Advancing Caribbean Teachers (ACT) in Mathematics Education: A Case of Three Eastern Caribbean Countries – St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia

The Commonwealth of Learning (COL) is an intergovernmental organisation created by Commonwealth Heads of Government to promote the development and sharing of open learning and distance education knowledge, resources, and technologies.

This report was prepared by Dr Schontal Moore, Adviser: VUSSC, Commonwealth of Learning, Dr Lois George, Senior Lecturer, School of Education, The University of the West Indies, and Deidrea Dwyer, Lecturer, The University of the West Indies, Mona, Jamaica.

Acknowledgement
We thank Carol Boddie, Ministry of Education, St. Kitts & Nevis; Nichole Franklyn-Ross, Ministry of Education and National Reconciliation, Saint Vincent and the Grenadines; Jonella Giffard, Ministry of Education, Sustainable Development, Innovation, Science, Technology, Technical and Vocational Training, Saint Lucia for their contributions as in-country project coordinators. Thanks also to Dr Tony Mays, Director: Education, Commonwealth of Learning and Carol Walker, Programme Assistant, for their input towards the finalisation of this report.

Published by:
Commonwealth of Learning
505 Burrard Street, Suite 1650, Box 5
Vancouver, BC V7X 1M6, Canada
Telephone: +1 604 775 8200
Fax: +1 604 775 8210
Web: www.col.org
Email: info@col.org

Advancing Caribbean Teachers (ACT) in Mathematics Education: A Case of Three Eastern Caribbean Countries – St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia

2025

Contents

List of Figures

List of Tables

Abbreviations

ACT	Advancing Caribbean Teachers
CEE	Common Entrance Examination
COL	Commonwealth of Learning
CoP	Community of Practice
CPA	Concrete-Pictorial-Abstract
CSEC	Caribbean Secondary Examination Certificate
ICT	Information and Communication Technology
ODL	Online and Distance Learning
OECD	Organisation for Economic Co-operation and Development
OECS	Organisation of Eastern Caribbean States
OER	Open Educational Resources
PCK	Pedagogical Content Knowledge
PD	Professional Development
PISA	Program for International Student Assessment
RBM	Results-Based Management [Framework]
SDG	Sustainable Development Goals
STEM	Science, Technology, Engineering, and Mathematics
TEL	Technology-Enabled Learning
TIMSS	Trends in International Mathematics and Science Study
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations International Children's Emergency Fund
VUSSC	Virtual University for Small States of the Commonwealth

Executive Summary

This report synthesises key findings and strategic insights from the ACT in Mathematics intervention conducted in St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia, facilitated by the Commonwealth of Learning (COL) and the Ministries of Education in the respective countries. The project aimed to enhance mathematics teaching and learning in primary and lower secondary schools by equipping educators with stronger content knowledge, effective pedagogical strategies and tools for inclusive and gender-responsive instruction. The project was designed to address persistent challenges in mathematics education across the region using a case study methodology, which began with a desktop review across the target countries.

Key challenges identified in all three countries include low student performance in both primary and secondary mathematics, particularly in foundational areas such as number sense and problem-solving. System-level issues — such as limited professional development opportunities, weak alignment between curriculum and assessments and underutilization of gender-sensitive strategies — were consistently noted. Stakeholders, including principals, teacher educators and Ministry of Education officials, highlighted a need for systemic support and structured instructional leadership.

To address the gaps identified in mathematics instruction, three, two-day face-to-face workshops were implemented in each country to be followed by ongoing professional learning (three synchronous virtual sessions, and a vibrant Community of Practice [CoP]).

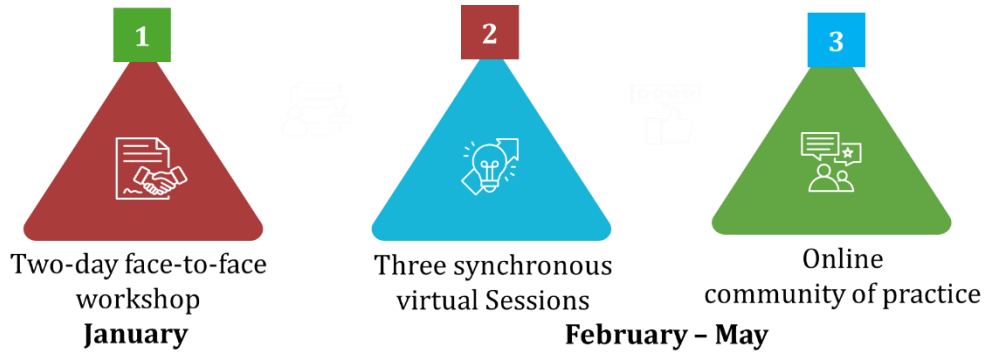

Figure 1. ACT in Mathematics Project Model.

The workshops yielded a range of positive outcomes. Teachers reported improved confidence and clarity in delivering mathematics content, greater appreciation for visual and hands-on learning approaches and increased awareness of differentiated and inclusive teaching methods. The use of the Concrete-Pictorial-Abstract (CPA) model and integration of gender-responsive

pedagogy were seen as particularly valuable. Participants also recognised the potential of CoPs to build collaborative practice and sustain professional growth. Despite variations in implementation of the workshops across countries, the ACT in Mathematics project demonstrated its capacity to foster instructional reform underscoring the importance of continuous, contextualized professional development supported by instructional leadership and embedded in national education systems.

This report provides recommendations to deepen impact and sustainability. These include aligning curriculum and assessment practices, investing in long-term teacher support structures, enhancing gender equity integration and embedding CoPs within national frameworks. The ACT initiative offers a scalable model for improving mathematics outcomes and strengthening teacher agency across the Organisation of Eastern Caribbean States (OECS) and other small island developing states.

1 Background and Context

Mathematics education at the primary level is fundamental to developing students' critical thinking, problem-solving skills, and overall academic success. Globally, however, many regions face persistent challenges in delivering effective mathematics instruction, often due to resource limitations, teacher capacity gaps and curriculum constraints. These issues are particularly acute in underserved communities where disparities in access to quality education hinder student achievement. In recent years, international assessments such as PISA and TIMSS have highlighted significant gaps in mathematical proficiency among school-age students in many countries, underscoring the urgent need for targeted interventions (George, 2023; Schmidt et al., 2007).

The ACT in Mathematics project emerged in direct response to the persistent underperformance in mathematics across the Eastern Caribbean. In countries such as St. Kitts & Nevis, Saint Vincent and the Grenadines, and Saint Lucia, national assessments and Caribbean Secondary Education Certificate (CSEC) results have consistently shown that fewer than half of the student population attains a passing grade in mathematics. These patterns signal a systemic learning crisis marked by insufficient teacher preparation, gaps in content knowledge, and misalignments between curriculum delivery, instructional methods and assessment tools. To address these challenges, the Commonwealth of Learning (COL), through its Virtual University for Small States of the Commonwealth (VUSSC), initiated the ACT in Mathematics project as a multi-tiered, blended professional development intervention.

A foundational premise of the ACT project is that early mathematical understanding — particularly in topics like fractions — significantly influences future learning trajectories and STEM opportunities. This position is well supported in the literature, including Chapman (2013),

Hecht and Vagi (2012), and Siegler et al. (2020), who stress that conceptual mastery in early numeracy lays the groundwork for advanced cognitive development and academic success.

