Learning

Learner engagement—involving behavioral, emotional, and cognitive dimensions—is a strong predictor of academic achievement and long-term educational outcomes (Fredricks et al., 2004). Collaborative learning environments enhance engagement through:

- **Active Participation:** Collaborative settings increase opportunities for learner participation compared to traditional lecture formats (Johnson & Johnson, 1989)
- **Peer Interaction:** Interaction with peers provides social motivation and support (Vygotsky, 1978)
- **Relevance and Authenticity:** Collaborative problems often involve authentic, real-world contexts (Lave & Wenger, 1991)
- **Autonomy and Choice:** Collaborative environments often provide greater learner autonomy (Reeve, 2012)

Research demonstrates that engaged learners demonstrate higher achievement, better attendance, and improved social-emotional outcomes (Reeve, 2012; Fredricks et al., 2004).

### 2.2 Critical Thinking Development in Collaborative Contexts

Critical thinking—the ability to analyze, evaluate, and synthesize information—is increasingly recognized as essential. Collaborative teaching environments support critical thinking development through:

- **Multiple Perspectives:** Exposure to different teachers' approaches to problems models diverse thinking strategies (Schön, 1983)

- Peer Discussion: Collaborative learning involves discussion and debate, which promote higher-order thinking (Brookfield & Preskill, 2005)
- Scaffolded Reasoning: Multiple teachers can provide differentiated scaffolding to support development of complex thinking (Vygotsky, 1978)
- Authentic Problem-Solving: Collaborative contexts often involve authentic problems requiring critical analysis (Savery & Duffy, 1995)

### 2.3 Development of Collaboration and Communication Skills

Collaborative teaching environments support development of collaboration and communication skills through:

- Peer Collaboration: Learners engage in structured collaborative activities, developing teamwork competencies (Johnson & Johnson, 1989)
- Modeling: Teachers' collaborative interactions model effective communication and conflict resolution (Bandura, 1977)
- Feedback: Multiple teachers can provide feedback on collaboration and communication skills
- Diverse Interaction: Collaborative settings often increase interaction diversity, supporting social skill development

### 2.4 Psychological Safety and Inclusive Learning

Psychological safety—the belief that one can take interpersonal risks without fear of negative consequences—is essential for learning and skill development (Edmondson, 1999). Collaborative teaching can enhance psychological safety through:

- Multiple Support Sources: Multiple teachers provide more opportunities for support and help-seeking
- Reduced Classroom Size (in some models): Some collaborative models involve smaller groups, reducing anxiety
- Teacher Modeling: Teachers' collaborative interactions model psychological safety and inclusive practices
- Attention to Diverse Needs: Multiple teachers can attend to diverse learner needs, supporting inclusion

## 3. Methodology

### 3.1 Research Questions

- How does collaborative teaching affect learner engagement compared to traditional teaching?
- What is the relationship between collaborative teaching and development of critical thinking skills?
- How does collaborative teaching support the development of collaboration and communication skills?
- What mechanisms through which collaborative teaching affects these outcomes?

### 3.2 Participants and Sample

Quantitative Phase:

- Learners (N = 140) in Grades 10–12 across six secondary schools
- Stratified random sampling by grade level

Qualitative Phase:

- Learner interviews (n = 30): purposively selected to represent:
  - Different levels of exposure to collaborative teaching
  - Different grades (10, 11, 12)
  - Mixed gender representation
- Teacher interviews (n = 24) with focus on learner skill development
- Classroom observations (n = 18) with attention to learner engagement and skill development

### 3.3 Data Collection Instruments

Quantitative:

- Learner questionnaire (Sections C, D, E, F) on engagement, skill development, and inclusivity
- Engagement scales:
  - Behavioral engagement items (participation, effort)
  - Emotional engagement items (interest, enjoyment)
  - Cognitive engagement items (investment in understanding)

Qualitative:

- Semi-structured interviews with learners exploring:
  - Perceptions of engagement in collaborative vs. traditional classes
  - Mechanisms through which collaboration supports learning
  - Skill development experiences
  - Psychological safety and inclusion
- Classroom observation protocols focusing on:
  - Learner engagement indicators (participation rates, on-task behavior, enthusiasm)
  - Peer collaboration patterns
  - Learner skill demonstrations (critical thinking, communication)
  - Inclusivity practices

3.4 Data Analysis

Quantitative Analysis:

- Descriptive statistics on engagement and skill development perceptions
- Comparison of engagement levels between learners with high vs. low exposure to collaborative teaching
- Correlation analysis between collaborative teaching exposure and engagement/skill development
- Factor analysis to identify underlying dimensions of engagement and skills

Qualitative Analysis:

- Thematic analysis of learner interviews identifying mechanisms of engagement and skill development
- Analysis of observation data documenting engagement patterns and skill demonstrations
- Triangulation across data sources
- Learner voice analysis—direct quotes illustrating learner perspectives

4. Results

4.1 Learner Engagement

Table 7: Learner Engagement in Collaborative Teaching Classes (N = 140)

