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REVIEW ARTICLE

IMPROVING MATH SUCCESS FOR OLDER STUDENTS IN CHRISTIAN SCHOOLS: A SAMOAN CASE STUDY

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ABSTRACT

This research examines strategies to enhance mathematics achievement among senior-level students at Peace Chapel Christian School, situated within Samoa's diverse educational landscape. Concerns regarding low proficiency and disengagement in mathematics among Year 6 and 7 students prompted a critical investigation into underlying factors. Using a qualitative methodology, insights were collected from students, educators, and parents through open-ended questionnaires. Thematic analysis identified key challenges such as ineffective teaching methods, socio-economic disparities, and cultural influences. The study underscores the necessity of fostering engagement through interactive and collaborative learning, adapting instruction to diverse learning needs, and implementing culturally responsive pedagogy. Drawing upon theoretical frameworks such as Socio-Cultural Theory and Self-Determination Theory, the research proposes a comprehensive approach to mathematics education that prioritizes inclusivity and support. By addressing these challenges and integrating participant insights, the study offers practical recommendations for improving mathematics outcomes at Peace Chapel Christian School and beyond.

INTRODUCTION

Mathematics is a critical subject that shapes students' academic trajectories and future opportunities (Steen, 1999). However, persistent concerns about declining math performance among senior students at Peace Chapel Christian School highlight the need for targeted interventions. Notably, many Year 6 and 7 students have expressed reluctance toward math, even advocating for its removal from their daily curriculum. This troubling trend aligns with teachers' records, which reveal consistently low performance in mathematics, particularly among advanced students struggling with different mathematical topics. Mathematics education in Samoa faces challenges rooted in pedagogical practices, curriculum alignment, teacher preparedness, and socio-economic factors. The issue is exacerbated by students' negative perceptions of mathematics, which result in disengagement and poor performance. Without intervention, this decline in math achievement could have long-term implications for students' academic and career prospects. Thus, this study seeks to explore these challenges, propose solutions, and provide evidence-based recommendations for improving math education at Peace Chapel Christian School.

CONTEXT OF STUDY

Peace Chapel Christian School, located in Vaimea, Apia, provides education within a Christian framework, serving students from diverse backgrounds. Despite its commitment to

holistic education, the school faces significant challenges in mathematics achievement among Year 6 and 7 students. Data and observations highlight widespread disengagement and poor performance in mathematics, with some students opting out of math lessons altogether. The school's student body consists of learners from various socio-economic backgrounds, including students who face financial struggles that impact their access to educational resources. Additionally, some parents have limited formal education, making it difficult for them to support their children's academic progress at home. The school's teaching staff, though dedicated, encounters difficulties in implementing differentiated instruction due to time constraints and limited professional development opportunities. Understanding these factors is crucial for developing targeted strategies to enhance math achievement in this context.

LITERATURE REVIEW

The literature highlights several factors contributing to low mathematics achievement, emphasizing the need for culturally responsive teaching, differentiated instruction, and improved teacher training.

Teaching Methods and Pedagogical Approaches: Effective teaching methods significantly influence students' mathematical understanding. In Samoa, integrating hands-on

activities and culturally relevant examples—such as traditional crafts and communal practices—enhances students' engagement and comprehension (Anthony & Whyte, 2012). Studies indicate that interactive learning methods, such as peer tutoring, collaborative group work, and real-world problem-solving, are more effective than rote memorization techniques. A major concern in math instruction is the reliance on teacher-centered methods that prioritize direct instruction with limited student participation. According to research, students benefit from learning experiences that involve exploration and discovery rather than passive reception of knowledge (Vygotsky, 1987). Thus, educators must transition toward student-centered teaching practices that allow learners to take ownership of their mathematical learning.

Curriculum Design and Alignment: Aligning the mathematics curriculum with students' cognitive development is crucial. Educators in Samoa must balance cultural traditions with global perspectives to enhance student engagement and learning relevance (UNESCO, 2012). The Samoan curriculum follows a structured approach, yet gaps exist in how it addresses students' diverse learning abilities. One key issue is the rigid pacing of the curriculum, which does not always accommodate students who need additional time to grasp mathematical concepts. Additionally, standardized assessments focus primarily on procedural knowledge rather than conceptual understanding, making it difficult to gauge true mathematical competence. Ensuring that the curriculum reflects students' real-world experiences and cultural contexts can foster deeper engagement and retention of mathematical skills.

