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Ethnomathematics: A Cultural Bridge from Indigenous Knowledge to the Scientific World - the Somali Case. Part I

Introduction

Referring to mathematics, most people share the opinion that this is a field of human knowledge open to a few, very talented, persons; the subjects involved are viewed as difficult, the language itself too technical, often incomprehensible, etc. Therefore the emotional approach to this science is usually clear and definite: 'I love mathematics' or 'mathematics is not my strong point' are the most frequent sentences. Other stereotyped statements declare that 'mathematics is an abstract subject', 'mathematics is a good training for the mind', 'mathematics is an universal language' and so on: the result is a deep furrow, which separates a few appointees from the others. At best, referring to mathematics, people can say that there are two different kinds of mathematics: the mathematics for the school and the mathematics for daily life.

All these remarks show a need to reflect on the global role of mathematics in the history, the culture and the life of the peoples at any latitude. So, mainly in the two last decades, a large movement of ideas arose, contributing in different ways to the carrying out of this reflection, inside and outside of the mathematicians' community.

Beside education and history of mathematics, terms like popularization, gender issues, power and political aspects, multiculturalism, ethnological elements, etc., are now common also when referring to mathematics and are giving rise to specific fields of researches in the mathematical area.

The aim of this paper is to briefly present some considerations about the so-called ethnomathematics and to enlighten possible influences of its application to a specific case, Somalia.

Ethnomathematics, indigenous knowledge and the scientific world

A Brazilian mathematician, U. D'Ambrosio, following ideas developed during and after his permanence in Mali, where he was working in a UNESCO educational project, first coined the term ethnomathematics. This word was defined in 1985 (D'Ambrosio 1985) as the mathematics which is practiced among identifiable cultural groups such as national-tribal societies, labor groups, children of a certain age bracket, professional classes, and so on. The term soon became the landmark for many researchers, who in open order were involved in topics not completely referable to mathematics education, history of mathematics, anthropology, ethnology, but partly pertaining to each of these sciences.

These mathematicians mostly are from South America, Oceania and Africa, but some of them are from North America, Europe and Asia, too. They were/are moved by various arguments: mainly, the need to recover and to save the local cultures or to handle the educational task of teaching a) in presence of minorities or multicultural situations or b) in developing countries. Related with these teaching contexts, it is possible to add the problem of using a scientific terminology introduced in the local language either artificially or through borrowings from non-mother tongues.

The meaning and the role of mathematics in the history and in the society also became a matter for debate. If we agree on the statement that mathematics is the way through which man explain and face reality, it is easy to understand that the second definition of ethnomathematics given by D'Ambrosio himself in 1995 (D'Ambrosio 1995) - the arts or techniques developed by different cultures to explain, to understand, and to cope with their environments - is more complete and broad.

Nevertheless, since it first appeared, the word ethnomathematics received different, sometimes overlapping, values; this essentially depends on the broad meaning of the word 'ethno' as well as on the real essence of the word mathematics. As recently has been pointed out by R. Vithal and O. Skovmose (1997), within the research and writing in ethnomathematics, it is possible to identify at least four strands. A first strand deals with historical aspects in non-western mathematics; a second strand analyses the mathematics of traditional cultures; a third one explores the connections, from the mathematical knowledge viewpoint, between cognition, culture and context, the last strand focuses on the relationship between ethnomathematics and mathematics education.

In our opinion, rather than using the word 'ethnomathematics', it would be better to refer to the 'ethnomathematical program': a program the aim of which is a deep investigation along the first three strands in view of their merging in the last one. The path to be followed within each strand must be strictly correlated to the context where the program is developed: different strategies are to be used in countries like Brazil, Mozambique, South Africa or USA!

The starting point is that mathematics is *not* a universal language, nor a culture-free discipline, as pointed out by A. Bishop (1988): there are plenty of examples of different mathematical techniques and strategies used to handle similar life situations in different cultures, even if geographically close. As far as Africa is concerned, C. Zaslavski's (1973) and P. Gerdes' (1991, 1994) works give great evidence of this fact.

Bishop's analysis suggests that mathematics must be conceived of as a cultural product, 'developed in each context as a result of ... six fundamental activities which ... are both universal, ... i.e. carried out by every cultural group ... and also necessary and sufficient for the development of mathematical knowledge' (Bishop 1988). These activities are counting, locating, measuring, designing, playing, and explaining. So if, once again, we agree on the above issues, we can easily recognize that each culture has its own mathematics, which in turn is part of the so-called indigenous knowledge.