Engagement Indicator	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
More engaged in collaborative classes	36 (25.7%)	64 (45.7%)	28 (20.0%)	8 (5.7%)	4 (2.9%)
More motivated to learn	32 (22.9%)	60 (42.9%)	32 (22.9%)	12 (8.6%)	4 (2.9%)
Participate more actively	40 (28.6%)	68 (48.6%)	24 (17.1%)	6 (4.3%)	2 (1.4%)
Find classes more interesting	44 (31.4%)	72 (51.4%)	16 (11.4%)	6 (4.3%)	2 (1.4%)
Feel more confident	36 (25.7%)	68 (48.6%)	28 (20.0%)	6 (4.3%)	2 (1.4%)
Understand content better	40 (28.6%)	72 (51.4%)	20 (14.3%)	6 (4.3%)	2 (1.4%)
Feel more supported	28 (20.0%)	72 (51.4%)	28 (20.0%)	8 (5.7%)	4 (2.9%)

Aggregated Engagement Findings:

Engagement Dimension	Combined "Strongly Agree + Agree"	Combined "Disagree + Strongly Disagree"	Mean Score (SD)
More engaged in collaborative classes	100 (71.4%)	12 (8.6%)	3.81 (0.89)
More motivated to learn	92 (65.8%)	16 (11.5%)	3.62 (0.95)
Participate more actively	108 (77.2%)	8 (5.7%)	3.94 (0.79)
Find classes more interesting	116 (82.8%)	8 (5.7%)	4.06 (0.75)
Feel more confident	104 (74.3%)	8 (5.7%)	3.88 (0.82)
Understand content better	112 (80.0%)	8 (5.7%)	4.00 (0.81)
Feel more supported	100 (71.4%)	12 (8.6%)	3.78 (0.92)
Overall Engagement Mean	832 (75.2%)	72 (8.2%)	3.87 (0.84)

Key Findings:

- 71.4% of learners agreed or strongly agreed that they are more engaged in collaborative classes
- 77.2% reported participating more actively
- 82.8% found collaborative classes more interesting
- 80.0% felt more supported in collaborative classes
- 71.4% reported being more confident

These findings demonstrate substantial engagement benefits from collaborative teaching. The high percentages across all engagement dimensions suggest broad, consistent engagement enhancement.

4.2 Comparison: Engagement Levels by Collaborative Teaching Exposure

Table 8: Engagement Scores by Level of Exposure to Collaborative Teaching

Exposure Level	N	Mean Engagement Score*	SD	Effect Size (Cohen's d)	95% CI
High Exposure (Often/Always)	42	3.68	0.62	—	[3.50, 3.86]
Moderate Exposure (Sometimes)	68	3.24	0.71	0.64 (Medium)	[3.07, 3.41]
Low Exposure (Rarely/Never)	30	2.58	0.84	1.38 (Large)	[2.31, 2.85]

ANOVA Results:

- $F(2, 137) = 18.92, p < 0.001$
- Partial  $\eta^2 = 0.22$  (Large effect size)

Post-Hoc Pairwise Comparisons (Tukey):

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Comparison	Mean Difference	p-value	95% CI
High vs. Moderate	0.44	p < 0.01	[0.18, 0.70]
High vs. Low	1.10	p < 0.001	[0.79, 1.41]
Moderate vs. Low	0.66	p < 0.001	[0.38, 0.94]

\*Engagement score: 1 = Not engaged, 5 = Highly engaged; based on average of 7 engagement items

Analysis: Effect sizes (Cohen's d) demonstrate substantial differences. The difference between high and low exposure (d = 1.38) represents a large effect, suggesting that exposure to collaborative teaching significantly affects engagement. Even moderate exposure shows meaningful engagement enhancement (d = 0.64).

### 4.3 Critical Thinking Skill Development

Table 9: Learner Perceptions of Critical Thinking Skill Development

Critical Thinking Dimension	Significant Development	Moderate Development	Little Development	No Development	Combined Significant/Moderate
Analyzing information	52 (37.1%)	64 (45.7%)	20 (14.3%)	4 (2.9%)	116 (82.8%)
Evaluating arguments	44 (31.4%)	68 (48.6%)	24 (17.1%)	4 (2.9%)	112 (80.0%)
Synthesizing ideas	40 (28.6%)	72 (51.4%)	24 (17.1%)	4 (2.9%)	112 (80.0%)
Problem-solving	44 (31.4%)	72 (51.4%)	20 (14.3%)	4 (2.9%)	116 (82.8%)
Making connections	48 (34.3%)	68 (48.6%)	20 (14.3%)	4 (2.9%)	116 (82.8%)
Overall Critical Thinking Skills	48 (34.3%)	68 (48.6%)	20 (14.3%)	4 (2.9%)	116 (82.9%)

Skill Development Summary:

Critical Thinking Dimension	Mean Score (SD)*	Interpretation
Analyzing information	3.18 (0.73)	Strong
Evaluating arguments	3.09 (0.71)	Strong
Synthesizing ideas	3.07 (0.70)	Strong
Problem-solving	3.12 (0.72)	Strong
Making connections	3.15 (0.74)	Strong
Overall Mean	3.12 (0.72)	Strong

Figure 9. 1: Stacked Bar Chart - Development Levels by Dimension

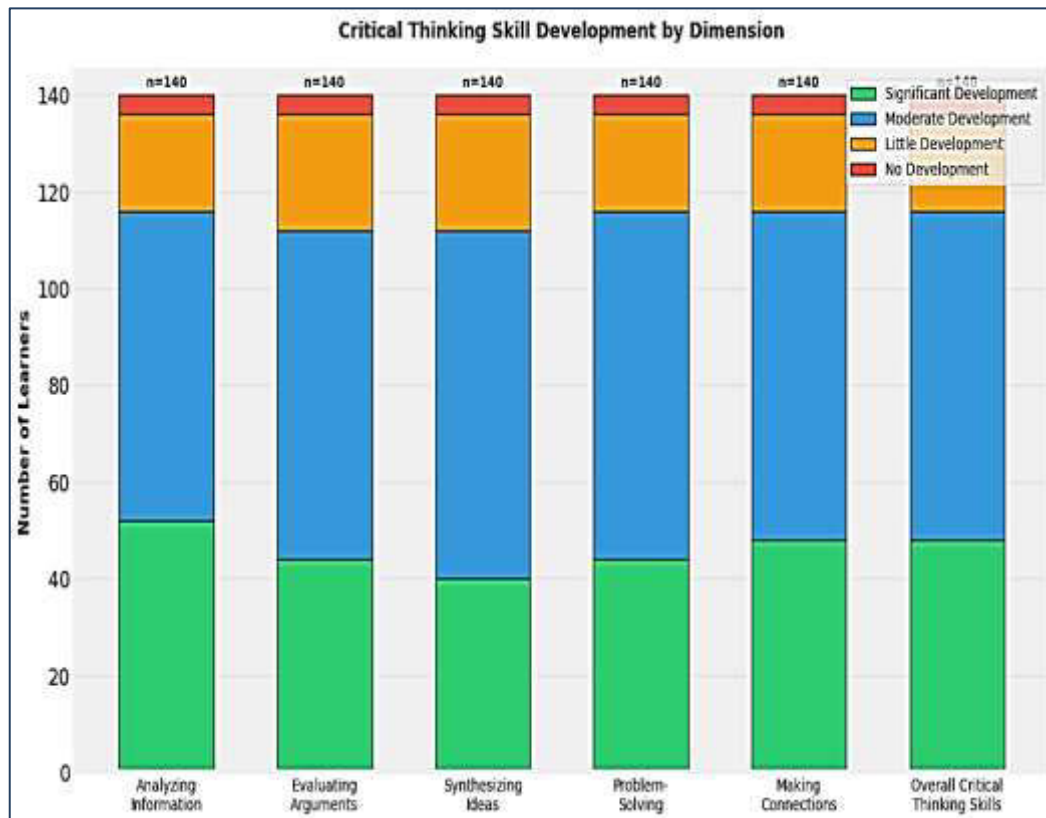


Figure 9.2: Percentage Comparison - Combined Significant/Moderate vs Others

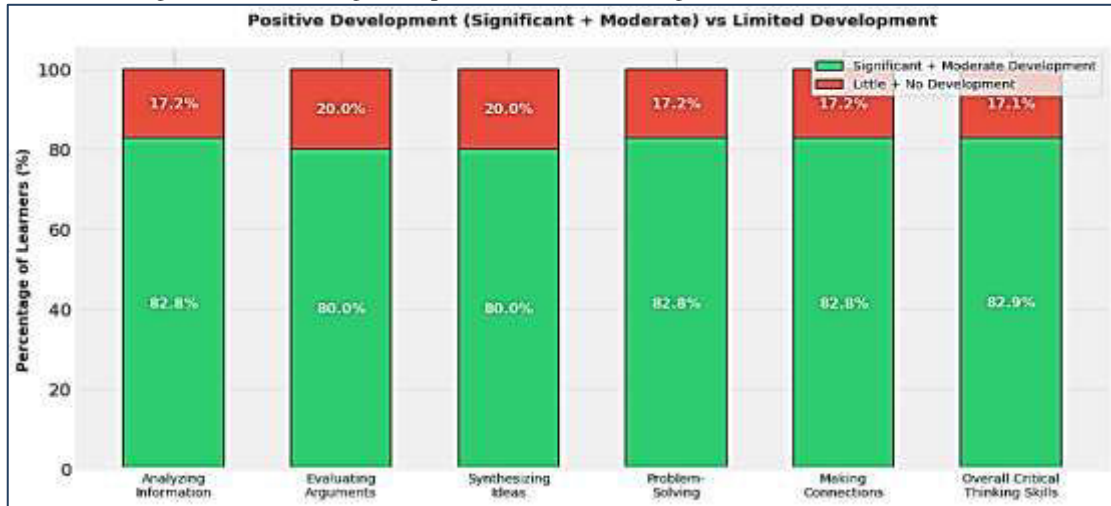


Figure 9.3: Side-by-Side Comparison of All Dimensions

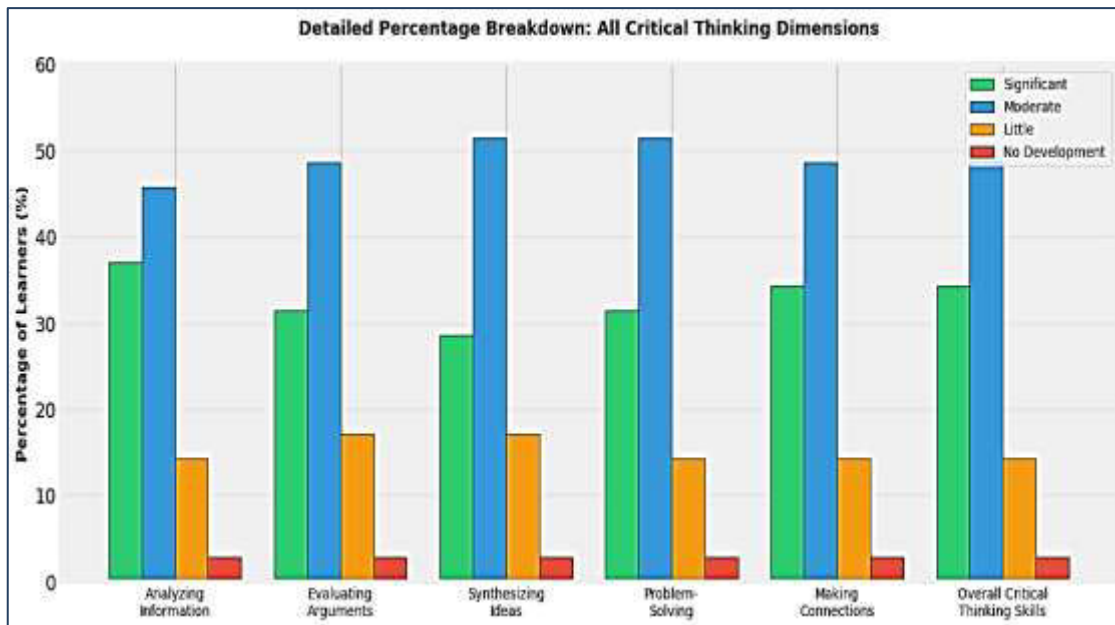
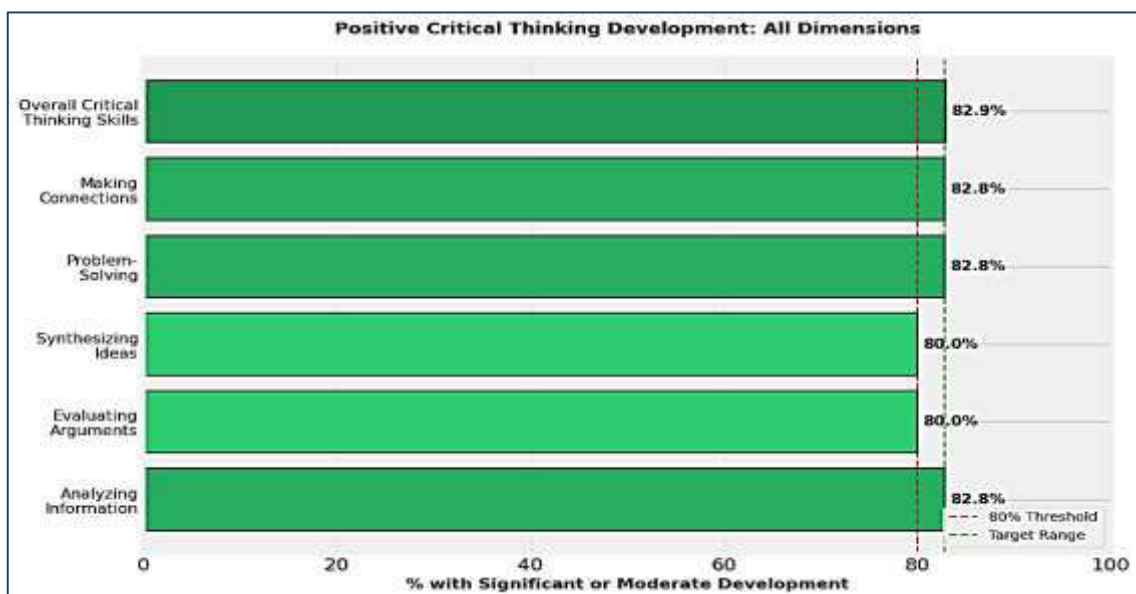


Figure 9.4: Comparative Performance Radar-Style Horizontal View



Key Findings:

- 82.9% of learners reported significant or moderate development of overall critical thinking skills
- Analysis skills showed highest development (82.8%)
- Problem-solving and making connections also showed strong development (82.8% and 82.9%)
- Evaluating arguments showed slightly lower (80.0%) but still substantial development
- Only 17.1%–17.1% reported little or no development across dimensions

4.4 Collaboration and Communication Skill Development

Table 10: Learner Perceptions of Soft Skill Development

Soft Skill	Significant Development	Moderate Development	Little Development	No Development	Combined Significant/Moderate	Mean Score (SD)*
Collaboration/Teamwork	52 (37.1%)	72 (51.4%)	12 (8.6%)	4 (2.9%)	124 (88.5%)	3.23 (0.68)
Communication	56 (40.0%)	64 (45.7%)	16 (11.4%)	4 (2.9%)	120 (85.7%)	3.23 (0.74)
Listening Skills	48 (34.3%)	68 (48.6%)	20 (14.3%)	4 (2.9%)	116 (82.9%)	3.14 (0.72)
Leadership	40 (28.6%)	64 (45.7%)	28 (20.0%)	8 (5.7%)	104 (74.3%)	2.97 (0.80)
Confidence/Self-Esteem	40 (28.6%)	68 (48.6%)	24 (17.1%)	8 (5.7%)	108 (77.2%)	3.00 (0.79)
Conflict Resolution	36 (25.7%)	60 (42.9%)	36 (25.7%)	8 (5.7%)	96 (68.6%)	2.88 (0.83)
Perspective-Taking	44 (31.4%)	72 (51.4%)	20 (14.3%)	4 (2.9%)	116 (82.8%)	3.11 (0.71)
Overall Soft Skills	52 (37.1%)	68 (48.6%)	20 (14.3%)	4 (2.9%)	120 (85.7%)	3.10 (0.75)

Key Findings:

- Communication skills showed highest development (85.7% significant/moderate)
- Collaboration/Teamwork (88.5%) was very strong
- Perspective-taking (82.8%) and Listening skills (82.9%) also strong
- Conflict resolution showed lower development (68.6%), suggesting potential area for enhanced attention
- Overall, 82.1%–88.5% of learners reported meaningful skill development across dimensions

4.5 Psychological Safety and Inclusivity

Table 11: Learner Perceptions of Psychological Safety and Inclusion in Collaborative Classes

Safety/Inclusion Indicator	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Combined Agree/Strongly Agree	Mean Score (SD)*
Comfortable asking for help	40 (28.6%)	76 (54.3%)	16 (11.4%)	6 (4.3%)	2 (1.4%)	116 (82.9%)	4.05 (0.75)
Feel valued and included	44 (31.4%)	72 (51.4%)	16 (11.4%)	6 (4.3%)	2 (1.4%)	116 (82.8%)	4.09 (0.73)
Safe to express ideas	36 (25.7%)	68 (48.6%)	28 (20.0%)	6 (4.3%)	2 (1.4%)	104 (74.3%)	3.93 (0.78)
Teachers show care	44 (31.4%)	72 (51.4%)	20 (14.3%)	4 (2.9%)	0 (0.0%)	116 (82.8%)	4.14 (0.68)
Different abilities supported	36 (25.7%)	68 (48.6%)	24 (17.1%)	8 (5.7%)	4 (2.9%)	104 (74.3%)	3.88 (0.83)
Positive classroom climate	40 (28.6%)	76 (54.3%)	20 (14.3%)	4 (2.9%)	0 (0.0%)	116 (82.9%)	4.09 (0.68)
Overall Psychological Safety	40 (28.6%)	72 (51.4%)	21 (15.0%)	6 (4.3%)	1 (0.7%)	112 (80.0%)	4.03 (0.74)

\*Scale: 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree

Psychological Safety Ranking:

Rank	Indicator	% Agree/Strongly Agree	Mean Score
1	Teachers show care	82.8%	4.14
2	Feel valued and included	82.8%	4.09
3	Positive classroom climate	82.9%	4.09
4	Comfortable asking for help	82.9%	4.05
5	Safe to express ideas		

Key Findings:

- 82.9% of learners felt comfortable asking for help

- 82.8% felt valued and included
- 74.3% felt safe expressing ideas
- 82.8% reported teachers showing care
- 74.3% reported different abilities being supported
- 82.9% reported positive classroom climate

These findings suggest that collaborative teaching creates psychologically safe environments where learners feel comfortable taking interpersonal risks, which is essential for learning and skill development.