The project employed a case study methodology, starting with comprehensive desktop reviews of each country to diagnose specific instructional and systemic weaknesses. The findings revealed shared constraints: overreliance on rote teaching methods, inadequate use of manipulatives and visual models and insufficient training in diagnostic or gender-responsive practices. The project is being implemented in three phases — face-to-face workshops, synchronous online sessions, and asynchronous engagement via the Moodle platform — and will be supported by robust CoPs to ensure continuity and peer collaboration.

At the core of ACT is a commitment to transforming mathematics instruction through the CPA model, gender-responsive pedagogy, and technology-enabled learning (TEL). These strategies were implemented through an application phase, allowing teachers to trial classroom innovations with the support of mentors and supervisors. The project was designed not only to award micro-credentials for completion but also aimed to align with national priorities for teacher upskilling and institutional development.

Persistent systemic issues such as weak curriculum pacing, underdeveloped assessment frameworks and low levels of instructional leadership were addressed by engaging a wide range of stakeholders, including Ministry officials, principals, curriculum officers, teacher educators, parents and students. Stakeholders across the three countries echoed the urgent need for targeted, classroom-embedded professional development that centres on content mastery, inclusive practice and student motivation.

Aligned with regional and global education goals — such as the United Nations' SDG 4 (United Nations, 2015) and the OECS Education Sector Strategy — the ACT project represents a strategic response to educational inequities. It enhances teacher competencies, strengthens institutional leadership and builds national and regional coherence through shared learning and policy integration. Furthermore, the ACT project offers a scalable and replicable model for addressing foundational learning gaps in mathematics with global relevance for other small states seeking inclusive, equitable and high-quality education systems.

According to Levin, Senior Economist at the World Bank, students in the Caribbean are struggling with foundational numeracy skills as early as primary school, which significantly limits their academic and economic prospects (as cited in Weekes, 2025). This concern was a key justification for ACT in Mathematics which focuses on transforming pedagogical practice through the CPA model, gender-responsive strategies and TEL tools.

The ACT in Mathematics initiative offers a globally relevant model for addressing foundational mathematics underachievement through evidence-based professional development and system-level reform. It contributes to international discussions on improving math education in developing and small state contexts. With alignment to SDG 4 (2015), UNESCO's ICT in

Education framework, and literature by Chapman (2013), Hecht and Vagi (2012), and Siegler et al. (2020), ACT serves as a blueprint for scalable, inclusive and sustainable educational innovation worldwide.

2 Literature Review

A synthesis of the related literature from the desktop reviews for St. Kitts & Nevis, Saint Vincent and the Grenadines, and Saint Lucia reveals consistent themes and scholarly insights into the key challenges in mathematics education across the three countries. These challenges reflect both global trends and local contextual factors related to teacher quality, instructional practices, curriculum alignment, gender disparities and the use of technology in teaching mathematics.

Teacher Quality and Professional Development

Teacher quality remains one of the most powerful determinants of student success in mathematics (Hattie, 2023; OECD, 2020). Desktop reviews from all three countries emphasise that many primary teachers lack adequate mathematical content knowledge. This gap impairs their ability to scaffold instruction effectively and address student misconceptions. Hattie underscores the teacher effect as more influential than class size or school resources.

Rosli and Aliwee (2021), in a systematic review of 40 studies, confirmed that long-term, well-structured professional development significantly improves teachers' content knowledge, attitudes and classroom practices. Their findings, corroborated by Darling-Hammond et al. (2017) validate the ACT project's investment in sustained, context-relevant teacher learning experiences that enhance pedagogical content knowledge (PCK) and instructional quality.

Instructional Practices and Conceptual Understanding

The dominant instructional model across the OECS remains procedural, with little use of manipulatives or real-life applications. Research supports a shift toward conceptual, inquiry-based approaches such as the CPA model (National Council of Teachers of Mathematics, 2014; Lutfi and Dasari, 2024).

A growing body of research indicates that strong conceptual understanding in early mathematics — especially of fractions — predicts long-term success (Ismail et al., 2024). Siegler et al. (2012) found that competence in fractions during elementary school strongly predicts future mathematics achievement. They further showed that mastery of fractions and division significantly predicts later algebra success even when controlling for background variables.

These findings are particularly relevant given the persistently low performance of students across the OECS in CSEC Mathematics. From 2019 to 2023, regional pass rates have remained significantly below the 75% benchmark, with some territories reporting rates as low as 33% to

45%. CXC examiner feedback consistently highlights students' weak conceptual understanding, especially in foundational areas such as number theory, algebraic manipulation and multi-step problem solving. Errors in reasoning, poor interpretation of questions and rote learning strategies persist as barriers to success. These realities underscore the urgent need for a pedagogical shift toward conceptual clarity, problem-solving competence and applied reasoning — outcomes the ACT initiative seeks to address directly (OECS, 2025).

Curriculum Alignment and Early Intervention

Curriculum pacing often outstrips learners' developmental readiness, leading to surface-level coverage of critical content. National assessments reinforce this trend by prioritising procedural recall over deep reasoning and problem-solving. The OECS Education Sector Strategy (2012-2021) advocates for progressive conceptual learning and formative feedback mechanisms to guide instruction (OECS, 2012).

Gender-Responsive Pedagogy

Gender dynamics play a significant role in mathematics outcomes. According to the OECS and supported by global frameworks such as the Convention on the Rights of the Child (UNICEF, 1989), education systems must implement inclusive, gender-sensitive practices. The ACT workshops introduced gender-responsive strategies that encouraged equitable participation, particularly noting the underachievement of boys in mathematics. CSEC performance data reveal that female students consistently outperform male peers in mathematics (OECS, 2025). Boys struggle particularly with language-heavy and multi-step questions. This trend is recognised in global frameworks like the Convention on the Rights of the Child (UNICEF, 1989) and SDG 4 (2015), which advocate for gender-responsive, equitable education strategies.

Technology and Digital Pedagogies

Although the benefits of technology-enabled learning and manipulatives are widely acknowledged, their use is limited across OECS classrooms. Teachers often lack the confidence and training to integrate these tools effectively. UNESCO's (2018) ICT Competency Framework encourages incorporating technology and tactile learning tools to promote visual, experiential understanding.

Thurm et al. (2024) posit that teacher professional development aligned with the TPACK (Technological Pedagogical Content Knowledge) framework promotes effective integration of digital tools in mathematics teaching. The ACT workshops addressed this gap by building teachers' capacity to use technology and manipulatives to support more interactive and inclusive instruction.

Alignment with ACT Objectives

The reviewed literature and regional analyses point to systemic, instructional and equity-related barriers to mathematics achievement in the OECS. However, there is a clear alignment between best practices in educational research and the goals of interventions like the ACT in Mathematics project. Addressing these challenges through targeted, evidence-based strategies holds significant promise for improving both outcomes and equity in mathematics education across the region.

Chapman (2013) emphasises that a strong conceptual understanding of fractions is foundational for future success in algebra and advanced mathematics. The article underscores that procedural fluency alone is insufficient; students must also grasp part-whole relationships and the meaning of operations with fractions. This supports the ACT project's focus on using manipulatives and visual models to deepen understanding.

Hecht and Vagi (2012) examined the cognitive predictors of fraction knowledge and found that both symbolic and non-symbolic numerical skills significantly influence fraction competence. Their findings imply that instruction should incorporate both number sense development and symbolic reasoning approaches well-aligned with the CPA methodology promoted in the ACT workshops.

