

## **Mathematics teaching in the Seychelles: The challenges of reforming practices in a small developing state**

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This paper is drawn from my PhD research which aimed at investigating the outcomes of a primary mathematics teaching reform in Seychelles. As part of the research, 4 primary schools were chosen for the fieldwork. In each school the following activities were achieved: a) samples of mathematics lessons were observed followed by post lesson interviews with the teachers, b) a six-teacher focus group interview was held to gauge the teachers' experiences enacting the reform, and c) relevant documents were reviewed to acquire background data about the school and the reform. This paper is based on findings from the focus group interviews. The findings revealed that the reform benefited the implementers' practices but the schools were challenging sites for pedagogical reform. The results have implications for teacher in-service education and policy making on pedagogical reforms.

**Keywords:** Seychelles, primary mathematics, reform, teacher change

### **Introduction**

The Mathematics Lesson Structure (MLS) reform, the main context of my PhD research, was described in an earlier BSRLM conference paper (Valentin 2011). This current paper reports on the teachers' responses of their experiences enacting the reform, collected through focus group interviews. Its impetus emerged following contradictory findings in data collected in other parts of my research. The teachers' responses to a questionnaire administered five years into the MLS reform suggested that they widely incorporate the reform ideas in their daily teaching. The teachers were overwhelmingly positive about MLS. They felt that the reform should be further promoted as it assists them in developing coherent and effective mathematics lessons. However, people who worked with the teachers felt that the teachers were not complying as requested. Some subject leaders felt that the teachers pretended to be using the reform when in fact they were not. Other education officers felt that teachers lacked rigour in their approach to incorporate the MLS ideas in their teaching. Furthermore, when data from 22 lesson observations were analyzed, only 5 contained all the suggested components of the reform. Most lessons did not consist of the important elements of the reform. A few other lessons deviated considerably from what the reform advocates. This paper reports on an inquiry made into the teachers' account of their experiences with the reform.

### **Theoretical perspectives**

In her argument to characterize the process of instructional change, Smith (2000) argues that the process of change in the classrooms is one of the dilemmas or conflicts that teachers have to endure in their professional life as a response to reform calls. Even if sometimes teachers are criticized for lacking commitment, will and capacity

(Spillane 1999) they are nevertheless the key to the success of curriculum reform (Spillane and Callahan 2000). Many of the reform ideas that are introduced in schools as a means to improve pupils' learning target them (Ling 2002; Nielsen, Barry, and Staab 2008; Tabulawa 1998). When teachers are presented with the reform intents they are generally being asked to make significant changes in the core business of their practices (Spillane 1999). Some of these reforms require them to deconstruct practices which have rooted over a long period of time, and other reforms challenge the teachers' beliefs and values. However, as Bowe et al. (1992) cited in (Millett and Bibby 2004) claim, "[teachers] do not [just] confront policy texts as naïve readers, they come with histories, with experience, with values and purposes of their own, they have vested interests in the meaning of policy." The teachers bring to the profession perceptions of their self-efficacy (Stein and Wang 1988). This is a self-evaluation of the extent to which they can handle the demand of the reform. Spillane points out that ... "for teachers to attend to the core reform ideas, most of them would have to appreciate the inadequacies of their current understandings about instructions relative to the reform proposal" (1999, 154). Fullan (1982) argues that other than self efficacy, teachers' motivation to fully implement the reform ideas depends on the extent to which they feel the intents of the reforms will work. This illustrates the fact that there are a number of issues that the teachers have to overcome before they attend to the intents of reforms. Taking all these issues into consideration is therefore important when discussing the teachers' enactment of the reform.

Millett and Bibby (2004) propose a model which they have developed from the works of Spillane (1999) to discuss outcomes of teacher change initiatives in schools. Several factors, they argued, impact on the teachers' enactment of reform ideas which ultimately deter the way teachers address reform. There are those factors that occur within the teachers' immediate working environment and those that occur at the periphery of this working environment. Most of the time, teachers do not have the freedom to determine how they attend to or ignore the calls to reform their instructional practices. Even if some teachers would claim that their decisions to change their practices are influenced by the responsibility they have for their pupils' learning, pressures from several other factors may dictate how they enact reform calls.