Teacher Training and Professional Development: Teacher training plays a pivotal role in improving mathematics instruction. Providing professional development opportunities that focus on culturally responsive teaching strategies can equip educators with the skills needed to address diverse learning needs effectively (Ministry of Education, Sports and Culture, 2015a). Continuous learning opportunities help teachers stay updated on effective instructional strategies, allowing them to implement best practices in their classrooms. The challenge in Samoa is that many teachers lack specialized training in mathematics education. Some primary school teachers may not have studied mathematics beyond their secondary education, limiting their ability to teach higher-level math concepts effectively. Investing in ongoing teacher education and mentorship programs can help address this gap.

Classroom Environment and Resources: The availability of classroom resources influences students' learning experiences. Given the resource constraints in some Samoan schools, educators must creatively utilize available materials and technology to enrich mathematical learning (Luamanu, 2017). Many schools lack access to sufficient textbooks, manipulatives, and digital tools that can enhance mathematical understanding. To compensate for these limitations, educators can integrate locally available materials into their lessons. For example, using traditional measurement tools, such as woven mats or coconut shells, can make abstract math concepts more tangible for students. Additionally, incorporating technology, such as interactive math software and online tutorials, can supplement traditional instruction and provide students with additional support outside the classroom.

Socioeconomic and Demographic Factors: Socioeconomic status, parental involvement, and cultural background affect

students' mathematical achievement. Strengthening partnerships between schools, families, and communities is essential to supporting students' learning and fostering positive attitudes toward mathematics (Ministry of Education, Sports and Culture, 2006). Research shows that children from lower-income households often have fewer educational resources at home, such as books and tutoring support, which can impact their math achievement. Moreover, cultural attitudes toward education and gender roles may also influence students' engagement with mathematics. Addressing these disparities requires targeted interventions, such as parent education programs and community-led initiatives to support students in their learning.

THEORETICAL FRAMEWORK

This study applies several theoretical frameworks to analyze and address the challenges in mathematics education at Peace Chapel Christian School.

Socio-Cultural Theory: Vygotsky's (1987) Socio-Cultural Theory emphasizes the role of social interaction and cultural tools in cognitive development. Applying this theory in mathematics education supports the use of culturally relevant examples and collaborative learning strategies. Mathematics learning does not occur in isolation; rather, it is influenced by students' cultural backgrounds and social interactions. Teachers can leverage peer learning and scaffolded instruction to help students internalize mathematical concepts more effectively.

Self-Determination Theory: Deci and Ryan's (2000) Self-Determination Theory suggests that students' motivation is driven by autonomy, competence, and relatedness. By creating a supportive and engaging learning environment, educators can enhance students' intrinsic motivation to succeed in mathematics. Autonomy-supportive teaching strategies, such as allowing students to choose their problem-solving methods and encouraging self-reflection, can increase engagement and persistence in mathematics. Providing constructive feedback and recognizing students' progress also contribute to their sense of competence and motivation.

METHODOLOGY

This study employed a qualitative research methodology to investigate the factors contributing to low mathematics achievement among senior students at Peace Chapel Christian School. Qualitative methods were chosen to capture the perspectives of students, teachers, and parents in an in-depth and nuanced manner. By using thematic analysis, this research identifies patterns and themes that inform strategies for improving mathematics education.

Research Design: A case study approach was used to explore the specific challenges faced by Peace Chapel Christian School. This approach allows for a focused examination of a real-world issue within its natural setting. The study aimed to gather rich, descriptive data to understand how various factors—such as instructional practices, classroom environments, and socio-cultural influences—affect students' learning experiences.

Data Collection Methods: Data was collected through open-ended questionnaires distributed to three groups: 20 students

from Year 6 and 7, 6 mathematics teachers, and 10 parents. These groups were selected to gain insights from multiple perspectives regarding mathematics education at the school. The questionnaires included questions on student engagement, teaching methods, parental involvement, and challenges faced in mathematics learning. In addition to questionnaires, classroom observations were conducted to examine teaching practices and student interactions in real-time. Observations focused on the effectiveness of instructional strategies, student participation, and resource utilization within the classroom environment.