Siegler et al. (2020) highlight the longitudinal importance of early fraction knowledge as a predictor of later mathematics achievement. They argue that targeted interventions in fractions can yield long-term benefits, particularly when implemented in the early grades. This reinforces the strategic decision by the ACT project to target fraction instruction in professional development sessions.

2.1 Theoretical Framework

The design and implementation of the ACT in Mathematics project are grounded in an integrated theoretical framework that draws upon three interrelated perspectives: Constructivist Learning Theory, Situated Learning Theory and the Pedagogical Content Knowledge (PCK) Framework. This tripartite framework provides a robust foundation for understanding the rationale behind the project’s design choices — particularly its emphasis on experiential professional development, contextualised instructional support, and equitable, student-centred pedagogy.

These theoretical lenses were selected not only for their relevance to teacher learning but also for their alignment with the persistent challenges in mathematics education across the OECS. As detailed in the preceding literature review, regional student performance on CSEC Mathematics exams from 2019 – 2023 has been consistently below the 75% benchmark, with pass rates in some territories dipping to between 33% and 45% (OECS, 2025). Key factors contributing to this underperformance include shallow conceptual understanding, procedural overemphasis, and instructional gaps — especially in foundational topics like number theory, algebra and fractions.

The ACT project's theoretical foundations were purposefully chosen to directly address these instructional deficits and to transform mathematics teaching practice through sustainable, school-based professional learning.

1. **Constructivist Learning Theory**

Constructivist theory, rooted in the work of Piaget and Vygotsky, posits that learners actively build knowledge through interaction with their environment, prior knowledge and social exchanges (Narayan et al., 2013). This epistemological view is foundational to the ACT project's emphasis on student-centred pedagogy and experiential learning. Specifically, the CPA model promoted through ACT workshops is a practical embodiment of constructivist principles: students construct understanding through hands-on manipulations, visual representations and gradual abstraction.

In this framework, teachers are positioned not as transmitters of information but as facilitators who guide learners through carefully scaffolded mathematical experiences. The ACT workshops themselves were designed as active learning environments, encouraging teachers to test strategies, reflect on outcomes and adapt practices to their classroom contexts — thereby modelling the constructivist cycle of inquiry and reflection.

2. **Situated Learning Theory**

Situated learning theory, advanced by Lave and Wenger (1991), asserts that knowledge is best acquired in authentic social settings where learners are engaged in meaningful activity. This theory underpins the ACT project's commitment to school-based implementation and the establishment of CoPs. Within these CoPs, teachers engaged in peer observation, collaborative problem-solving and collective analysis of student learning — all embedded within their own teaching environments.

By anchoring professional development in the daily realities of the classroom, the ACT project ensured that learning was contextually relevant, immediately applicable and culturally responsive. This aligns with broader calls for PD models that avoid decontextualised, one-off training sessions and instead prioritise continuity, feedback loops and professional dialogue.

3. **Pedagogical Content Knowledge Framework**

The PCK framework, introduced by Shulman (1986), emphasises the intersection between subject-matter knowledge and instructional knowledge — that is, knowing how to make specific mathematical concepts accessible and meaningful to diverse learners. ACT's professional development model explicitly targeted PCK development with a focus on fractions, number sense and problem-solving — areas repeatedly flagged in OECS CSEC performance data and international research (Siegler et al., 2012, 2020).

By equipping teachers with instructional tools such as manipulatives, the project strengthened teachers' capacity to mediate mathematical meaning rather than merely deliver procedures. Additionally, the integration of gender-responsive pedagogy, technological tools and

differentiated strategies within PD content reflects a deliberate extension of the PCK model to support equity and inclusion in mathematics instruction.

Together, these three theoretical perspectives shaped the ACT in Mathematics project's structure, pedagogical focus and implementation strategy. Constructivist learning informed its student-centred instructional models; situated learning informed the design of embedded, school-based CoPs; and the PCK framework guided the content and delivery of teacher development sessions. Most importantly, this framework aligns with the project's long-term objectives: enhancing teacher agency, promoting instructional equity and improving student mathematics outcomes across the OECS.

Table 1. Summary of Theoretical Framework

Theory	Key Elements	Relevance to ACT Project
Constructivist Theory	Learning via experience, reflection, and scaffolding	Underpins CPA model and experiential workshop design
Situated Learning	Authentic learning in social contexts (CoPs, classrooms)	Reflects CoPs and contextual implementation
Pedagogical Content Knowledge	Integration of content, pedagogy, and curriculum	Directly targeted through training and classroom application

3 Methodology

3.1 Case Study Approach

This section outlines the case study methodology used in the ACT in Mathematics project conducted in St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia. The project adopted a qualitative multiple-case study approach to explore how targeted professional development interventions can improve instructional practice in mathematics education across different national contexts.

The ACT in Mathematics project utilised a multi-phased, research-informed methodology to enhance teacher capacity in mathematics instruction across three OECS countries: St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia. This methodology integrated

experiential learning, collaborative professional development and reflective practice, ensuring both immediate knowledge acquisition and sustained pedagogical transformation.

3.2 Rationale for Case Study Design

The case study method was selected to allow for an in-depth examination of each country's unique educational setting, teacher experiences and systemic challenges. This approach enabled the research team to capture rich, context-specific insights while also identifying cross-cutting regional trends. Using Yin's (2014) principles of case study research, each participating country was treated as a bounded system with embedded units of analysis (teachers, principals, curriculum officers, etc.).

3.3 Participant Selection and Workshop Design Framework

Participants were purposively selected in collaboration with the respective Ministries of Education. The selection included teachers (mainly primary-level), school leaders, curriculum officers, numeracy coaches and supervisors. The workshop content and structure were informed by findings from the desktop reviews and tailored to national priorities. The workshops employed a phased, experiential learning model incorporating the CPA method, inclusive pedagogy and technology-enabled tools. The design of the workshops was grounded in adult learning theory and constructivist pedagogy. The methodology emphasised the CPA approach to teaching fractions, which supports conceptual understanding and mathematical reasoning. Teachers were engaged as active learners through hands-on activities, small group discussions and model teaching practices.

Figure 2 below summarises the number and type of participants in each country:

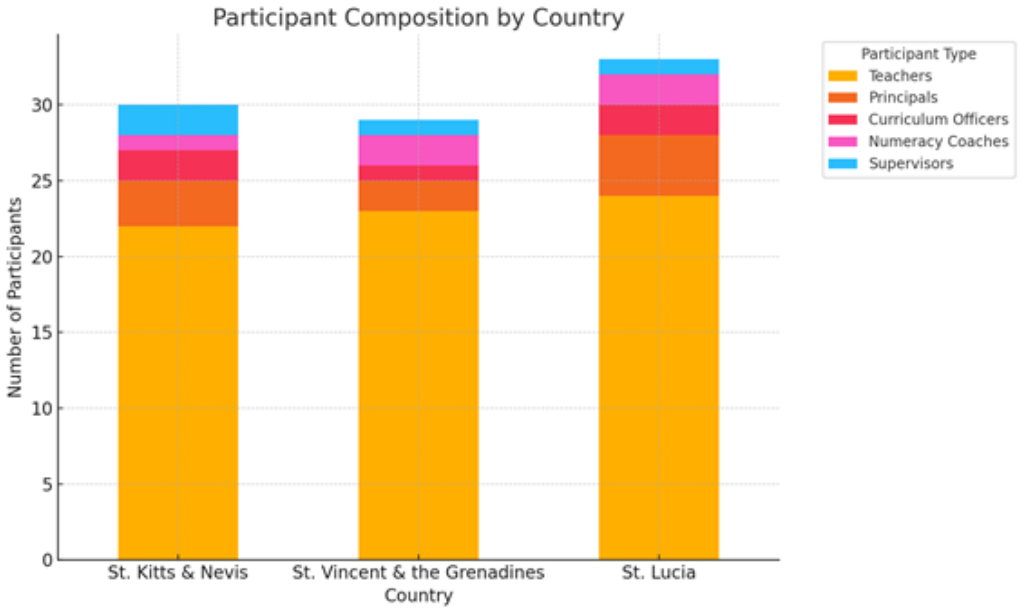

Figure 2. Participant Composition.