The aim of this paper is to report on an inquiry into the teachers' experiences so as to ascertain some predominant issues in relation to enacting the MLS reform ideas. If supporting teachers is part of the quest then understanding the disparity between the teachers' self-reported data and the actual practice is an imperative. Cuban (1998) argues that evaluating the teachers' enactment of reform ideas depends on the characteristics, background and position of whoever is doing the evaluation, which eventually affect how the success or failure of the reform is interpreted and evaluated.

## **Methods**

One focus group interview was held in each of the four case study schools. In each school, six teachers, ranging from P1 to P6 participated. The teachers were of varying years of teaching experience. Hence the sample consisted of teachers who were teaching when the reform started to be implemented and those who have only recently started to use the reform in their actual practices. The responses reflect the views of 24 teachers in mixed and varied contexts. The interviews, led by the author of this paper, were conducted in an empty room in the teachers' respective schools. Only the

participating teachers were present in the room at the time of the interviews to allow free responses. On average the interview lasted for 45 minutes.

### ***The Data***

The teachers answered questions based on the following issues: the process by which they were made aware of and involved in the reform, their involvement in the development of the reform, their engagement with the reform ideas, the actual implementation of the reform at school level, their reflection on their experiences, and their perception of the benefits and outcomes of the reform. The interviews were audio-taped, transcribed and translated verbatim as much as possible. However, there were instances when I had to rephrase the teachers' accounts in translation.

### ***Data analysis***

I used constant comparative analysis embedded in the grounded theory approach (Braun and Clarke 2006; Bryant and Charmaz 2010; Strauss and Corbin 1998) to analyze my data. Since MLS was an emerging innovation, I relied heavily on elements of grounded theory techniques, using participants' comments and my personal observations to identify interesting or problematic aspects of the reform. First I analysed the schools' individually one at a time. Onwuegbuzie (2009) advises on analyzing each focus group data separately which he argues allows the researcher to assess whether themes emerging from one group do emerge from the other groups, hence making it possible to determine when data saturation is reached. I began the data analysis with open coding followed by the first level of code categorization, axial coding (Bryant and Charmaz 2010) in which codes with a same sense were grouped to form broader categories. The second level of categorization produced more abstraction and it was at this level where themes began to emerge. In this paper I discuss three of the themes which emerged as factors inhibiting the teachers' compliance to the reform: reform message, teacher capacity and support.

### **Analysis of the findings**

While I present the teachers' quotes in this section, I use some identifiers. ALP, BET, GAM, and KAP are initials of the schools, Alpha, Beta, Gamma, and Kappa respectively, in which the focus interviews were held. T(*i*) is one of the six teachers from that specific school. The three themes that I will focus on are: reform message, teacher capacity, and teaching support.

### ***Reform message***

I begin this section with a quote from a newly qualified teacher, who had reported elsewhere that as a trainee, he was introduced to the reform during his training.

... when I got to the school, everybody was using it so I also used it ... [GAM T1, 1 yr experience].

My interpretation of his response suggests that he missed out on the true essence of the reform idea. His decision to use the reform is one which sought to make him fit the community of practice (Wenger 2000) he belongs to. This response suggests that there was no proper rationale given to teachers, especially the new ones as to why they should be using the MLS ideas in this specific school.

An experienced teacher in a different school assumed that there was no proper reason to introduce MLS in schools. Her reaction challenged the Ministry's approach to deal with teaching related weaknesses.

... anyway, this is the problem with [the Ministry of] Education. Each time they want to introduce something, they put all teachers in the same bag. I think, like that they can implement whatever they like... [ALP T4, 25+ yrs of experience].

Another teacher from the same school as the latter teacher discussed how she viewed those calls to reform teachers' practices. She recognized that even if reform can bring about positive outcomes to teaching, the introduction process can be damaging.

MLS has done good things in schools. However, when we were given the reasons to change to MLS we felt that we were not teaching as we were expected to. And this really demoralised a lot of us ... We felt bad. We felt that our effort to give the pupils a good education was not being appreciated... [ALP T2, 17 yrs of experience].

In my opinion the reform message appeared to have been unclear to the teachers. Even if elsewhere, the teachers had reported that they were sensitized about the reform, these three quotes suggest otherwise. The fundamental purpose of MLS in schools was blurry to the teachers, suggesting that defying the reform might have been due to a lack of clarity in the reform message transmitted to them by their leaders or members of other support teams.