Starting from this point of view, it is then necessary to reconsider many aspects involving mathematics - the western mathematics - its use and teaching. It is necessary to emphasize that each people, with their own culture, have to strengthen and develop their indigenous knowledge as widely as possible.

Local indigenous knowledge should be integrated and coordinated with the universal one, the scientific world: in this way, gaining a mutual cultural enrichment and obtaining all the instruments which could make it possible to create development and to relate satisfactorily to other cultures.

The case of Somalia

For an ethnomathematical program, the Somali context is a favorite one. Somalia is culturally and socially homogeneous enough, geographically and demographically well defined. Furthermore the present historical passage can give the chance to build something really new in the educational field, in particular in the education of mathematics. In fact, as quoted in a UNESCO report on education in Somalia (UNESCO 1997), there occurred a school education breakdown: Somalia's education system has been abandoned inside and out. Therefore, there must be a strong co-operative push not only to rebuild the schools, but also

to define new curricula, to write appropriate textbooks, to promote training courses for teachers, to review and update the scientific Somali terminology, etc.

In reshaping the mathematics curricula worked out in 1985, the ethnomathematical issues must hold a pre-eminent role, particularly at the primary school level. The pre-civil-war textbooks (Ministry of Education 1973, 1985a) for primary schools, presently still used in some Somali regions, show an abundance of arithmetic and very few geometric arguments. They are full of repetitions, haunting in their main aim to let the children be skilled in mnemonic and technical computations. Geometry and geometric drawings, which could offer the first plain attempt to explain the surrounding reality and its properties, are quite absent: a few terms are associated, as labels, to some figures and sometimes even using quite misleading - i.e. conceptually wrong - words!

Reading the curricula for the mathematics to be taught in the secondary schools (Ministry of Education 1985b) and the related textbooks, on the other hand, reveals an evident will to reproduce the western situation. Any issue suggested by the local context in terms of culture, teachers, out-of-school perspectives, etc., is forgotten. The negative effect of this situation was easily checked in the propaedeutic university year and in the first semesters of the scientific faculties in the Somali National University (in Mogadishu). There, the introduction of a 0-course in mathematics (Favilli et al 1990), first, and of a Practical Mathematical Laboratory course (Favilli et al 1987), after, became a necessity in order to allow the students to attend their courses with adequate proficiency.

According to the ethnomathematical program, mathematics can be introduced essentially through the local culture, in its many aspects. The culture has therefore to be deeply analyzed and studied in view of this new aim.

As far as Somalia is concerned, our present researches (Jama and Favilli forthcoming) are offering various and interesting information and hints to be worked out for a didactic application in a mathematical curriculum, from primary school level to secondary level, involving both elementary notions and, surprisingly, higher ones.

References

- Bishop, A. (1988): 'Mathematical Education in its Cultural Context', *Educational Studies in Mathematics*, 19, 179-191.
- D'Ambrosio, U. (1985): 'Ethnomathematics and its Place in the History and Pedagogy of mathematics', *For the Learning of Mathematics*, 5(1), 44-48.
- D'Ambrosio, U. (1995): 'Ethnomathematics: Theory and Pedagogical Practice'- I part, *L'Educazione Matematica*, 2(3), 147-159.
- Favilli, F. et al. (1987): *Laboratorio Matematico Pratico*, Mogadishu: Università Nazionale della Somalia.
- Favilli, F. et al. (1990): *Matematica Propedeutica*, Mogadishu: Università Nazionale della Somalia.
- Gerdes, P. (1991): *Lusona: Geometrical Recreations of Africa*, Maputo.
- Gerdes, P. (1994): 'On Mathematics in the History of Sub-Saharan Africa', *Historia Mathematica*, 21, 345-376.
- Jama Musse Jama and Favilli F. (forthcoming): *Mathematics under an African Acacia Tree*.
- Ministry of Education of Somalia, Curriculum Development Center (1973, in English), (1985a, in Somali): *Mathematics Textbooks*, Mogadishu.

Ministry of Education of Somalia, Curriculum Development Center (1985b): *General Secondary Schools: Syllabi*, Mogadishu.

UNESCO report, April 1997.

Vithal R. and Skovmose O. (1997): 'The End of Innocence: A Critique of Ethnomathematics.' *Educational Studies in Mathematics*, 34, 131-157.

Zaslavsky C.: (1973): *Africa Counts*, Boston: Prindle, Weber & Schmidt Inc.