3.4 Data Collection

The ACT in Mathematics project employed a multi-method, qualitative approach to data collection, drawing from both primary and embedded practitioner-generated sources. Data were organized across four key streams:

1. Documentary Analysis

- Desktop Reviews: Systematic analysis of national education policies, curriculum frameworks and student mathematics performance in St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia.

2. Workshop-Based Data

- Observations & Reflections: Facilitators recorded structured and open-ended observation notes and reflective memos during face-to-face and virtual workshops.
- Participant Feedback: Teachers completed feedback forms, reflection prompts, and formative assessments during and after sessions.
- End-of-Workshop Reports: These synthesised key themes, participant responses and system-level insights from each implementation phase.

3. Post-Workshop Monitoring

- CoPs: Teachers shared lesson plans, photos, student work samples, and reflective accounts of implementation challenges and successes.
- Teaching Artefacts: Samples of instructional materials and strategies developed during and after the workshops were collected as evidence of transfer to classroom practice.

4. Formative and Observational Assessment

- Pre- and Post-Reflections: Teachers completed structured reflection exercises to assess shifts in knowledge, confidence and practice.
- Facilitator Observations: Field notes captured anecdotal evidence of engagement, instructional experimentation and collaborative learning within schools.

This layered approach enabled triangulation of insights and supported real-time refinement of workshop content, ensuring contextual alignment and responsiveness to local instructional realities.

Primary data were collected through:

- Desktop reviews of national education systems and mathematics performance in each country.
- Face-to-face and virtual workshop activities, including observation notes, facilitator reflections and participant feedback forms.
- End-of-workshop reports capturing thematic analyses, teacher responses and Ministry-level observations.
- Post-workshop monitoring through CoPs, where participants shared implementation experiences and teaching artifacts.

Participant engagement was monitored through:

- Pre- and post-workshop reflections,
- Formative assessments and
- Structured feedback forms.

Facilitators also conducted observational assessments and collected anecdotal records of classroom application and participant interactions. This data will inform continuous improvement of content delivery and alignment with local contexts.

3.5 Integration with National Education Systems

The methodology was collaboratively developed with Ministries of Education in all three countries to ensure relevance and policy alignment. Key ministry personnel and curriculum officers were embedded in the design and facilitation process, helping to embed the methodology into national professional development frameworks. This participatory approach strengthened institutional ownership and scalability.

3.6 Data Analysis

Qualitative data from all sources were thematically analysed using an inductive coding approach. Common themes were identified across country reports and synthesised to generate evidence-based conclusions. Thematic categories included changes in teacher practice, perceived value of workshop components, institutional support and challenges in implementation. Comparative analysis was also conducted to highlight differences and similarities across the three country cases.

3.7 Ethical Considerations

All participants provided informed consent and were made aware of the project's objectives. Confidentiality of responses was ensured in the documentation and reporting phases. The project adhered to ethical standards for research involving educational professionals and respected institutional protocols in each country.

Ultimately, the ACT in Mathematics project employed a layered, evidence-based methodology that facilitated active learning, systemic support and sustainable professional development. Its integration of CPA pedagogy, synchronous learning and ongoing collaboration through CoPs reflects global best practices in mathematics education reform.

4 Key Findings from Country Desktop Reviews

Across the Caribbean, persistent underachievement in mathematics at both the primary and secondary school levels continues to be a major educational concern. National and regional assessments reveal that students in St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia consistently struggle with foundational mathematical concepts, conceptual reasoning and application-based problem solving. These challenges are particularly acute as students transition from primary to secondary education, where declining performance trends are evident.

Comparative Analysis of Mathematics Performance

Table 2. Primary School Mathematics Performance by Country

Country	Assessment Tool & Levels	Key Findings
St. Kitts & Nevis	KAL Census Pilot 2022 – Grade 4	• High % in 'Beginning' band—76% in Measurement, 59% in Number and Pattern. • Only 41% met expectations in problem-solving; 70% struggled with Division.
Saint Vincent and the Grenadines	National Diagnostic Tests (Grades 2 & 4) 2021–2023	• Grade 2 Mastery + Competence fell from 67.6% (2021) to 48.8% (2023). • Grade 4 critical-level soared to 55.3% in 2023.

Saint Lucia	Minimum Standard Exams (Grades 2 & 4), CEE (Grade 6)	• Mean scores declined from 2010–2019; Grade 2 fell to ~50%, Grade 6 to 55%. • Teacher qualification was high (86–91%), but scores dropped.

Table 3. Secondary School Mathematics Performance by Country

Country	Secondary Assessment	Key Findings
St. Kitts & Nevis	2024 CSEC Mathematics	• 38% pass rate out of 227 examinees. • 27% of scripts ungraded, indicating submission or comprehension issues.
Saint Lucia	CSEC Mathematics 2010–2024	• Pass rate dropped from ~56% (2015) to ~43% (2024). • Minor recovery after 2021's COVID dip (~39%).
Saint Vincent and the Grenadines	Not detailed	• Focused on primary-level diagnostics. • Historical pass rate low (~33%); no recent CSEC data shared.

The foundational role of mathematics in fostering critical thinking, supporting employability, and driving national development has been widely recognised by Ministries of Education and regional bodies such as the OECS. Consequently, these countries have aligned with global education commitments like the UN Sustainable Development Goals (United Nations, 2015) and the Convention on the Rights of the Child (UNICEF, 1989), embedding the principle of equity and quality in their educational strategies. A key pillar of the OECS Education Sector Strategy

2012–2022, "Every Learner Succeeds," emphasises teacher effectiveness as central to improving student outcomes (OECS, 2012).

Despite these policy commitments, findings from the desktop reviews indicate systemic challenges that hinder progress. These include:

- **Teacher content and pedagogical gaps**: Many teachers, especially at the primary level, exhibit limited confidence and competence in teaching mathematics. This is often due to inadequate pre-service preparation and a lack of sustained, practical in-service training.
- **Instructional practices**: Classrooms are often dominated by rote procedures and example-based instruction with insufficient use of manipulatives or real-world application. Where strategies like the CPA approach are encouraged, they are inconsistently applied.
- **Curriculum misalignment**: Curriculum pacing and assessment demands frequently outstrip students' developmental readiness, especially in upper primary and secondary grades. This leads to shallow coverage and missed opportunities for deep learning.
- **Assessment and monitoring deficiencies**: Evaluations often overemphasise recall over reasoning, while teacher training initiatives lack the necessary follow-up and classroom support.
- **Socioeconomic and gender disparities**: Boys tend to underperform compared to girls, particularly in application-based tasks. Disparities in home support and access to supplementary resources further exacerbate inequities.

