# INNOVATION OR NOT? CONSISTENCY IN THE CURRICULUM PRESCRIPTION IN THE NEW CURRICULUM IN MOZAMBIQUE

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*The study aims at exploring the interrelation and consistency in the new Mozambican Grade 8 curriculum across the proposed teaching methods, activities and evaluation criteria in relation to the innovative focus on the development of students' reasoning. It also seeks to understand the possible effects of the proposed changes on the classification and framing of school mathematics. The analysis of the new curriculum document produced some evidence of consistency between the aims, the gaols and the objectives, and a dissonance of the teaching methods, tasks and activities with the innovative aspects of the new curriculum. In addition, the proposed pedagogy can be described as a weakening of the framing in some aspects. It is unlikely that this document is suitable to guide the innovation of teaching practice as intended.*

## INTRODUCTION

The curricula in Mozambique have experienced transformations during the last decades. The last reform process started in 2000 with the primary school curricula, and new curricula are being gradually introduced in the following grades. In 2008 the new curriculum was launched in grade 8.mPresently, the mathematics primary and lower secondary school syllabuses cover the following topics: Number sets and operations, functions, equations and inequalities, Euclidian and spatial geometry, trigonometry and statistics. As the analysis deals with the grade 8 mathematics curriculum, I will describe the most important changes for this grade in some detail.

The grade 8 mathematics syllabus in Mozambique has been changed four times after the independence in 1975. In general the content in those syllabuses remained the same. In the third version, introduced in 2004, only slight changes in relation to the former were made in the objectives. They were subdivided into objectives of knowledge and objectives of competences. The rest of the text remained the same. In the historical context of curriculum development in Mozambique, the recent curriculum (2008) has to be interpreted as progressive. In contrast to the previous one, it generally promotes a learner-centred approach and is partly competency based. It tries to overcome a focus on mastering mathematical techniques and also intends to change the social base of instruction from lecture type to more students' involvement. The new version is to be meant to guide a reform of teaching practice.

In comparison to the previous versions, the new Grade 8 Syllabus exhibits two innovative features: the incorporation of mathematical competences centred around the development of students' reasoning and the use of heuristic methods and procedures that help students to construct his (her) own knowledge assuring the meaningful understanding of the content. So, I decided to seek the extent of the

consistency of the text of the Grade 8 Syllabus across the different sections referring to these two principles, which seemed to represent a shift in paradigm.

## THEORETICAL BACKGROUND

As the new version of the Mozambican curriculum is to be meant to guide a reform of classroom practice, the question is to which extent a change in paradigm in content and pedagogy can be traced in the mathematics curriculum documents that are expected to be read by the teachers. The question is not to uncover the implicit values, but to look at the statements explicit in the curriculum document. So the focus is on the content and pedagogy as manifested in curriculum documents. The ways teachers interpret the curriculum documents and the unintentional effects the change might produce are subject of a case study of grade eight classrooms. Are there different identities of learners and their relation to the subject constructed or not? The general question is about how mathematical knowledge is recontextualized in the document and if this affects classroom practice or not. In terms of the, "recontextualizing fields" (cf. Bernstein, 2000, 56 f.), the groups who participated in the process are hard to locate. But the official end product in the curriculum document has to be taken to reflect the preferred modes on the side of the state school authority.

Garcia (2009) notes that the stating of curriculum aims and goals is not a consensus action, it depends on the social context, and is generally a source of debates between groups that want to see their values, views of knowledge, interests and ideologies expressed in the curriculum. Ernest (1991) identified five groups of interests with diverse views of mathematics and consequently different mathematical aims that influenced the reforms in the 80ths in Britain, namely, the industrial trainers, the technological pragmatists, the old mathematicians, the progressive educators and the public educators. The industrial trainers held up the teaching of basics numeracy, the technological pragmatists support the development mathematics useful to industry-based situations, the old humanist mathematicians on their side, proposed the transmission of pure mathematics, the progressive educators are concerned with the creativity and self-realisation of the students, whereas the public educators' desire is the use of mathematics to develop critical and democratic citizens. These groups of interests may exist in any country and play an important role when educational reforms take place. A curriculum document can be analysed with respect to theses ideologies.

