

MATHEMATICS EDUCATION IN BARBADOS AND TRINIDAD: CHALLENGES AND PROGRESS

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This paper will provide an overview of Mathematics education in the Caribbean region with specific focus on Barbados and Trinidad based on the author's PhD thesis. Findings from this study are based on 50 interviews and 87 hours of observations. Curriculum documents as well as specific Mathematical problems will be examined. There will also be some discussion regarding the possibility of education borrowing - the attempt to share best practices across the region – as a means of improving the quality of education in the region. The session will focus on the themes of cultural conflicts, teaching styles and implications for Maths education in both the Caribbean and globally as some of the challenges in Barbados and Trinidad are universal. By examining Maths education in a different context, we may be able to learn more from each other.

INTRODUCTION

The quality of education is a central concern of the Education for All by 2015 initiative as quality influences access to schools. As Mathematics is often mandatory for children in compulsory schooling, the quality of teaching and learning in Mathematics is a particularly pertinent issue. While Wolff and Castro (2000) assert that education in Latin America and the Caribbean is 'inadequate' by international standards, this article explores the intricacies of the quality Mathematics education in Barbados and Trinidad, two English speaking islands who are in different stages of developing new national curricula. Indeed, recent developments in the Caribbean have paved the way for education development. The strength of the Caribbean Examinations Council (CXC) is evident in the currency of the Caribbean Secondary Education Certificate and the Caribbean Advanced Proficiency Examinations (CAPEs). Both exams have successfully reduced the dependence on Cambridge Examinations at the Ordinary and Advanced level as school leaving exams – and hence currency in the wider scope of tertiary institutions abroad. Further associations such as CARICOM have attempted to create a regional alliance rather than a colonial reliance on Western multilaterals.

Clearly, the examinations are an important part of the school systems as they are the outward benchmarks needed to obtain the currency of knowledge required by institutions abroad. They may also serve as markers of a good education system in the region as CXC reports focus on the number of student entries and passes - two 'indicators' of a successful national system. High failure rates also indicate a flaw in the system as a linear approach to schooling suggests that school leaving exams are the apex of education. Yet full student participation in these exams has yet to be seen in both countries despite compulsory lessons in Mathematics throughout secondary

school. As the overall research question for the author's PhD focused on policy, the responses discussed in this paper are part of larger interview transcripts. In this paper, only aspects related to Mathematics education will be discussed. Through examining educationalists' perspectives of the system, the gap between the intentions of national policy and the dynamics of teaching and learning will be explored. While this is a preliminary step in improving the quality of Mathematics, identifying similarities and differences may uncover challenges of reform in the Caribbean and provide implications for other small states and 'developing' countries.

METHODOLOGY

After completing the pilot of 14 interviews, 36 further interviews took place between September 11-October 19, 2007. The positions held by respondents is as follows: 32 teachers, 2 school administrators, 6 academics, 5 policymakers and 5 respondents from regional or international organizations. Some of the respondents have worked in various positions and the current position held may not fully represent their expertise. Several academics worked extensively on national curriculum items and some of the senior teachers were former chief examiners for CXC. This study was largely qualitative although quantitative approaches may appear in some aspects of data analysis in the full PhD when completed. An interview question bank was prepared before the pilot and used throughout the pilot interviews. Following the pilot, the questions were amended to include further perspectives on aspects of teaching and learning to help triangulate the findings within policy documents related to improving secondary education. Another key intention behind the interviews was to explore similarities and differences between Mathematics education in both countries to probe the possibilities of education borrowing. The interviews were largely informal in nature but questions were prepared prior to the interview such as those involving strategies teachers employed to deliver the curriculum and perspectives on their teaching.

FINDINGS

Hierarchy of secondary schools

Although both Barbados and Trinidad continue to use equivalent 11+ exams to determine secondary school places, criticism was expressed by respondents regarding the differences in status of schools. In Barbados, schools were ranked according to achievement at CXC exams while the denominational schools in Trinidad were seen as prestigious institutions compared to government secondary schools. These divisions created a hierarchy. B1 speaks about the experience from Barbados and argues:

“For the ones who are not so clever, there are some weaknesses. Our system at the moment is not geared towards bringing the slower ones along as fully as they should be”.

Trinidadian teachers were also critical of the hierarchy produced by the secondary school system. When asked about the extent to which the hierarchy in Trinidadian

schools mirrors the social divisions within Trinidadian society, T1 responded: “It is there alive, prominent, unfortunately that is what drives the society”.