At the secondary level, CSEC Mathematics pass rates remain low in all three countries, reinforcing the urgency for intervention. In Saint Vincent and the Grenadines and Saint Lucia, results suggest a marked drop in proficiency by Grade 4 — underscoring the cumulative nature of learning gaps when early numeracy is not securely developed. In St. Kitts & Nevis, over one-quarter of secondary candidates received ungraded results, suggesting deeper systemic issues such as poor exam preparedness and administrative constraints.

Educational stakeholders — including Ministry officials, principals, teachers, parents, and students — agree on the need for targeted, evidence-based reforms. There is a wide consensus that enhancing teacher capacity through practical, classroom-embedded professional development is vital. Interventions must also address student motivation, embed mathematics in meaningful contexts and provide differentiated support tailored to diverse learning needs.

In response, the proposed initiative aims to enhance mathematics teaching and learning outcomes by:

- Diagnosing existing instructional and systemic challenges
- Strengthening teacher content knowledge and pedagogical skills through workshops and continuous virtual support

- Promoting the effective use of manipulatives and technology
- Fostering stakeholder engagement across all levels of the education system

This effort represents a strategic investment in human capital and educational equity. By supporting teachers — the linchpins of classroom learning — and addressing foundational gaps in mathematics, the project seeks to contribute meaningfully to long-term national development and regional educational goals.

4.1 Analysis and Evaluation of Workshop Activities

This section presents an analysis and evaluation of the ACT in Mathematics workshops conducted in St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia. The analysis is based on participant feedback ratings, aggregated by core activity areas such as content understanding, use of teaching aids, pedagogy and engagement. Figure 3 below illustrates the comparative ratings across countries.

Figure 3. Participant Ratings of Workshop Activities by Country.

Overall, participant feedback on workshop activities was highly positive across all three countries. The highest-rated areas were 'Workshop Relevance and Engagement' and 'Collaborative Group Work' with average scores above 4.5 in all countries. The use of manipulatives and understanding of fractions using the CPA approach also received strong feedback indicating success in addressing core conceptual gaps.

Technology integration received the lowest ratings, with averages ranging between 3.7 and 3.9. This suggests a continued gap in teacher familiarity or access to digital tools despite recognising their importance. Gender-responsive pedagogy was moderately rated, indicating growing awareness but requiring more practical guidance and modelling.

Participants' Most Valuable Aspects and Suggestions for Future Workshops

The following chart illustrates the frequency of themes emerging from participant feedback across St. Kitts & Nevis, Saint Vincent and the Grenadines, and Saint Lucia. It summarises the most appreciated aspects of the ACT in Mathematics workshops and participant suggestions for enhancing future training sessions.

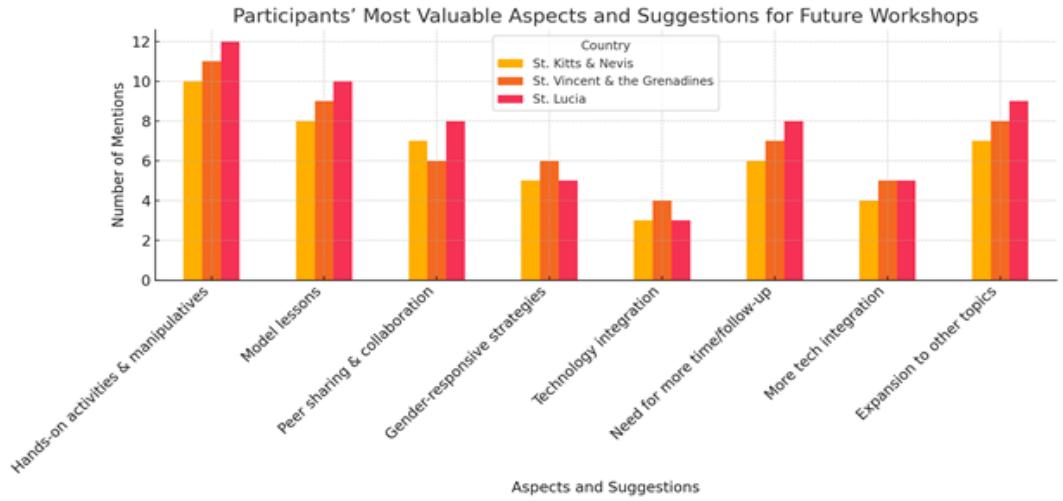

Figure 4. Participants' Most Valuable Aspects and Suggestions for Future Workshops.

Across all three countries, hands-on activities using manipulatives and model lessons were the most frequently cited as valuable. Participants appreciated opportunities for collaborative learning and peer engagement. There was consistent interest in extending training time, incorporating more technology and expanding content coverage to include other mathematics strands. Gender-responsive strategies, while noted as important, require additional reinforcement and practical application. These insights provide critical guidance for refining future workshop design to better meet educators' needs and support systemic improvement in mathematics instruction.

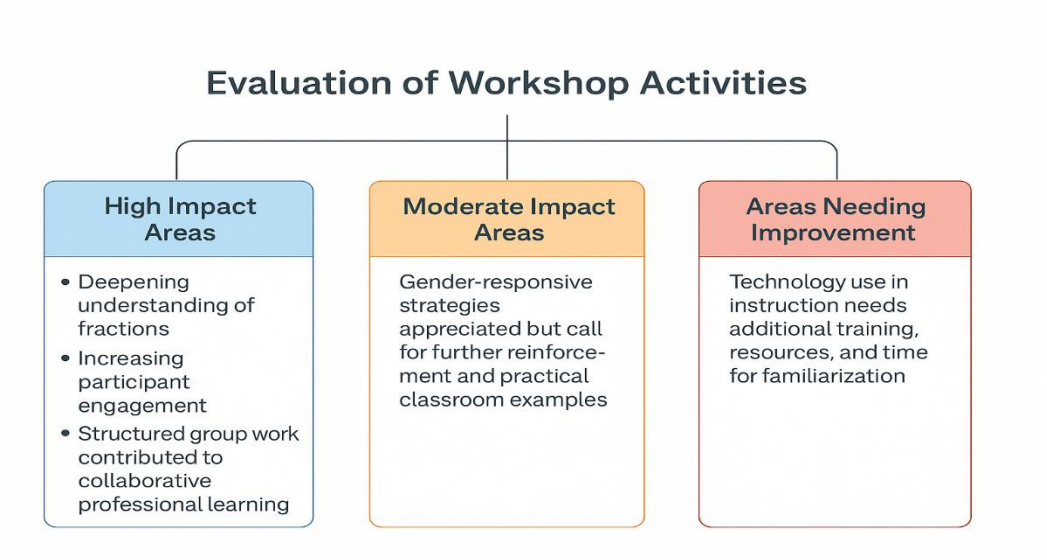

Figure 5. Evaluation of Workshop Activities Flowchart.