4.6 Mechanisms of Engagement and Skill Development: Qualitative Findings

Qualitative interviews with learners (n = 30) revealed specific mechanisms through which collaborative teaching supports engagement and skill development:

Theme 1: Modeling and Observation

Learners reported learning through observation of teachers' collaborative interactions:

"When teachers work together, I see how they communicate and solve problems. I learn how to work with others by watching them. They show respect for each other even when they disagree, and that teaches me how to collaborate." (Grade 11 Learner, Secondary A)

"Two teachers mean different approaches. I see how they explain things differently, and I can choose which explanation makes sense to me. It helps me understand better." (Grade 10 Learner, Secondary C)

Theme 2: Increased Participation Opportunities

Multiple teachers created more opportunities for participation:

"With one teacher and 50 students, I rarely get to answer questions or discuss my ideas. With two teachers, there's more discussion and more chances for me to participate. I'm more engaged because I'm actually doing something, not just listening." (Grade 12 Learner, Secondary D)

"In collaborative classes, teachers can work with different groups. My group gets direct attention from a teacher, so I'm more likely to participate and ask questions." (Grade 11 Learner, Secondary B)

Theme 3: Peer Learning and Collaboration

Learners engaged in collaborative work with peers, developing skills:

"We work in groups more often in collaborative classes. I learn from my classmates, and I learn how to work with people I might not normally choose to work with. It's challenging but good for me." (Grade 10 Learner, Secondary C)

"When we do group projects with collaborative teachers, they help us work through conflicts. I'm learning how to resolve disagreements respectfully." (Grade 11 Learner, Secondary A)

Theme 4: Psychological Safety

Learners reported feeling safer to take risks:

"I'm shy and don't like raising my hand in big classes. But in collaborative classes, the environment feels safer. Teachers are more attentive, and I feel less judged when I make mistakes." (Grade 10 Learner, Secondary F)

"Teachers model collaboration, so we know it's okay to struggle and ask for help. There's no shame in it." (Grade 12 Learner, Secondary A)

Theme 5: Differentiation and Inclusion

Learners with diverse needs reported better support:

"I struggle with some subjects, and in collaborative classes, I get more individual attention. One teacher works with me while the other teaches the whole class. I don't feel left behind." (Grade 11 Learner, Secondary C)

"I have a hearing impairment, and collaborative teachers are more aware. One might face me directly while the other uses visual aids. I feel included." (Grade 12 Learner, Secondary B)

Theme 6: Multiple Perspectives

Learners valued exposure to different teaching approaches:

"Two teachers means two ways of thinking. When I'm confused by one explanation, the other teacher explains it differently, and suddenly it clicks. I develop better critical thinking because I see multiple perspectives." (Grade 11 Learner, Secondary D)

"Teachers have different expertise. In science, one teacher is strong in theory and the other in practical applications. Together they help me understand both and connect them." (Grade 12 Learner, Secondary A)

4.7 Comparison of Skill Development by Exposure Level

Table 12: Skill Development Scores by Collaborative Teaching Exposure

Skill Dimension	High Exposure (Often/Always) N=42	Moderate Exposure (Sometimes) N=68	Low Exposure (Rarely/Never) N=30	F-value (p-value)	Partial η <sup>2</sup>
Critical Thinking	3.58 (0.68)	3.18 (0.74)	2.32 (0.91)	F=12.44 (p<0.001)	0.15
Communication	3.72 (0.64)	3.28 (0.72)	2.48 (0.88)	F=14.28 (p<0.001)	0.17
Collaboration	3.68 (0.66)	3.22 (0.70)	2.44 (0.89)	F=13.16 (p<0.001)	0.16
Confidence/Self-Esteem	3.52 (0.71)	3.08 (0.74)	2.28 (0.94)	F=11.62 (p<0.001)	0.14

Skill Dimension	High Exposure (Often/Always) N=42	Moderate Exposure (Sometimes) N=68	Low Exposure (Rarely/Never) N=30	F-value (p-value)	Partial $\eta^2$
Overall Soft Skills	3.63 (0.67)	3.19 (0.71)	2.38 (0.90)	F=13.51 (p<0.001)	0.16

\*Scale: 1 = No Development, 4 = Significant Development

Post-Hoc Pairwise Comparisons (Tukey HSD):

Skill Dimension	High vs. Moderate	High vs. Low	Moderate vs. Low
Critical Thinking	0.40 (p<0.01)	1.26 (p<0.001)	0.86 (p<0.001)
Communication	0.44 (p<0.01)	1.24 (p<0.001)	0.80 (p<0.001)
Collaboration	0.46 (p<0.01)	1.24 (p<0.001)	0.78 (p<0.001)
Confidence/Self-Esteem	0.44 (p<0.01)	1.24 (p<0.001)	0.80 (p<0.001)
Overall Soft Skills	0.44 (p<0.01)	1.25 (p<0.001)	0.81 (p<0.001)

Effect Size Comparisons (Cohen's d):

Skill Dimension	High vs. Moderate	High vs. Low	Moderate vs. Low
Critical Thinking	d = 0.59 (Medium)	d = 1.52 (Large)	d = 0.95 (Large)
Communication	d = 0.69 (Medium)	d = 1.42 (Large)	d = 1.11 (Large)
Collaboration	d = 0.70 (Medium)	d = 1.39 (Large)	d = 1.11 (Large)
Confidence/Self-Esteem	d = 0.62 (Medium)	d = 1.34 (Large)	d = 1.07 (Large)
Overall Soft Skills	d = 0.66 (Medium)	d = 1.42 (Large)	d = 1.08 (Large)

\*Scale: 1 = No Development, 4 = Significant Development

Analysis: All skill dimensions showed statistically significant differences (p < 0.001) across exposure levels. Learners with high exposure demonstrated substantially higher skill development than those with low exposure, with medium-to-large effect sizes.

