

**NATIONAL SCIENCE AND TECHNOLOGY FORUM (NSTF)  
SUMMARY OF ISSUES FROM WORKSHOP ON SCIENCE, TECHNOLOGY,  
ENGINEERING AND MATHEMATICS (STEM) EDUCATION  
16 APRIL 2010**

**Education investment**

- If the mathematics grade 12 performance is to be raised, then it is necessary to improve maths education at primary level (before grade 8). Combining this finding with the literature on cognitive development suggests that the earlier the interventions are made, the higher the returns on that investment.
- Investment in the foundation phase of education is critical for long-term development.
- In the short term, interventions throughout the education system should continue, as there are possibilities of assisting some learners to improve their performance in mathematics, and such learners should not be abandoned.
- College and university lecturers as well as retired people might be prepared to participate in teacher retraining programmes in exchange for a stipend.

**Teaching and learning environment**

- The teaching and learning environment within schools seems to be the main problem with the system of education in South Africa.

**Teacher development**

- There seems to be too much emphasis in teacher development initiatives on getting teachers to master the content of the subjects they teach, and not enough on developing teachers' ability to teach so as to promote understanding among learners.

**Reflective teaching practice**

- There is a need to develop reflective teaching practitioners who are aware of their role in fostering learners' understanding.

**Promotion in the education system**

- The view was expressed that the promotion system in the education system had allowed people with limited qualifications and ability to be promoted to positions of subject advisors, who are responsible for teacher training and development, but may themselves not necessarily be competent teachers.

**Quality assurance and supervision in schools**

- Quality assurance is absent in schools. Supervision is needed to keep the level of work in classrooms high.

**Textbooks**

- Good quality textbooks are needed. Textbooks tend to be lacking or deficient, with concepts that are difficult to grasp. Bad textbooks exacerbate the learning environment in a situation in which teachers are poor.

**Teaching of IKS and everyday examples in the science classroom**

- The departmental position on teaching IKS and everyday examples in the science classroom was hotly debated. The view was that IKS should not be used as a substitute for proper teaching, learning and experimentation in science, but only as supplementary examples in order to enhance learners' understanding (with the proviso that teachers should understand the scientific principles and concepts behind the IKS examples).
- It was suggested that a database of well-documented IKS and everyday examples would be useful for teachers to access in order to explain scientific principles and concepts in the curriculum to the learner, but this should not be a substitute for proper teaching and learning. A role for the NSTF in facilitating the establishment of such a database was suggested.

**Use of calculators in the classroom**

The stated view of the departmental representative against the use of calculators in the classroom seemed to be too simplistic and should be more thoroughly considered (with the use of research findings and evidence) before a departmental policy position in this regard is adopted.

#### **Use of home language in the classroom**

- The stated view of the departmental representative in favour of using the home language of learners to explain difficult concepts in the mathematics classroom needs to be nuanced after further investigation.

#### **Mathematics teachers' forum**

- It was suggested that a forum of experienced mathematics teachers be established to explore what is wrong with mathematics teaching in this country and how to address the issues.

#### **Teaching diagnostics and remediation**

- Mass participation in the first rounds of science and mathematics Olympiads (which are curriculum based) was suggested. The results could be analysed and used to identify areas of weakness and poor understanding among learners so that remedial action could be taken by teachers.
- Workshop attendees did not respond to the departmental proposal that scientifically developed diagnostic tests be administered by the teacher after teaching a particular topic in order to assess the extent to which learners had mastered the concepts and to enable teachers to take remedial action to address misconceptions. This proposal would need to be further explored before policy development in this regard.

#### **Closing degraded schools and bussing learners to better-resourced schools**

- Workshop attendees did not respond to the proposal of the DBE representative that instead of trying to upgrade degraded schools, consideration should be given to closing some of them and bussing the learners to other better-resourced schools. Thorough consideration of the implications and more robust public debate should take place before a policy position is adopted.

#### **Unions**

- The view was expressed that teacher unions have a negative impact on education by dissuading teachers from attending capacity building sessions; and instructing teachers to go on strike and not to submit to performance appraisals, which are used to monitor teacher development and teaching ability.
- An alternative view was that the workshop should not criticise teacher unions unless the unions are invited to defend their position.