Table 4. Comparative RBM Framework Outcomes

	RBM Result Area	Indicator	St. Kitts & Nevis	Saint Vincent and the Grenadines	Saint Lucia
1	STO2.1 Improved capacity of institution staff	# of staff/faculty reporting improved knowledge and skills	25 teaching staff (22F, 3M)	30 teaching staff (22F, 8M)	25 teaching staff (18F, 7M)
2	STO2.3 Gender-responsive, quality, ODL/OER-based learning	# of gender-responsive ODL/OER-based courses offered	One 2-day workshop improving teaching of 2 courses	One 2-day workshop improving teaching of 3 courses	One 2-day workshop improving teaching of 3 courses
3	O1.1 Government policymakers/staff trained or sensitised	# of government staff trained/sensitised	2 (1M, 1F)	2 (1F, 1M)	11 (8F, 3M)
4	O2.1 Institutional staff trained in ODL, OER, TEL, GE or COL models	# of staff/faculty trained in ODL/OER/TEL/GE/COL	25 (22F, 3M)	30 (22F, 8M)	25 (18F, 7M)
5	O3.4 Communities sensitised	# of community members sensitized in ODL/OER/TEL/GE/COL	400 (300F, 100M)	500 (400F, 100M)	1700 (1200F, 500M)

5 Discussion of Findings and Implications

The findings from the three desktop reviews and country reports — St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia — reveal shared instructional challenges, policy gaps and opportunities for transformation in mathematics education across the OECS. The triangulated evidence from national assessments, teacher feedback and workshop evaluations presents a compelling case for system-wide reform grounded in responsive pedagogy, targeted professional development and institutional strengthening.

Across all three countries, students consistently underperform in foundational mathematical domains, particularly fractions, number sense and problem-solving. These difficulties are evident from as early as Grade 4 and persist into secondary education, as reflected in CSEC Mathematics performance from 2019 to 2023, where pass rates remain significantly below the regional 75% benchmark — sometimes dipping to between 33% and 45% (OECS, 2025). Examiners repeatedly cite shallow conceptual understanding, weak reasoning skills and reliance on rote memorisation as chronic barriers to student success. These outcomes mirror findings by Siegler et al. (2012, 2020), who demonstrate that early fraction knowledge and conceptual understanding predict later achievement in algebra and other higher-order mathematics.

The root causes of these outcomes are deeply systemic: teachers frequently lack sufficient mathematical content knowledge and confidence (Hattie, 2023; OECD, 2020), and classroom instruction often defaults to procedural, teacher-centred approaches. As observed by Rosli and Aliwee (2021), professional development that is fragmented or short-term fails to address these entrenched pedagogical habits. Additionally, curriculum pacing regularly exceeds students' cognitive readiness while assessment practices tend to prioritise procedural recall over reasoning and application — an issue also highlighted by national reviews and echoed in ACT workshop feedback.

The ACT in Mathematics project was designed as a direct response to these challenges, offering a blended, school-embedded professional learning model anchored in constructivist pedagogy, situated learning and the PCK framework. Key strategies included the CPA approach, use of manipulatives, gender-responsive techniques and technology-supported instruction — all grounded in best-practice literature (George, 2023; Thurm et al., 2024; Chapman, 2013). Teachers who participated in the ACT workshops reported significant gains in confidence, lesson planning, and a shift toward more conceptual, student-centred instruction. These outcomes reflect the kind of change Rosli and Aliwee (2021) describe as resulting from sustained, high-quality PD.

Nonetheless, some components — particularly gender-responsive pedagogy and the use of digital tools — require further support and deeper institutional integration. Although the ACT model introduced these elements, the long-term impact will depend on ongoing support structures, especially for underrepresented student groups.

Several critical implications emerge from the ACT experience:

1. Professional development must be continuous, embedded and reflective — not a series of isolated workshops. This aligns with situated learning theory and the use of CoPs as effective mechanisms for peer mentoring and iterative improvement (Lave & Wenger, 1991).

2. Instructional reform should begin early, focusing on lower primary grades, where mathematical foundations are laid. Research by Siegler et al. (2012) and Hecht and Vagi (2012) underscores the lasting benefits of early intervention in number sense and fractions.

3. Systemic change requires multilevel engagement — not only teachers but also curriculum officers, principals, and ministry leadership. Coherence between PD, curriculum frameworks and assessment practices is essential for sustainability.

4. Leveraging technology and CoPs presents scalable, cost-effective ways to enhance teacher agency and improve instructional quality. However, as noted in both the literature and the ACT implementation, technology integration must be supported by ongoing PD and aligned with teachers' pedagogical goals (Thurm et al., 2024).

In conclusion, the findings and implications from the ACT initiative reinforce the urgency of coordinated, evidence-based reform in mathematics education across the OECS. The ACT project represents not just a pilot intervention, but a scalable, theoretically grounded framework for strengthening mathematics instruction in small-state contexts. By integrating research-informed strategies, building teacher capacity and embedding practice in authentic school settings, the initiative contributes to the long-term vision of equity, excellence and sustainability in Caribbean education.

6 Recommendations

Based on the ACT in Mathematics project findings across St. Kitts & Nevis, Saint Vincent and the Grenadines and Saint Lucia, the following recommendations are proposed to guide future interventions and policy directions in mathematics education:

1. Institutionalise Continuous Professional Development
Move beyond isolated workshops toward sustained, embedded professional learning models. Integrate CoPs, coaching and mentoring systems to support teachers' ongoing growth in mathematics instruction.
Rosli & Aliwee (2021); Lave & Wenger (1991); Sims et al. (2025); Thurm et al. (2024)

2. Prioritise Conceptual Understanding in Teacher Training
Embed the CPA approach and problem-solving pedagogy into both pre-service and in-service training to ensure consistent, developmentally appropriate instruction in core mathematics concepts.
George (2023); Chapman (2013); Constructivist Learning Theory (Narayan et al., 2013)

3. Address Foundational Learning Gaps Early
Implement diagnostic tools and targeted interventions in early primary grades to prevent cumulative learning deficits especially in number sense, place value and fractions.
Siegler et al. (2012; 2020); Hecht & Vagi (2012)

4. Strengthen Curriculum and Assessment Alignment
Ensure that curriculum pacing aligns with developmental readiness and that assessments promote reasoning, conceptual understanding and real-world application over rote recall.
OECS (2012); Siegler et al. (2012); Hattie (2023); OECD (2020)

5. Scale Gender-Responsive Pedagogy
Provide practical, context-specific examples and tools for integrating gender-responsive strategies in mathematics classrooms. Monitor gender-disaggregated performance data to inform targeted supports.
UNICEF (1989); United Nations' SDG 4 (2015)

6. Build Instructional Leadership Capacity
Engage principals, curriculum officers, and Ministry leaders in professional development to support instructional supervision, teacher support, and institutional coherence.
OECD (2020); Rosli & Aliwee (2021); PCK Framework (Shulman, 1986)

7. Leverage Technology to Expand Access and Engagement
Invest in infrastructure and training to support digital platforms like Moodle, virtual workshops and online teaching tools. Use technology to sustain peer learning and improve instructional delivery.
Thurm et al. (2024); UNESCO (2018); TPACK Framework; ACT Project Findings

8. Institutionalise Monitoring and Evaluation Systems
Develop tools for assessing classroom practice, student progress and teacher growth. Use evidence from classroom observations, teacher reflections and student assessments to refine practices.
Rosli & Aliwee (2021); OECD (2020)

9. Embed ACT into National Education Reform Agendas
Align ACT outcomes and practices with broader national and regional policies such as the OECS Education Sector Strategy and Sustainable Development Goal 4 (Quality Education) to support

scalability and sustainability.
OECS (2012); SDG 4 (2015); Constructivist and Situated Learning Frameworks

These recommendations aim to guide Ministries of Education, teacher education institutions and development partners in expanding the impact of the ACT in Mathematics model and addressing persistent inequities in mathematics education across the Caribbean.