The structure of the official curriculum may take different forms. The Mozambican Grade 8 Syllabus resembles a curriculum document rather than a syllabus. It includes the aim and the goals set by the Ministry of Education and are structured as following:

General aims to which all school subjects are expected to contribute (in different ways)

General goals categorized as related to the preparation of students for mastering their private everyday life, professional training and to the career options of the students, development of the students' personality (such as working attitudes), the functioning of the society (norms and values), and cultural heritage of the society.

The subject-specific part is organized in the following way: the introduction to the discipline, objectives of the discipline, a table of content specific objectives, detailed topics and student outcomes, methodological suggestions (content based), performance indicators, and assessment framework.

The general goals statement is an indispensable part, as it transmits the philosophy, the rationale and the aims of the educational system, that is, the ideology. The aims more or less steer the whole curriculum management process. Subordinate to them are the content standards, the set of subject topics and the abilities and skills students are expected to master, the pedagogy, which refers to teacher practices, the evaluation criteria that presents alternative forms of assessment, the performance standards with the indicators of expected students' achievement.

The conversion of a vague language, in which the goals are stated, into a specific set of tasks or rules cannot be considered as straightforward. It is not just a translation from general aims into more specific aims and detailed suggestions for topics and classroom management, but a series of redescriptions in another discourse. However, if the general aims valorize the development of mathematical reasoning, one would expect to find the concept "reasoning" or evidence of issues, proposed activities or methodological instructions that may reflect the criteria of what counts as mathematical reasoning in all parts. The mathematical content can be described by the internal and external classification, but it is only in the section "methodological suggestions", in which proposed changes in framing can perhaps be identified (Bernstein, 1975).

The specific goals can be related to different types of what is expected to be "known" by the students in each sub-area, such as understanding specific concepts, methods and principles or mastering distinct procedures and knowing a selection of facts. The move towards mathematical reasoning marks a move towards a more principled school mathematical discourse which makes more explicit the principles on which it is based.

Both, objectives and content may influence the choice of the pedagogy and the three elements support the instruments proposed to assess students' performance, teachers' methods, school materials and so forth. However, in each of these redescriptions and specification steps there is huge space for interpretation, in which different ideologies can come to play. Eventually, such a document can contain different messages conveyed to the teachers. The study tries to explore the consistency and coherence across the aims, goals and objectives outlined by the educational system and the pedagogy and assessment proposed in the documents.

## METHODOLOGY

The study aims at tracing two innovative aspects in all parts of the document, on the one hand, and the extent to which the proposed activities for classroom practice imply changes in classification and framing (Bernstein, 2000).

To attain the first target I attempted to compress the curriculum text in fewer categories that allowed me to infer the extent to which the different parts of the curriculum build a non-contradictory consistent chain of suggestions.

Content analysis is a powerful technique that fits to the objectives of my study, which is to look at the main trends and patterns (Stemler, 2001) and how they are interrelated crossways in the different components of the curriculum. As any research method content analysis techniques attracts critics. Subjectivity of the interpretative exploration (Oliveira at al., 2003), reduction of the study into a simple words count (Palmquist, 2001), draw of erroneous conclusions due to the use of more available words in the curriculum developers' lexicon (Stemler citing Weber, 1990) may weaken the study.

Trying to strengthen the reliability of the technique I was aware of the occurrence of synonym words, expressions with an ambiguous meaning or with a dual meaning. The words written with multiple meanings were pulled out and analyzed in the context where they were written. Moreover, a set of explicit recording instructions that rules the coding was developed (Stemler, 2001; Palmquist, 1980).

The texts were broken-down into simple words and paragraphs - the coding units of analysis, used to assay and interpret different characteristics of the message.

Inferences on the classification and framing can only be drawn from the parts that contain concrete suggestions for types of tasks and methodological setup of classroom practice. As to the ideologies, it seems possible to infer these to some extent from the text. This however amounts to the construction of "imaginary" recontextualisers because the different groups cannot easily be identified as agents in the process of the development of the new curriculum in Mozambique.