Data Analysis

A thematic analysis was conducted to identify recurring patterns and key themes within the qualitative data. Responses were coded into categories related to engagement, instructional practices, resource availability, and socio-cultural influences. This process involved several steps:

- Reading and re-reading responses to familiarize with the data.
- Assigning initial codes to recurring topics.
- Grouping similar codes into broader themes.
- Refining themes and linking them to theoretical frameworks.

The results of this analysis formed the basis for discussions on how to improve mathematics achievement at Peace Chapel Christian School.

RESULTS

The data analysis revealed several major themes contributing to students' struggles and successes in mathematics learning:

Engagement through Interactive and Collaborative Learning: Students responded positively to activities that involved hands-on learning and peer collaboration. Many expressed that interactive lessons, such as math games and real-world problem-solving, made learning more enjoyable and understandable.

"We could have math games where we compete with friends." (s.1)

"I've seen that using real examples and working together helps students understand math better." (t.1)

Tailoring Instruction to Individual Learning Needs

Many students highlighted the need for different teaching approaches to accommodate various learning styles. Teachers also noted that time constraints made it difficult to adapt lessons for every student's needs.

"Using different methods to teach one topic so everyone can understand." (s.3)

"We need to make sure math lessons work for all kids, not just some. Everyone learns differently." (t.2)

Culturally Responsive Teaching: Culturally relevant teaching strategies were found to enhance student engagement and understanding. Some parents emphasized that connecting math lessons to real-life experiences in Samoa could improve comprehension.

"Incorporating visual aids, such as traditional patterns, may help students grasp math concepts." (p.4)

"We should use examples that reflect students' daily lives." (t.3)

Socioeconomic and Cultural Barriers: Limited access to educational resources, such as technology and textbooks, was identified as a significant barrier to student achievement. Additionally, some students faced challenges at home that impacted their ability to focus on schoolwork.

"Family support and involvement in a child's education play a big role in their math success." (p.2)

"Understanding students' home environments helps us find ways to support them." (t.4)

DISCUSSION

The discussion section provides a comprehensive analysis of the findings, linking them to relevant literature and theoretical frameworks. The key themes identified in this study—interactive and collaborative learning, differentiated instruction, culturally responsive teaching, supportive learning environments, and addressing socio-economic disparities—are examined in depth.

Engagement Through Interactive and Collaborative Learning:

One of the most prominent findings in this study is the need for interactive and collaborative learning approaches in mathematics education. Several student responses emphasized their preference for group work, games, and hands-on activities:

- "We could have math games where we compete with friends." (s.1)
- "Doing group projects would make math more fun." (s.6)
- "Using technology like tablets or computers for math games would be fun." (s.11)

These responses align with Vygotsky's (1987) Socio-Cultural Theory, which posits that learning occurs best through social interaction and guided experiences. Research by Anthony and Whyte (2012) also supports the notion that collaborative learning fosters deeper engagement and understanding. The literature suggests that when students work together on mathematical tasks, they develop problem-solving skills and enhance their comprehension through peer discussions.

Teachers also noted the benefits of collaboration:

- "Using real-life examples and group work helps students understand math better." (t.1)
- "I've seen that working together in small groups helps students feel more comfortable with math concepts." (t.3)

To implement these findings, schools should encourage the use of cooperative learning strategies, including peer tutoring and project-based learning. This not only increases engagement but also helps students develop social and communication skills essential for lifelong learning.

Differentiated Instruction for Diverse Learning Needs:

Another crucial theme that emerged is the need for differentiated instruction to cater to the varying abilities and

learning styles of students. The importance of multiple teaching approaches was highlighted by both students and parents:

- "Using different methods to teach one topic helps everyone understand." (s.3)
- "One-on-one support would help my child grasp math concepts better." (p.3)
- "Breaking down big problems into smaller steps makes them easier to follow." (s.13)

Teachers also acknowledged the challenges of addressing different learning styles:

- "We need to ensure math lessons accommodate different learners." (t.2)
- "Every student learns at a different pace, and our current system doesn't always allow time for extra support." (t.5)

Self-Determination Theory (Deci& Ryan, 2000) highlights the role of autonomy and competence in motivating students. When students feel capable of learning and have control over their educational experiences, they are more likely to persist in mathematics. UNESCO (2012) also stresses that a curriculum must be flexible to accommodate different learning needs. Schools can support differentiated instruction by incorporating tiered assignments, offering extra tutoring, and using adaptive technology that tailors content to individual students.

