

**Student teaching in Non-western Science Classrooms: some reflections from a western perspective**

**Práctica docente en Ciencias en escuela no occidental: algunas reflexiones de una perspectiva occidental**

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It was with a mixture of despair and optimism that I completed my first reading of the paper by Temecheqn Engida (Engida 2000) relating to the training of science teachers in Ethiopia.

From a western perspective the challenges faced by science teacher trainers and science teachers are indeed very difficult to appreciate:

- Minimum science class sizes in secondary schools of seventy!
- Severe constraints on access to materials, teaching accommodation and apparatus
- Teacher training courses in which work in schools is restricted to a four or five week period within three years
- Theory-based courses of science and pedagogical study where the direct experience of actual practice is severely limited for both tutor and student
- The lack of any explicit models for science teaching (beyond teaching science so that as many pupils as possible can pass the examination?)

This list is daunting but Engida is undoubtedly correct when he states that within the African context “we can not delay helping our students be critical thinkers, effective problem solvers and decision makers”. However, in spite of a detailed analysis he does not really suggest any practical solutions to the

issue. The purpose of this short note is to open a debate as to what should be done? One clear fact is that the transfer of curricula from the west is NOT an option. This has been tried and failed – although we DO have much to learn together.

It is the intense and urgent needs of humanity across Africa and the developing world that gives hope that science education can develop in ways which are more meaningful, engaging and relevant to many of its teachers and students. Those who are responsible for developing science education and science teacher education must have the courage and confidence to make the study and investigation of real problems legitimate within the secondary science curriculum. We may then hope that those engaged in science education as teachers and learners may together contribute to the identification, investigation and solution of problems which could have personal, community and national significance. This is not to argue that theoretical ideas should be avoided but that, wherever possible, they should be developed in a context meaningful to the learners – and not ‘merely’ to prepare for an examination. Neither is it being suggested that this represents the whole of the curriculum – it is only an (important) ingredient.

Some examples of possible areas of investigation include:

- Observation and investigation of growth and development of plants which are grown and harvested locally
- Exploring use and efficiency of use of energy, water, fertilizers, animals, materials
- Re-use and recycling – waste, sewage
- Invention and evaluation of (science) educational aids for younger pupils from local materials.

There seem to be a number of opportunities for being involved in exploring, and evaluating appropriate technological developments (adapted to meet local needs and materials).

All of this requires, and is enhanced by, close links between schools, teachers, and the local community (including parents, employers, and local government and support agencies). However, unless such activities are encouraged, or at least accepted as legitimate, by those responsible for developing and

evaluating the system, it can never happen.

It is presumptuous of me, with only very limited experience of life and education in Africa, to make even these tentative suggestions, but it does seem that Engida has raised important issues which go well beyond merely science teacher education and relate to very fundamental concerns regarding the nature and purposes of science education and its contribution to national wealth and human welfare.

Clearly there are many other educational dimensions concerned with mathematical, linguistic and communication skills and also to cultural, spiritual, moral, legal, financial and other issues. However, science and technology education have contributions to make. I believe there are few recipes for successful science education, but early engagement with meaningful and personally significant questions seems to be a requirement. In few systems of education, even in the west, is this achieved with more than a small minority of learners. The failure to do this represents a huge waste of human potential and resourcefulness.

I hope this paper will encourage further debate (within the pages of this journal) and developments within 'non-western science classrooms' which are appropriate to the students and teachers directly involved. Perhaps the next stage would be for Engida and others in situations like his, to share with us their developing agendas for action?

## **Bibliography**

Engida T. (2000) . Student teaching in nonwestern Science classrooms: analysis of views from potential participants in the program. *J. Science Education*, 1 ( 2 ) , 86-93.