Developing pre-service teacher education in times of constraints: the case of the Eritrean elementary school

Jeppe Skott, CICED, Copenhagen, and the Danish University of Education

Abstract: This paper describes the development process and some preliminary results of a new programme for elementary teacher education in Eritrea. The programme aims support genuinely mathematical types of student participation in mathematics classrooms in college and subsequently in elementary school, while acknowledging the significance of contextual constraints for this intention. The paper argues that the new programme may be seen as an attempt to strengthen communities of teaching practice for student teachers while they are still at college. Upon graduation these communities become virtual, but it is conjectured that they may still supplement what is often a rather more traditional influence of the actual communities of practice in the schools where the novice teachers take up teaching.

The context of Eritrean teacher education

Eritrea is changing her educational system. Comprehensive plans for a transformation of the sector have been developed and external funding has been found to support it. Elementary teacher education is part of the process. In 2001 a development scheme was introduced to change the contents and the dominant teaching-learning practices of the present programme. But rather than a wholesale replacement of the present, it may be seen as a continuation of efforts that have been ongoing almost since Eritrea gained her independence from Ethiopia in 1993. This is so at least in mathematics.

To some extent, the educational discourse related to the present situation as well as to the envisaged changes is cast in terms of the rhetoric of international reform efforts. It questions an exclusively academic orientation of the education system, and it introduces ‘a student centred approach’ to replace ‘passive listening’ and ‘didactic and traditional pedagogy’ with more interactive and participatory teaching-learning styles (e.g. Ministry of Education, 1997; Osman Saleh, 2003).

However, contextual factors limit the opportunities for the rhetoric to play prominently in practice. Divided by ethnic and linguistic boundaries, the 3½ million Eritreans living on the horn of Africa face harsh conditions. Per capita gross national income is US $ 250, infant mortality rate runs at +10%, and life expectancy is 46.

Continued political and military tension with Ethiopia significantly influences all aspects of Eritrean society, including education.

The social and economic conditions have obvious impact on education. Large classes, lack of quality materials, poor physical conditions, and insufficient teacher qualifications are aspects of “the ground situation” frequently mentioned as immediate contextual constraints on the reform. It is, of course, a main aim of the reform to overcome these. However, elementary teacher education needs to find ways of promoting educational change in schools, while acknowledging the existence of
constraints. This poses particular problems for the types of classroom interaction envisaged by the overall reform: How is student participation and interaction encouraged, and how may teacher education contribute to the envisaged practices under these conditions?

The present course at the Asmara Teacher Training Institute

At present, the only major institution of elementary teacher education is the Asmara Teacher Training Institute (ATTI). Located in the capital of Asmara, ATTI enrols app. 600 secondary school graduates for a one-year programme qualifying the students to teach all subjects in grades 1-5.

Teacher educators at ATTI have developed the present programme, which is now considered a professional rather than an academic one. In mathematics, previous emphases have been replaced with content that is closely related to the school subject. Also, an element of mathematics methodology has been introduced to supplement the shift of focus in the subject itself. Originally the methodology aspect was taught as a separate course, but it is now part of a single subject of mathematics and mathematics methodology.

The mathematics/methodology course is taught 4 lessons a week, i.e. a total of app. 125 lessons. Mathematically, it deals with the whole and the rational numbers and the four operations. Other and equally important aspects of the school curriculum are not dealt with because of time constraints. The teacher educators regret this, not least as the students are considered mathematically weak in spite of their background as secondary graduates. These weaknesses were documented as part of a situation analysis that was conducted to inform the reform efforts (cf. the next section).

Towards the end of the course there is one month of teaching practice. The rationale for the timing of the practice period is that the students teaching is assessed and should take place only when they are fully prepared to teach.

The main teaching-learning material is a locally produced set of notes, the manual. The manual initially discusses some problems of school mathematics and claims that they do not stem from the subject itself, but from how it is taught. This is summed up as classroom practices in which the teacher explains and provides examples, and the students copy the terminology and procedures presented. As an alternative, the manual suggests a more activity based and process oriented approach: Students’ investigations should form the basis for understanding and conceptual development. The rest of the manual seeks to adopt such an approach to school mathematics.

The intentions of the present course, then, are highly compatible with those of the overall reform. It is acknowledged, however, that they do not materialize at present, not least because of the contextual constraints mentioned above.
Developing a new curriculum

The situation above constitutes the background of a new teacher education programme developed jointly by ATTI-staff and a Danish consultancy team. In mathematics, the work is headed by Tesfalidet Gebremeskel, mathematics teacher at ATTI, but other ATTI-staff have also been involved. The consultant is the author of this paper. Whenever I write ‘we’, I refer to those involved at the time. This includes Tesfalidet, the consultant, and possibly other teacher educators.

It is a structural premise of the reform that the new course is to last one year and to prepare the students for teaching all subjects in grades 1-5. Following the intentions for the sector as a whole, it is another premise that the new course is to qualify the student teachers for increasing elementary students’ mathematical participation in the classroom. It is one task of the development process to elaborate on what this means in greater detail and how it may be accomplished. At the heart of the reform process, then, is an intention of supporting more processual and participatory approaches to school mathematics and mathematics teacher education. Below, I shall describe some suggestions for the revised course on this. Before doing so, though, I shall outline some results of a situation analysis that became part of the development process.