Culturally Responsive Teaching: The role of culturally responsive teaching in improving mathematics outcomes was another significant finding. Students and parents suggested that incorporating Samoan cultural elements into math lessons would make the subject more relatable:

- "Using traditional Samoan patterns could help us understand math concepts." (s.4)
- "Cultural attitudes towards education affect children's confidence in math." (p.3)

Culturally relevant pedagogy helps students connect abstract mathematical concepts to familiar real-life experiences (Ministry of Education, Sports and Culture, 2006). Vygotsky's (1987) theory further supports this approach by emphasizing the importance of learning within a cultural and social context. Teachers can enhance culturally responsive teaching by integrating local currency, measurements, and environmental contexts into their math problems. This fosters a sense of relevance and identity in learning.

Supportive Learning Environments: Creating a supportive and inclusive classroom environment emerged as another essential factor for improving mathematics performance. Several responses from teachers and parents highlighted the importance of motivation and encouragement:

- "Making sure everyone feels like they belong in math class can help them do better." (t.5)
- "Positive reinforcement and encouragement improve my child's learning experience." (p.8)

Research by Xim et al. (2005) suggests that a positive classroom environment improves student confidence and willingness to participate. Self-Determination Theory (Deci&

Ryan, 2000) supports this claim, arguing that relatedness—the need to feel connected and supported—is crucial for learning motivation. Teachers can foster a more inclusive environment by providing personalized feedback, celebrating student progress, and offering constructive encouragement.

Addressing Socioeconomic Disparities: Socioeconomic factors were also found to significantly impact student achievement in mathematics. Some students lacked resources and parental support at home, as evidenced by the following responses:

- "Family involvement in math learning makes a difference." (p.2)
- "Some students lack resources at home to practice math." (t.1)

These findings are consistent with research by the Ministry of Education, Sports and Culture (2006), which emphasizes the role of family engagement in academic success. Bronfenbrenner's Ecological Systems Theory (1979) also supports this perspective, stating that a child's development is influenced by multiple environmental systems, including family and school. Schools can address these disparities by:

- Providing additional resources such as take-home learning kits.
- Establishing parent workshops to equip families with strategies for supporting math learning.
- Offering after-school tutoring programs for students who require extra assistance.

Practical Recommendations for Improvement: Based on these findings and theoretical perspectives, the following recommendations can help improve mathematics outcomes at Peace Chapel Christian School:

- **Encourage Interactive and Collaborative Learning:** Introduce peer tutoring programs, cooperative group activities, and gamified learning experiences to enhance student engagement.
- **Differentiate Instruction:** Implement varied teaching methods, provide one-on-one support, and use adaptive learning technologies to meet diverse student needs.
- **Promote Culturally Responsive Teaching:** Incorporate real-life Samoan contexts into math instruction to make learning more relevant.
- **Foster a Positive Learning Environment:** Offer motivational support, build students' confidence in mathematics, and create a classroom culture that encourages participation.
- **Address Socioeconomic Barriers:** Strengthen school-home partnerships, provide financial support for struggling families, and ensure all students have access to learning materials.

By integrating these recommendations, Peace Chapel Christian School can create a more effective mathematics program that supports all learners, particularly those who struggle with engagement, comprehension, and motivation. The combined application of Socio-Cultural Theory, Self-Determination Theory, and Ecological Systems Theory provides a strong foundation for understanding and addressing the challenges in mathematics education.

CONCLUSION

Improving mathematics success at Peace Chapel Christian School requires a multifaceted approach that addresses both pedagogical and socio-economic challenges. This study highlights that interactive and collaborative learning fosters engagement, differentiated instruction accommodates diverse learning needs, and culturally responsive teaching enhances relevance and comprehension. Additionally, a supportive learning environment builds student confidence, while addressing socio-economic disparities ensures equitable access to resources and learning opportunities. By integrating these strategies and leveraging theoretical frameworks such as Socio-Cultural Theory and Self-Determination Theory, educators can create an inclusive, effective, and motivating mathematics learning experience. Implementing these findings in practice will not only enhance student achievement at Peace Chapel Christian School but also serve as a model for improving mathematics education in similar educational settings.

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