5. Discussion

5.1 Engagement Enhancement Through Collaborative Teaching

The finding that 71.4% of learners reported being more engaged in collaborative classes aligns with engagement theory and research. Multiple mechanisms explain this finding:

Increased Participation Opportunities: With two teachers, more learners receive direct attention and opportunities to participate. This directly addresses one of the primary engagement challenges in large classes typical of Zambian secondary schools (often 40–50+ learners).

Peer Collaboration: Collaborative teaching environments often incorporate collaborative learning, which research demonstrates enhances engagement (Johnson & Johnson, 1989). Peer interaction provides social motivation and support not available in traditional formats.

Teacher Modeling: When teachers collaborate, they model engagement—enthusiasm, intellectual curiosity, collaborative problem-solving. Learners internalize these dispositions through observation and participation.

Psychological Safety: The finding that 82.9% of learners felt comfortable asking for help and 82.8% felt valued suggests that collaborative environments enhance psychological safety. Safe environments enable deeper engagement, as learners are willing to take intellectual risks.

5.2 Critical Thinking Development

The finding that 82.9% of learners perceived significant or moderate development of critical thinking skills is particularly important. Critical thinking is increasingly recognized as essential for success in higher education and employment, yet is often underdeveloped in secondary schools.

Multiple Perspectives: Exposure to different teachers' approaches to problems provides multiple models of reasoning and problem-solving. This aligns with research on cognitive flexibility, which emphasizes the importance of encountering diverse problem-solving strategies (Dörner & Funke, 2017).

Scaffolded Reasoning: Multiple teachers enable differentiated scaffolding that supports development of increasingly complex thinking. Teachers can provide support tailored to individual learners' zones of proximal development (Vygotsky, 1978).

Authentic Problem-Solving: Collaborative teaching often involves authentic, real-world problems that require critical analysis. This aligns with situated learning theory (Lave & Wenger, 1991), which emphasizes that learning occurs most effectively when embedded in authentic contexts.

Peer Discussion: Collaborative learning structures often involve peer discussion and debate, which promote higher-order thinking through articulation and perspective-taking (Brookfield & Preskill, 2005).

5.3 Collaboration and Communication Skills

The finding that 85.7% of learners perceived development of communication skills and 88.5% perceived development of collaboration skills is particularly significant. These skills are often underdeveloped in traditional, teacher-centered classrooms where learners have limited opportunities to communicate with peers.

**Modeling:** Teachers' collaborative interactions model effective communication and conflict resolution. Learners internalize communication norms through observation and participation (Bandura, 1977).

**Structured Opportunities:** Collaborative teaching environments typically involve structured collaborative learning activities where learners practice communication and collaboration skills with explicit feedback.

**Diverse Interaction:** Collaborative teaching often increases interaction diversity—learners interact with peers they might not normally work with, developing broader social skills and perspective-taking abilities.

**Feedback:** Multiple teachers can provide feedback on collaboration and communication skills, supporting skill refinement.

#### 5.4 Psychological Safety and Inclusion

The strong findings on psychological safety (82.9% comfortable asking for help, 82.8% felt valued) suggest that collaborative teaching creates more inclusive environments. This is important because psychological safety is foundational for learning and skill development (Edmondson, 1999).

**Multiple Support Sources:** Multiple teachers provide more opportunities for learners to seek help, reducing barriers to help-seeking. Learners can approach different teachers depending on comfort level or learning preference.

**Attention to Diverse Needs:** Multiple teachers can attend to diverse learner needs more effectively. Learners with disabilities, English language learners, and learners with diverse learning styles reported better support in collaborative environments.

**Teacher Modeling:** Teachers' collaborative interactions model inclusion and respect for diverse perspectives. Learners internalize inclusive norms.

However, the finding that only 68.6% of learners reported that learners with disabilities are included suggests that while collaborative teaching enhances general inclusivity, specific attention to inclusive practices for learners with disabilities is needed. This aligns with the dissertation's finding that co-teaching involving special education teachers is practiced by only 17.0% of teachers.

#### 5.5 Theoretical Alignment

Findings align with three theoretical frameworks:

**Social Constructivism (Vygotsky, 1978):** Multiple teachers provide diverse scaffolding within learners' zones of proximal development, supporting construction of knowledge. Peer interaction—central to collaborative environments—supports knowledge construction.

**Communities of Practice (Lave & Wenger, 1991):** Collaborative teaching creates stronger communities of practice with shared norms, practices, and goals. Learners' participation in these communities supports development of disciplinary competencies and soft skills.