ALP T4 challenged the "one size fits all" approach to reform. Her reaction suggests that teachers should be distinguished and be supported accordingly. Her reference, "putting everybody in the same bag", suggests that there were teachers like herself who might have felt better than the others, and possibly better than that general model to teaching mathematics. Perhaps to ALP T4, MLS was not adding anything to her professional development. Defying the reform, in her context, could possibly be an issue of competence. If MLS was introduced to stimulate change as opposed to a "rule to obey", the intended message had not been properly conveyed to many teachers like ALP T4. My argument of a poor reform message transmission is further supported by the next quote. "... why do I have to plan all these lessons, I know what I am doing..." [GAM T6, 6 years of experience]. The latter quote sounds the voice of a teacher questioning the reform intention. This teacher seems to be reacting to an issue of confidence in her teaching. She viewed the reform as a call to do more unnecessary work. She was indeed not enjoying that. Her response suggested that she had had no proper rationale given to her for using the MLS reform. Hence I suggest that there could be a link between the way the teachers were implementing the reform and the reform message.

### ***Teacher capacity***

In the following quote the teacher was reacting to the question, why was the pupils' achievement still weak? She responded:

... sometimes I blame myself too. I think maybe I have been teaching the wrong concept. This is what I feel. [...] I have been trained to teach maths but I did not like doing maths when I was at school. I've trained, I have to teach maths. First of all I did not feel at ease to start teaching maths. But at times I feel that I am teaching with experience ... I think I need certain... some knowledge on certain topics [KAP T2, 29 yrs of TP].

On the basis of this quote, I claim that there were serious teaching issues which might have limited the teachers' ability to implement the reform appropriately. In other

focus interviews some teachers were also reporting that they had problems in incorporating the more challenging elements of the reform in their teaching. These are some additional vivo codes taken from the interview data which could be indicating that there were teaching problems associated with the issue of teacher capacity: a) real life examples difficult and not easy to get, b) problem solving can't be done, c) no lesson with investigative features, d) mixed ability teaching – complicated, and e) graded tasks – no challenge. What I worked out from the teachers' responses was that many teachers were challenged to implement aspects of the reform which required them to use high cognitive ability.

### ***Teaching support***

In reality, teachers' capacity to teach links with support received at school level. Here are the responses of two teachers who were talking about their experiences with regards to the quality of support they were getting their school.

Take graded tasks for example. Some people say that we need several types of tasks covering the same topic but some other people tell us that we need just one set of tasks but covering many objectives. We now tend to stick to what we have been doing. Having small groups and setting one exercise for each group. [BET T5].

This business of mixed ability is a problem ... is a good example. Early Childhood Coordinators [part of the Education Coordinator team] tell you to do differentiation. IPAM people [referring to members of the Mathematics Working Group] tell you to do graded tasks. The lesson plan that I do for IPAM, these ECC's do not accept it. [BET T6].

Both accounts suggest that while on the one hand teachers might be blamed for constructing "wrong reform message", they were on the other hand getting "conflicting messages". In a small developing system where teachers rely heavily on expertise from the headquarters, I argue that they need supports which are robust and reliable. Moreover, in other parts of the interviews, the teachers talked about how teaching resources were limited. The weaker teachers desired teaching guides and proper textbooks. Indeed in those schools where the teachers were experiencing conflicting messages, textbook could have been alternative support materials.

### **Conclusion**

Consistent to what Millet and Bibby (2004) argue, my data suggest that several factors could be conditioning the teachers' ability to comply with the reform: factors inside and outside the teachers' immediate working environment. Applying this lens to my data, I can conclude that primary schools in Seychelles were challenging sites for pedagogical reform. My data are also consistent to what Bowe et al. (1992) cited in Millett and Bibby (2004) argue, in that teachers like ALP T4 and GAM T6 do not just confront reform with naive behaviours. There are genuine pedagogical reasons such as, unclear reform messages, teacher competence, poor provision of resources which may lead them to defy reform calls. Subsequently, this paper sets the ground for deeper analyses into the teachers' account of their experiences which can reveal other factors inhibiting the way they implemented the reform. One issue which was not taken into consideration in the MLS context was this issue of "one size fits all". Teachers with experience and potential might have seen this quest as restricting their teaching. This could be so in schools where capable teachers construed MLS as a rule

to obey. My study has significance and implications for more research into this reform, in teacher education, and in policy making.

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