## RESULTS

The following aims and goals to be achieved emerged from the text:

Aims: development of reasoning and debate of ideas, development of autonomous and critical thinking, and formulation of judgments, use of knowledge, abilities and values to propose alternative solutions, and being an active subject in the knowledge construction assuring the understanding of the meaning of the content.

Goals: use mathematics in order to properly think and reason, express and argue opinions, formulate judgements, give definitions and enunciate proprieties, interpret tables, graphs, mathematics expressions and symbols, and transform the natural language to symbolic and vice-versa.

The goals principles seemed to be derived from the stated aims. There is an interrelation of meanings between both components. Two important dimensions that are present in the aims and goals statements are related to “students’ communication” and “students reasoning”. The extent of the prevalence of these in the objectives could be traced by the phrases or sentences that are related to “students’ communication” and “students reasoning” in those statements. The curriculum document provided the following verbs that can be seen as redescriptions of the two dimensions (for the number of occurrences see Table 1):

- Students’ communication: to discuss, to confront ideas, to explain, to justify
- Students’ reasoning: to observe regularities to relate intuitively to interpret to translate the natural language into symbolic language to characterize to estimate to define to demonstrate to enunciate theorems

The verbs in the first line, linked with communication situations, were used in the objectives section. However, the occurrence of such verbs varied. The verb 'to argument', which describes an important action in the communication, appeared twice in the general aims and goals but it was absent in the rest of the components as displayed in the table below.

| | **Explain** | **Confront of ideas** | **Argument** | **Justify** | **Discuss** |
|---|---|---|---|---|---|
| **Objectives** | 5 | 1 | | 1 | 2 |
| **Methodology** | 3 | | | 2 | 2 |
| **Performance** | 1 | 1 | | | |
| **Assessment** | 1 | | | | |
| **Total** | 10 | 2 | 0 | 3 | 4 |

**Table 1: Occurrence of related verbs**

In the second line are the verbs I assume to be linked with classroom activities usually used to engage the students to elicit their grasp of concepts.

The examples of tasks provided in the document consist of questions that step by step take the students to the stated goal, and were generally structured to be accessible to the students. However, the teacher was in most of the tasks suggested to summarize the discussions. In few cases, students in collaboration with the teacher are asked to do this and in others it is omitted who has to do. Furthermore, the tasks seemed not to be sufficiently rich in cognitive demands in order to trigger the appropriation of mathematical content.

Besides the tasks, the curriculum recommends students to engage in activities, using tools such as paper, pencil, graduated straight line, weight instrument, tables, diagrams, manipulative materials, compass, angle measure instruments and rulers.

Generally, the activities do not involve much of a principled mathematical discourse. Students are required to read a table or a diagram, measure segments or angles, make some calculations.

An example: According to the curriculum instructions the students are by means of an “empty number line” expected to discover the order relationship of integers. However, to scale a straight line students have to master the order relationship already or the teacher has to scale the line, which includes a change in the social base of the activity. An activity with the use of a weighing scale, which might be a powerful tool, is proposed without any explanation of its relation to the topic. Similar to the other activity, it is suggested that the students carry it out in collaboration with the teacher or that the teacher demonstrates the activity to the students.

Tasks and activities are proposed to be completed individually or in group work with comparison of results and discussions about them, what presumes that students tackled the problems and drew conclusions. However, in most of the activities the role of summarizing, drawing conclusions, enunciating the theorems, stating the properties is assigned to the teacher. The methodological suggestions are concerned with the problem solutions recommending teachers to moderate students’ discussions where the results are compared. There was emphasis to look at different results rather than in the justification of the procedures and its relation to the underlying mathematical concepts or the relation between the solution and the parameters (cf. Carpenter and Lehrer, 1999).

In the assessment the main aims and goals of the curriculum seemed to be expressed in the sentences that suggest teachers to emphasize not just the memorization of rules and procedures. The recommendations highlight the evaluation of understanding of concepts, the development of reasoning, but also the “know how to do”. Furthermore, it is proposed to make use of students’ portfolio, however, without any explanation of how a teacher may use the items to assess in quantitative terms the achievement of a student which is the final requirement at the end of each trimester.