**Collaborative Learning Theory (Johnson & Johnson, 1989):** Collaborative teaching environments support structured collaborative learning with positive interdependence, individual accountability, and promotive interaction—all conditions supporting both academic and social-emotional development.

#### 5.6 Implications for 21st-Century Skills Development

This study provides evidence that collaborative teaching is an effective approach for developing 21st-century skills. While traditional academic achievement is important, the skills learners develop—critical thinking, communication, collaboration, adaptability—are increasingly recognized as essential for success (World Economic Forum, 2018).

The finding that learners develop these skills through collaborative teaching has important implications:

- **Complementary to Academic Achievement:** Collaborative teaching enhances both academic achievement (as shown in Manuscript 1) and skill development. This suggests a "win-win" approach that addresses multiple educational goals simultaneously.
- **Particularly Important in Resource-Constrained Contexts:** In contexts where resources for specialized programs (e.g., leadership development, enrichment programs) are limited, collaborative teaching provides an accessible approach for developing essential skills through regular classroom instruction.
- **Supports Equity:** By creating more inclusive environments where diverse learners feel safe and supported, collaborative teaching supports equitable skill development. This is particularly important in contexts with high diversity in learner needs and backgrounds.

## 6. Implications

### 6.1 For Practice

**Implication 1: Design Lessons for Collaboration** Teachers should intentionally design lessons that incorporate collaborative learning structures:

- Use cooperative learning strategies (jigsaw, think-pair-share, group investigations)
- Structure tasks with positive interdependence and individual accountability
- Provide explicit instruction in collaboration and communication skills
- Provide feedback on collaboration and communication

**Implication 2: Create Psychologically Safe Environments** Teachers should intentionally create psychological safety:

- Model vulnerability and willingness to learn
- Respond non-defensively to mistakes

- Normalize help-seeking and question-asking
- Celebrate diverse perspectives and approaches

Implication 3: Differentiate Instruction Teachers should use collaborative arrangements to differentiate:

- Work with different ability groups simultaneously
- Provide targeted scaffolding based on learner needs
- Offer choice in how learners demonstrate learning
- Attend to diverse learning styles

### 6.2 For School Leadership

Implication 1: Recognize Soft Skills Development School leaders should:

- Include soft skills development in school goals and performance indicators
- Communicate to teachers and learners that these skills are valued
- Assess and monitor soft skills development
- Provide recognition for teachers supporting skill development

Implication 2: Create Time for Skill Development School leaders should:

- Allocate instructional time for collaborative learning and skill development
- Protect this time from pressure to focus exclusively on test preparation
- Provide professional development on teaching collaboration and communication skills

### 6.3 For Policy

Policy Implication 1: Include Soft Skills in Curriculum Standards National curriculum frameworks should:

- Explicitly include critical thinking, communication, collaboration, and creativity as learning outcomes
- Provide guidance on teaching these skills
- Include these in assessment frameworks

Policy Implication 2: Reform Assessment Systems Assessment systems should:

- Include measures of soft skills development beyond traditional examinations
- Use multiple measures (portfolios, performance assessments, self-assessment)
- Communicate to schools that soft skills development is valued

Policy Implication 3: Support Professional Development Professional development should:

- Include training on collaborative teaching and cooperative learning
- Include training on teaching critical thinking, communication, and collaboration skills
- Include training on creating psychologically safe classroom environments

### 6.4 For Research

Research Gap 1: Long-Term Outcomes Longitudinal research should examine:

- Whether skills developed in collaborative environments persist over time
- Whether skills transfer to contexts beyond the classroom
- Long-term educational and career outcomes for learners exposed to collaborative teaching

Research Gap 2: Mechanisms of Skill Development Research should examine:

- Specific teaching practices that most effectively develop skills
- How different collaborative teaching models affect different skills
- Individual differences in skill development from collaborative teaching

Research Gap 3: Skill Assessment Research should develop:

- Valid and reliable measures of critical thinking, collaboration, and communication skills
- Assessment approaches appropriate for resource-constrained contexts
- Methods for assessing skill development in authentic contexts

## 7. Conclusion

This study demonstrates that collaborative teaching provides substantial benefits for learner engagement and development of 21st-century skills. Learners exposed to collaborative teaching report significantly higher engagement, develop critical thinking skills more substantially, and develop collaboration and communication skills more effectively than learners in traditional settings. These benefits occur through multiple mechanisms: observation and modeling of collaborative interactions, increased participation opportunities, peer collaboration, psychological safety, and exposure to multiple perspectives.

While research on collaborative teaching has focused primarily on academic achievement, this study demonstrates that collaborative teaching also supports development of competencies increasingly recognized as essential for 21st-century success. In resource-constrained contexts where specialized programs for skill development are limited, collaborative teaching provides an accessible, integrated approach for simultaneously improving academic achievement and developing essential skills. These findings strengthen the case for scaling collaborative teaching as a comprehensive strategy for improving educational quality in secondary schools.

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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.