The situation analysis was to inform the new curriculum and to qualify both teacher educators and consultants for the task of developing such a curriculum in the Eritrean context. It includes among others a review of existing curricular documents for teacher education and interviews and observations with teacher educators, student teachers, and elementary students about mathematics teaching and learning.

There was limited time for the observations and interviews. The empirical analyses, then, do not in and by themselves point to changes in Eritrean mathematics teacher education. However, to the extent that they provoke or resonate with understandings of mathematics teacher educators, they may raise problems and suggest possible routes for curriculum change. These routes, in turn, have been and will be explored further and may be used to inform curricular decision-making.

As part of the situation analysis, we made observations of mathematics teaching at ATTI and in elementary schools with follow-up interviews with teachers and students in both settings. The focus of the observations was the types of communication and student participation encouraged and sustained.

At both types of institution, classes are organised as a combination of whole-class teaching and individual work. The teachers dominate the interactions, mostly lecturing in a participatory manner. Most students are enthusiastically engaged in activities that are primarily of a routine type: they are expected only to repeat or apply concepts and procedures already presented by the teacher.

This is especially the case in elementary school. ‘Passive listening’ (cf. the introduction) is not an appropriate description of the students’ activity, as they are
generally very anxious to take part, both on whole class settings and when working individually. However, the students’ mathematical participation is significantly limited by the character of the tasks, as they are exclusively repeating procedures already presented to them. (cf. Skott (preprint)).

At ATTI, the teachers often ask mathematical and methodological questions that are open and that apparently encourage more profound modes of student participation. However, they tend to accept only one or a very limited range of answers and to close each exchange by explicitly confirming or rejecting the students’ first suggestions, even when the initial question is open. In other terms, a student’s first attempt is accepted or turned down and hardly ever taken as starting point for further investigation or compared with other possibilities.

In both types of institutions, then, the students are very active, even in whole class settings in very large classes. However, they are only encouraged to become involved in very restricted mathematical participation: In elementary school this is the only type of activity initiated; in teacher education the use of closed responses on the part of the teacher educators limit the students’ opportunity to engage in continued joint investigations. The problem of mathematics teaching, then, is not that the students do not participate. Rather it is that their participation is not mathematical. The task for teacher education is to capitalise on the traditions of the students participating, while challenging the character of that participation.

**Suggestions for the new curriculum**

It is a significant feature of the new curriculum as it intends to develop the student teachers’ ability to encourage mathematical participation. This is apparent in the syllabus of the new subject of mathematics education (rather than mathematics), most noticeably in a separate section on Orchestrating classroom communication. However, it is also reflected in sections on mathematical processes (e.g. problem solving) and on the learning environment and in the way the syllabus is phrased and structured. It does not describe expected learning outcomes in specific terms, as these may degenerate into mastery of ready-made procedures. It uses broad descriptions of the competences and understandings that the course is to help the students acquire and of key concepts and processes that they are to work with when doing so.

Two other initiatives were taken to encourage more significant mathematical participation on the part of the students at college and subsequently in schools. First, we suggested timing the students’ teaching practice differently and introducing continuous collaboration with schools. This is to make the students’ school based activities a learning experience rather than merely an assessment procedure. It may allow continued, collective reflection on problems arising from practice, for instance with regard to encouraging and sustaining elementary students’ mathematical participation in large classes. Second, we collectively developed suggestions for
modes of mathematical communication that may be used in large classes. Building on the work of Watson and Mason (1998), we made three groups of altogether 20 questions that are to be used by the teacher educators both when phrasing mathematical questions and as explicit objects of discussion. The first of these uses reflect the intention of modelling good teaching at ATTI; the other reflects an acknowledged need to move beyond modelling good teaching and make teachers’ decision-making an explicit object of discussion, in order to suggest reflective tools for the student teachers: Is this an appropriate time to use one of the questions on “Challenging students’ procedures and results?”

I have argued elsewhere that teachers’ activity may be viewed as the simultaneous engagement in multiple actual and virtual communities of practice (Skott, 2002). Also, I claimed that communities of teaching practice for the novice teacher may be constituted primarily through mental dialogue with the peers and teachers from their pre-service education. This, however, may be the case only if the pre-service course has addressed problems of teaching in contexts that are comparable to those in which the teacher is to work upon graduation. Also, it depends on the strength and character of the community of the teachers at the school.

The situation analysis indicates that there are strong communities of teaching practice in Eritrean schools. To some extent, these do not appear to share the intentions of encouraging new modes of student participation. The new teacher education programme may be seen as an attempt to build communities of teaching practice with the student teachers at college. Upon graduation these become virtual, but they may still be influential if they address the problems of teaching in the contexts where teaching occurs. The virtual communities of teaching practice may supplement the actual ones of the novice teacher. If they do, they may become influential in changing the types of interaction now dominating Eritrean mathematics education.

**Reference**