7 Contribution of the ACT Workshops to Institutional Capacity Building

The ACT in Mathematics workshops made a substantial contribution to institutional capacity building across the participating Eastern Caribbean countries by fostering systemic improvements in pedagogical practices, curriculum alignment and professional learning structures. Through targeted professional development that emphasised the CPA model, gender-responsive pedagogy and the integration of TEL, the initiative equipped educators with practical tools to enhance instructional quality and student engagement in mathematics.

Institutions benefited from the structured inclusion of teacher educators, curriculum officers, principals, and Ministry officials, thereby ensuring that workshop content was aligned with national education priorities and embedded within broader institutional frameworks. The "Train the Trainers" approach further enhanced scalability by preparing selected participants to lead future sessions, strengthening leadership pipelines within schools and teacher training colleges.

Additionally, the establishment of sustained CoPs supported by asynchronous digital platforms will enable cross-school collaboration and knowledge exchange, promoting a culture of continuous professional learning. The workshops also initiated a model for blended professional development — face-to-face engagement reinforced by synchronous virtual sessions and asynchronous support — that can now serve as a blueprint for ongoing in-service training across the region.

By reinforcing teacher content knowledge, enhancing pedagogical strategies and embedding reflective practice into professional routines, the ACT workshops have laid a durable foundation for institutional transformation in mathematics education.

Table 5. Summary of Institutional Capacity Building through ACT Workshops

Capacity Area	Description
Enhanced Pedagogical Capacity	Teachers trained in CPA, gender-responsive and TEL strategies.
Leadership Integration	Curriculum officers, principals and ministry officials actively involved.
Train-the-Trainer Model	Builds scalable teacher leadership for broader institutional outreach.
Communities of Practice	Collaboration via synchronous/asynchronous platforms to sustain learning.
Blended PD Model	Combines in-person, virtual and Moodle-based support systems.
Institutional Alignment	Workshops aligned with national priorities and curriculum frameworks.

References

Chapman, O. (2013). Investigating teachers' knowledge for teaching mathematics. *Journal of Mathematics Teacher Education*, 16, 237-243 https://doi.org/10.1007/s10857-013-9247-2

Darling-Hammond, L., Hyler, M. E., & Gardner, M. (2017). Effective teacher professional development. https://files.eric.ed.gov/fulltext/ED606743.pdf

George, L. (2023). Investigating large-scale, high school mathematics achievement through the lens of the cognitive domains. *The Electronic Journal for Research in Science & Mathematics Education*, *20*(3), 35-63. https://ejrsme.icrsme.com/article/view/23076

Hattie, J. (2023). Visible learning: A synthesis of over 800 meta-analyses relating to achievement. https://doi.org/10.4324/9781003380542

Hecht, S. A., & Vagi, K. J. (2010). Sources of group and individual differences in emerging fraction skills. *Journal of Educational Psychology*, 104(1), 199–215. https://www.researchgate.net/publication/49694773_Sources_of_Group_and_Individual_Differences_in_Emerging_Fraction_Skills

Hecht, S. A., & Vagi, K. J. (2012). Patterns of strengths and weaknesses in children's knowledge about fractions. *Journal of Experimental Child Psychology, 111*(2), 212–229. https://doi.org/10.1016/j.jecp.2011.08.012

Ismail, S.A.S., Maat, S.M., & Khalid, F. (2024). Understanding the challenges and strategies in teaching fractions: Insights from experienced mathematics teachers. *International Journal of Academic Research in Progressive Education and Development*, 13(3). http://dx.doi.org/10.6007/IJARPED/v13-i3/22855

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge University Press. http://dx.doi.org/10.1017/CBO9780511815355

Lutfi, J.S., & Dasari, D. (2024). Research trends on learning mathematics with the CPA (Concrete-Pictorial-Abstract) approach. *Prisma*, *13*(1), 103-112. https://jurnal.unsur.ac.id/prisma/article/view/3947/3014

Narayan, R., Rodriguez, C., Araujo, J., Shaqlaih, A., & Moss, G. (2013). Constructivism — Constructivist learning theory. In B. J. Irby, G. Brown, R. Lara-Alecio, & S. Jackson (Eds.), *The handbook of educational theories* (pp. 169–183). IAP Information Age Publishing. https://www.researchgate.net/publication/283615020_ConstructivismConstructivist_Learning_Theory

National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all*. NCTM.

OECD. (2020). TALIS 2018 results: Teachers and school leaders as valued professionals (Vol. II). TALIS, OECD Publishing. https://doi.org/10.1787/19cf08df-en

OECS. (2012). 2012-2021 OECS education sector strategy. OECS. https://www.globalpartnership.org/sites/default/files/2012-2021-oecs-education-sector-strategy_0.pdf

OECS. (2025). Thematic analysis of student performance at CSEC. https://oecs.int/en/our-work/knowledge/library/thematic-analysis-of-student-performance-at-csec-cover-page-final-web-version

Rosli, R., & Aliwee, M. F. (2021). Professional development of mathematics teacher: A systematic literature review. *Contemporary Educational Research Journal*, *11*(2), 81–92. https://doi.org/10.18844/cerj.v11i2.5415

Schmidt, W. H., Wang, H. C., & McKnight, C. C. (2007). Curriculum coherence: An examination of US mathematics and science content standards from an international perspective. *Journal of Curriculum Studies, 37*(5), 525-559. https://doi.org/10.1080/0022027042000294682

Shulman, L.S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15, 4-14. https://www.wcu.edu/webfiles/pdfs/shulman.pdf

Sidney, P. G., & Alibali, M. W. (2015). Making connections in math: Activating a prior knowledge analogue matters for learning. *Journal of Cognition and Development,* 16(1), 160-185. https://doi.org/10.1080/15248372.2013.792091

Siegler, R. S., Duncan, G. J., Davis-Kean, P. E., Duckworth, K., Claessens, A., Engel, M., ... & Chen, M. (2012). Early predictors of high school mathematics achievement. *Psychological Science*, 23(7), 691–697. https://doi.org/10.1177/0956797612440101

Siegler, R. S., Im, S., & Braithwaite, D. W. (2020). Understanding development requires assessing the relevant environment: Examples from mathematics learning. *New Directions for Child and Adolescent Development*, 173, 83–100. https://doi.org/10.1002/cad.20372

Sims, S., Fletcher-Wood, H., O'Mara-Eves, A., Cottingham, S., Stansfield, C., Goodrich, J., Van Herwegen, J., & Anders, J. (2025). Effective teacher professional development: New theory and a meta-analytic test. Review of Educational Research, 95(2), 213-254. https://doi.org/10.3102/00346543231217480

Thurm, D., Bozkurt, G., Barzel, B., Sacristán, A.I., Ball, L. (2024). A review of research on professional development for teaching mathematics with digital technology. In: B. Pepin, G. Gueudet, & J. Choppin (Eds.), *Handbook of digital resources in mathematics education (pp. 1-39)*. Springer, Cham. https://doi.org/10.1007/978-3-030-95060-6_49-1

Tomlinson, C. A., & Imbeau, M. B. (2014). *Leading and managing a differentiated classroom*. ASCD. https://files.ascd.org/pdfs/publications/books/Leading-and-Managing-A-Differentiated-Classroom-2ed-sample-pages.pdf