Perspectives on CXC exams

Although both countries also have national syllabuses, it is important to note that the CXC exams are the outward qualifications in both countries and completing the syllabus is an internal exercise. As such, questions surrounding the national syllabus usually did not generate much discussion, except in the case of Trinidad in which a new initiative was viewed as controversial. There was also the critique that the exams are an exercise at the end of a training period, rather than a measure of intelligence. From the perspective of the CXC, one of the key benefits the tracking the deficiencies of both teachers and students (B2). Yet this benefit may come at a high cost. B3 expressed the concern that these exams dictate too much of the Maths education system in Barbados: “...until the exam is set in a way that Mathematics is more practical then we’re not going to get very much done”. T2 was also critical of the lack of creativity within the Caribbean exams: “This is the way the CAPE syllabus is, it’s a linear approach where you do step a, b, c and then d you get the answer”.

Aspects of teaching and learning

In general, teachers from both countries had mixed responses regarding less traditional modes of teaching such as problem solving, group work, cultural contexts of Mathematics and real life examples. Some teachers stressed the necessity and frequency of use of these techniques while others stated they did not use them. While teachers were critical of ‘chalk and talk’ methods, they often admitted they taught in this style: “I think I try but I know sometimes it’s too much chalk and talk” (T3). B4 offered this explanation: “Because of the intake that we have we tend to use a similar approach for all of the children, assuming that their needs are roughly the same”. As the schools are divided by ability, teachers may assume that other methods are not needed to reach out to different types of intelligences.

Some teachers, however, felt that teacher centered methods were not only effective, but also ideal. B5 was asked about the criticism of too much chalk and talk in the Caribbean, and responded the following:

“I taught in the Cayman Islands and they had all the resources and they are far weaker. Yes there is lots of chalk and talk but if the person delivering it is still good, it is still effective”.

The concurrent criticism yet continued use of chalk and talk finding is consistent with the observations. Several teachers were asked to identify the benefits and drawbacks of this teaching method by the researcher as a way of trying to overcome bias against traditional methods of teaching. T4, a Trinidadian explained reasons for choosing this instructional method: “You are able to explain...and if they didn’t follow a step, you can erase it and go over it again”. However, T4 was not able to identify the drawbacks of chalk and talk. Similarly, B6, a Barbadian teacher stated the only drawbacks of dictation might arise if a child was absent during dictation or if there

was a child with a hearing difficulty. T8, a policy personnel offers an explanation for the high emphasis on traditional methods of teaching and starts at the level of university lecturers who do not have exposure to education training and are content specialists. Teachers such as B7, however, are also able to see the limitations of chalk and talk:

“...it usually pigeonholes the students into adopting specific approaches to particular problems.... We are directing the course of the lesson instead of students having their input to the lesson”.

Administrators such as T1, however, are working on improving teaching through collaborative planning and argues that schools must be professional research communities and teachers must learn to sit together and talk.

Others insisted they used group work and stressed problem solving techniques. For the most part, respondents were able to identify the limitations in this area. Teachers cited both lack of time and the exam oriented system as restraining factors for dependence on chalk and talk. Some of the reasons included size of the class and length of the syllabus. The interview questions also probed the extent to which problem solving approaches were used. Although these were not explicitly noted in the observations of both countries, B8 argued that the CXC exam contains this element of Maths education: “...to ensure teachers do this at the school...”. B5, argued that problem solving approaches were used to a large extent but revealed a level of dependence on the teacher: “I try to show them how to go through the steps, A, B, C, and not just focusing on the answer”. Other teachers in both countries asserted that problem solving skills were emphasized all the time. Yet a former chief examiner of Maths seems to concur that the weakest area is problem solving (I1). On the other hand, T2 attributed the little emphasis on problem solving skills to the reliance on past papers: “They all want to see past exam papers and...they want to see it all, so if they see it worded in a different way, they can’t solve it”.

Although not witnessed in the observations, some teachers described their styles as interactive. This may be a result of the differences in definition of the word. It is possible that respondents felt that interactive learning involved participation on the part of students, whether during dictation exercises or repetition of mathematical concepts. Some teachers claimed to use group work; however this was only seen once in the 6 weeks of fieldwork. Through the interviews, some respondents such as T5 expressed the view of group work as chaotic. This may explain why classes were minimally participatory and followed traditional modes of learning. However, these approaches are supported by the respondents from the Ministries of Education in both countries.