As a subject, school mathematics remains to be strongly classified: it has its own timetable and it appears organisationally insulated from the other subjects and is taught by one teacher. However, in the new document it appears less strongly classified than in the older versions in terms of the content as it proposes some integration of non-academic issues. The curriculum establishes along with the topics the lessons allocated to each topic, and the methodological sections describe in detail the transmission strategies proposing steps to follow and possible examples. In doing so, it seems that teachers may have little room in relation to the selection of the content sequencing and pacing. However, there appears to be space for discussions, students may be given opportunities to choose different forms of communication. In this aspect, there is a weakening of the framing as compared to the previous one.

## DISCUSSION AND CONCLUSIONS

The first aim of this study was to explore, the extent of the prevalence of two main innovative aspects of the new Mozambican Grade 8 curriculum, namely the development of students' reasoning and the support of meaningful understanding (through a change in the base for communication) across the curriculum components. These aspects are outlined in the general subject-related aims. It turned out that at the more detailed goals statements indeed tend to explicate and specify the ideas stated in the aims. In addition, the verbs signifying students' activities in the descriptions of intended outcomes seem to specify actions that may accomplish the curriculum intentions. So there is a chain of related meanings, in which the innovative aims are redescribed as goals and as objectives. The document is written in a way that makes it possible to read the goals statements as an instruction of how to read the more general aims, and the objectives as an instruction to read the goals. The meanings remain consistent at these levels with regard to the innovative aspects of the new curriculum.

However, the tasks and the activities proposed in the parts containing the methodological suggestions are not structured in a way that matches the intention to the change in the social base for the communication. While it is suggested that the students, for example, engage in drawing conclusions, searching for patterns and seeking generalisations, the teacher is advised to enunciate the pre-defined outcomes of these activities. This suggests that there should eventually be strong framing over the criteria, though on the other hand, while the students are suggested to work in groups on some more open activities, this could be weakened. The innovative aspect of changing the procedural discourse into a more principled one is not reflected in the criteria for the activities to be carried out when solving the tasks, which are proposed. Altogether, the lack of theoretical challenge of the tasks and activities and the suggested teaching strategies do not reflect the evaluation criteria for the activities proposed in the aims.

The section about assessment, which is written without reference to mathematics as a subject, reflects a change in pedagogy. Teachers are, for example, urged to use portfolios to gather information about the development of students' reasoning, abilities, skills, attitudes and values. It is not possible to link the proposed modes of assessment to the other parts of the curriculum in terms of criteria. The techniques listed in the section can be interpreted as a move towards implicitness because some of the suggested activities (for example students' documenting their own work orally and in written form) imply a weaker framing over the criteria. This is in contrast to the suggestions from the methodological section.

The new curriculum document for grade eight conveys contradictory messages. The most specific parts, that is the sections with methodological suggestions, are most likely to be taken up by the teachers. In this case, the innovative effect would be minimal. Some parts could be interpreted in a way that suggest to operate in or switch between different more strongly and more weakly framed activities. The constitution of the mathematical activities as an unprincipled discourse that is reflected in the

tasks, is in contrast to the main intention to change this towards a more principled one. Theoretically, the teachers have the freedom to select other than the suggested types of tasks and activities and only take into account the general aims, goals and objectives. The school or national tests may reflect the prototype activities and tasks presented in the methodology section and thus set the criteria for what is to be achieved by the students. So, this may take teachers to prepare students for the tests and examination, holding back their initiative to support innovative aspects. The criteria conveyed in the examination papers can impact negatively on the type of more principled mathematical discourse expressed by the general aims, and even on the level suggested in the methodological section, as for example shown by Saldanha and Neves (2006) in they study about the impact of the national tests on the teachers' practice.

The document can be interpreted as an outcome of hybrid ideologies. The assessment framework and the statements in the aims, goals and objectives can be interpreted as a reflection of progressive pedagogy, whereas the section containing specified descriptions of mathematical activities and teaching strategies, if one would apply Ernest's (1991) categories, can be interpreted as reflecting the aims of "technological pragmatists" in a perspective where mathematics is considered a body of technical knowledge, and the students are exposed to applicable mathematics.

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