UNESCO. (2018). ICT competency framework for teachers. https://unesdoc.unesco.org/ark:/48223/pf0000265721

UNICEF. (1989). Convention on the rights of the child. https://www.unicef.org/child-rights-convention/convention-text

United Nations. (2015). General assembly resolution A/RES/70/1. *Transforming our world: The 2030 agenda for sustainable development.* United Nations. https://documents.un.org/doc/undoc/gen/n15/291/89/pdf/n1529189.pdf

Weekes, E. (2025, February 19). World Bank official identifies gaps in Caribbean education. https://www.winnmediaskn.com/world-bank-official-identifies-gaps-in-caribbean-education/

Yin, R.K. (2014). *Case study research: Design and methods* (5th ed.). Sage. https://doi.org/10.3138/CJPE.30.1.108

Appendix 1: St. Kitts & Nevis Educational Stakeholders Interviewed

Stakeholders	Name	Gender	Zone/Institution
Ministry Officer	Stakeholder 1	Male	Ministry of Education
Principal	Stakeholder 2	Male	East
	Stakeholder 3	Female	West
Teacher/Deputy	Stakeholder 4	Male	Basseterre
Principal	Stakeholder 5	Female	Primary School (*East)*
Parent	Stakeholder 6	Female	Basseterre
	Stakeholder 7	Female	West
Student	Stakeholder 8	Female	West
Total = 8			

Appendix 2: Saint Vincent and the Grenadines Educational Stakeholders Interviewed

Stakeholders	Name	Gender	Zone/Institution
Ministry Officer	Stakeholder 1	Female	Ministry of Education
Ministry Officer Mathematics	Stakeholder 2	Male	Curriculum Development Unit
Principal	Stakeholder 3	Male	Primary School
	Stakeholder 4	Female	Government School
Teacher	Stakeholder 5	Female	Primary School
	Stakeholder 6	Male	Government School
Parent	Stakeholder 7		XXX *(Redacted)* Government School
Student	Stakeholder 8	Female	Primary School
Total = 8			

Appendix 3: Saint Lucia Educational Stakeholders Interviewed

Stakeholder Name	Gender	Designation	Assigned School/Institution
Stakeholder 1	M	Ministry Officer - Instruction	Ministry of Education
Stakeholder 2	F	Ministry Officer - Mathematics	Ministry of Education, Curriculum and Materials Development Unit (CAMDU)
Stakeholder 3	M	Ministry Officer - Testing and Measurement	Ministry of Education, Examination and Assessment Unit
Stakeholder 4	F	Mathematics Teacher Educator	School A
Stakeholder 5	F	Principal	School B
Stakeholder 6	M	Principal	School C
Stakeholder 7	F	Teacher	School D
Stakeholder 8	M	Teacher	School E
Stakeholder 9	F	Parent	Has a student at School F
Stakeholder 10	F	Parent	Has a student at School G
Stakeholder 11	F	Student	Grade 5 student at School F
Total = 11			

Appendix 4: Interview Protocol

ACT in Mathematics Project
Interviews with Educational Stakeholders

Interview Protocol: Ministry Officer

Introduction: Good morning/afternoon [*Name and Title*]. Thank you for accommodating this interview. I am XXX, a Mathematics Education at XXX and a consultant collaborating with the MoE and Commonwealth of Learning on a project aimed at improving mathematics education. This discussion will help us align project interventions with local needs. Are you comfortable proceeding and being audio recorded?

Questions:

1. From your perspective, how significant is the issue of unsatisfactory mathematics performance in [island name]?
2. What do you identify as key factors contributing to this challenge?
3. What strengths exist in the current mathematics teaching practices in [island name]?
4. What initiatives has your Ministry implemented to improve mathematics outcomes?
5. How effective were those initiatives, and what could have been improved?
6. What are your priorities or recommendations for enhancing mathematics teaching and learning?

Conclusion: Do you have any additional questions or points to share? Thank you for your time and valuable insights. Have a wonderful day.

Interview Protocol: Principals

Introduction: Good morning/afternoon [Name and Title]. Thank you for meeting with me. I am XXX, a consultant collaborating with the Ministry of Education and the Commonwealth of Learning to improve mathematics education. Your insights are crucial for understanding school-level perspectives. Are you comfortable proceeding and being audio recorded?

Questions:

1. Can you tell me a little bit about yourself?
2. From your perspective, how significant is the issue of unsatisfactory mathematics performance in [*state the island*] and your school?
3. What are the biggest challenges in students learning mathematics and teachers teaching mathematics?
4. How do teachers in your school approach teaching mathematics?
5. What strategies or programs have been most successful in improving mathematics learning here?
6. Many students are currently struggling in mathematics. How can we better support these students?
7. What are the main professional development needs to teachers in mathematics? OR What additional resources or training would benefit your teachers?

Conclusion: Do you have any questions or further thoughts to share? Thank you for your input. Have a great day.

Interview Protocol: Teachers

Introduction: Good morning/afternoon [Name and Title]. Thank you for participating in this interview. I am XXX, working on a project to improve mathematics teaching and learning. Your experiences as a teacher are invaluable. Are you comfortable proceeding and being audio recorded?

Questions:

1. Can you tell me a little bit about yourself?
2. From your perspective, how significant is the issue of unsatisfactory mathematics performance in your school?
3. What are the main challenges you face in teaching mathematics?
4. What teaching methods or resources have you found most effective in engaging students?
5. What are your students' greatest challenges in learning math?
6. How do you address diverse learning needs in your mathematics classes?
7. What professional development opportunities have been most beneficial to you?
8. What additional support or training would enhance your teaching effectiveness?

Conclusion: Do you have any additional questions or suggestions? Thank you for sharing your experiences. Have a wonderful day.

Interview Protocol: Parents

Introduction: Good morning/afternoon [Name]. Thank you for taking the time to meet with me. I am XXX, working on a project to support mathematics education improvements. Your perspective as a parent is crucial. Are you comfortable proceeding and being audio recorded?

Questions:

1. Can you tell me a little bit about yourself?
2. How do you feel about your child's experiences with mathematics at school?
3. What challenges does your child face in learning mathematics?
4. How do you support your child's mathematics learning at home?
5. What resources or programs have been most helpful to you in supporting your child?
6. How do you think schools could better support students in mathematics?
7. How do you see the role of parents in improving mathematics outcomes?

Conclusion: Do you have any questions or additional thoughts? Thank you for your insights. Have a great day.

Interview Protocol: Students

Introduction: Good morning/afternoon [Name]. Thank you for talking with me today. I am XXX, and I'm working on a project to improve mathematics teaching and learning. I'd like to hear about your experiences. Are you comfortable proceeding and being audio recorded?

Questions:

1. Can you tell me a little bit about yourself?
2. What do you enjoy most about learning mathematics?
3. What do you find most challenging in mathematics?
4. What helps you understand math concepts better?
5. Do you like how your teacher teaches math OR How do your teachers make math interesting or engaging for you?
6. You have friends that find math difficult? Why do you think they find math difficult?
7. What do you think could be done to make learning math easier or more fun?

Conclusion: Do you have any questions or suggestions? Thank you for your time. Have a great day.

Commonwealth of Learning
505 Burrard Street, Suite 1650, Box 5
Vancouver, BC V7X 1M6, Canada
Telephone: +1 604 775 8200
Fax: +1 604 775 8210
Web: www.col.org
Email: info@col.org

June 2025