‘Real life’ Mathematics

As a whole, teachers in both countries expressed some interest in ‘real life’ Mathematics but this did not seem to be an important teaching strategy. Beyond stereotypical constructions of Mathematics as ‘useful’ in counting and business, the

wider context of Mathematics was not explicitly noted in the observations. However, relevance to 'real life' and connections to out-of-classroom experiences are seen as necessary. In particular, the Mathematics associated with the students' own culture – that of their home environment or out of classroom culture - was not identified within lessons with the exception of one Trinidadian teacher T5, who pointed out the Maths involved in drug dealing. While this may vilify the practice of building upon out-of-classroom experiences, other aspects of children's lives such as media, cultural practices, the arts and nature were not identified as possible breeding grounds for both examples and exploring the Mathematics beyond 'academic' Mathematics curriculum. Most teachers recognized this, and cited examples in their interviews of how "Maths is all around us" (B9) but did not appear to build on it in their lessons. This may be a result of the reputation that out-of-classrooms have as inappropriate and invaluable to the school experience. When asked if outside school knowledge was built upon in the classroom, a few respondents noted that the communities in which some of these children live carry out practices that are not approved by the teachers.

Mathematics and Caribbean culture

When asked about the importance of regional or local Caribbean culture, respondents seemed ambivalent to the idea. A few respondents asked for examples while others agreed but did not express enthusiasm. One teacher was supportive and provided an example of vectors and travel between Caribbean islands in her response to the question. Others such as T3 simply stated: "Maybe we are just not thinking along those lines". Others felt it was important such as B9, as it would help students develop a better attitude towards Maths. Yet there were other respondents such as B10 who stressed the importance of a global awareness, feeling "we should not go from one extreme to another...we should recognize the world is the world, so not just the Caribbean but expose them to other things out there".

A few teachers questioned the effectiveness of these techniques, such as T2: "They talk about cricket scores and so on, they relate well to it. I don't know. I'm not sure if it works, theoretically it should work, but I haven't seen evidence". T6 offers various ways in which Maths is present in the local Trinibagonian context through examples of patterns on steel pans and trapezium motifs, flutes in Hosay festivals, wing spans of carnival costumes and several others in an unpublished paper. The perspective of T7 may sum up how Maths teachers from both islands feel: "It's important, how much time devoted to it is another question. History is probably more able to do it than Math class but I think it's important for them to learn about Trinidad".

Accommodations for Lower Achieving Pupils

It appears that a systematic approach is lacking and teachers from both islands used a variety of different methods to cater to lower achieving pupils. B3 states: "most schools have accelerated groups, those who move on faster and the slower ones who take a little more time to come". Some teachers such as T8 identify some methods used such as "Try to bring them to the front of the class...walk around, stand next to

them, and help them, and after class you can help them out...”. One example of a school initiative is the development of a peer tutoring programme at one Barbadian school, which is in the process of being widened in scope. Only one teacher, B6, recognized the possibility that students may not be achieving due to method of instruction. Similarly, in classroom observations, teachers treated lower achieving pupils as needing more enforcement with basic concepts. The notion of going beyond chalk and talk did not seem apparent. This may be a result of the hierarchical divisions among secondary schools in both Barbados and Trinidad, in which the rhetoric of the system may be based on divisions based on ability. As such, the notion of catering to different ability levels may be perceived to be less of an issue as students of similar levels are placed in the same school.

CONCLUSION

This article begins to discuss some of the challenges teachers and educationalists face in two developing island states. Despite curricula reform, teachers predominately use traditional methods for delivering the canon of ‘western’ school Mathematics. This is perhaps as a result of the lack of culture which is associated with Mathematics as it suffers from an apparently neutral and ‘global’ persona in Barbados and Trinidad. Further interviews with policymakers show this notion is systemic as one respondent noted the curriculum was consistent with NTCM guidelines (B11) and another interviewee discussed the inspiration from the New Zealand curriculum (T9). The smallness of scale of these island states seems to contribute to dependence on ‘western’ constructions of Mathematics education. This may stem from the need to participate in the knowledge economy where children are able to gain international currency for their education and thus attend universities abroad. Further study into examining the similarities and differences in the Mathematics education of Barbados and Trinidad may contribute to a description of Maths in the Caribbean and how it may be improved to ensure larger participation in CXC examinations that the system attempts to focus on as a linear goal. Yet a larger aim of ensuring children are able to see Mathematics as something beyond static examination content may have longer – and stronger – benefits for developing island states. This may require teaching methods which are much further from traditional modes of teaching and support for teachers implementing the new curricula. It also requires examination into the ways in which postcolonial powers promote and construct Mathematical knowledge as this is strangely emulated in small states.

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