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<th>Expert Group Meeting: Training to Popularize Scientific and Technological Culture, 28th-31st May 1997, Singapore: [reports of working groups sessions]</th>
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Report on the “Brainstorming” session of the three working groups held on Thurs. May 29th

Joan Solomon

It was interesting to observe that the three groups involved in this session started from three quite different initial positions.

- Group A - from the perspective of school science
- Group B - from the popularisation of science and technology in society
- Group C - from the need for human development.

However despite these different starting points there were at least six common issues which were mentioned by all the groups although approached from these different perspectives. In the first part of this paper I will try to show how these common issues could arise in such different ways, arguing that those that did must be particularly well embedded, or richly connected, in the network of our concerns about Scientific and Technological culture in the Commonwealth.

Group A began by asserting that it was not the science curriculum which was at issue so much as the relevance of the teaching to the young people's interests, and the environment of the classroom, which includes methods of assessment. This led them on to discuss the motivation of the students which linked with two issues beyond the classroom walls that impinged strongly on the quality of the teaching and learning provided.

1. Appropriate training and education of the teachers
2. Parental involvement in school education.

Both these issues also arose out of the human development thematic approach used by Group C under their heading of 'culture generic'. They too wanted improved quality of teacher preparation and parental attitude and expectations. However when Group B pursued the idea of the popularisation of science, formal education was only one part of the total education scene as they saw it. This included informal education through the media and IT, and also adult education both formal and informal. The latter was also touched upon by Group C.

Another couple of issues which turned up in all the reports were

3. Activities in and out of school relevant to local culture, and
4. The impact of Technology on local culture and gender issues.
Group A saw gender factors as a part of the out-of-school background to education; group B saw it as part and parcel of popularisation, and group C as a natural concern with the management of Science and Technology change. Clearly moral attitudes and local belief systems must be included in the discussion of both 3. And 4.

It was quite striking to see how the role of government, NGOs, and the Commonwealth itself figured in all these group discussions. To a greater or lesser extent all three groups found that support would be needed to help societies manage the kinds of change they envisioned and was also required to put in place the communication needed.

5. Government commitment and political will.

6. Improved communication by the media and IT.

Here again it is possible to trace the different routes by which the groups arrived at their priorities. For Group A they were needed to improve school education by sharing the facilities of the school with the community, for Group B and Group C they were to improve motivation in the general public and so to help societies to cross cultural boundaries. In all three groups communications and the sharing of information was taken very seriously, and this included communications with and from scientists.

On the other hand, it was possible to look at the work of the different groups in order to draw out the rather different conclusions which had been worked out in more detail.

Group A
Analysing the requirements of school science encouraged this group to call not only for better teacher training but also for better classroom practice including more practical work. They clearly felt that systems of assessment could not only be used to check on the effectiveness of the teaching and learning process, but that it could also be used to move practice in the appropriate directions. They were not the only group to talk about promoting good thinking skills, something on which science has always prided itself, but that this would promote inventiveness in the general public and offer other activities beneficial and relevant to cultural change and the economic development of the country.

Group B
Beginning from the question “What should we popularise?” this group looked first at the possible impact of science and technology knowledge which was relevant to the community’s own culture and daily life.

They also spent a considerable amount of time looking at the use of the media. TV and science journalism for spreading informal science and technology education. They talked, as did Group A, about the appropriate technology for delivering this new kind of
education, and it was this which led them to look at the wide diversity which exists within and between the countries of the Commonwealth. They also constructed a matrix of factors to be considered in this context.

**Urban / rural**
- Information rich / Information poor
- Geographically big / geographically small
- Computer literate / computer illiterate

While considering countries in the light of these factors the group observed that a factor which might have been an advantage in one country might well be a disadvantage in another. An example of this was the rural/urban divide. In New Zealand and the UK, some of the greatest deprivation in terms of education and computer literacy is found in the derelict areas of the inner cities. In other countries the greatest deprivation occurs in the remote rural areas.

Finally Group C, which set itself to look more deeply into cultural factors and the effect that the promotion of science and technology might have on the quality of life, found themselves discussing the role of technology rather more deeply that did the other groups. They were interested in the public perceptions of technology and asked themselves if it should be considered in a different light from science itself. The impact of new technology on culture including communication through IT, could clearly be huge - although it is important not to ignore the requirements for training people to use it and to maintain it. Within the Commonwealth IT provides a golden opportunity for information sharing - a point which also arose in Group B’s discussions. However the question of WHAT would be appropriate to share, WITH WHOM? and HOW were clearly far from simple.

This group was unique in paying attention to the students’ own perceptions and motivations and those of their peer groups. They wanted a science curriculum which would demystify science and encourage inputs from traditional and local cultures. Other original points made in this discussion were (a) better school governance with greater democratic participation and transparency to students and teachers alike and (b) more links between educational and industrial institutions.

**After the reports from the three groups were received in the plenary session three very pointed and unanswered questions were raised.**

1. Has any research been carried out on the public’s access to Science and Technology in the different Commonwealth countries?

2. Is there a data-base on initiatives already carried out to improve scientific culture?

3. Which previously carried-out initiatives in this field have been properly evaluated and shown to have worked?
EXPERT GROUP MEETING

Summary of group discussions on Friday May 30\textsuperscript{th}

These discussions were based upon

(a) a paper prepared by Dr Cream Wright
(b) a summary of brainstorming on the previous day prepared by Dr Joan Solomon

The task was to use these issues to foray ideas for strategies.

1. Training of teacher trainers and teachers

. Emphasis on the teachers’ right to in-service education
. This might be through the use of teachers’ centres with mobile experts, networking, IT, and other methods.

2. Curriculum enrichment

. Encourage science of everyday activities in primary schools and also pre-school provision, where it exists.
. Promote the involvement of parents and the community.
. Encourage practical work and student-centred projects.
. Include health and other important relevant topics, an use assessment to show that these are to be taken seriously (include “Child to Child”)
. Use radio, videos, films as well as IT.

3. Out of classroom experiences (including cultural impact)

. Field work, industrial visits, vocational placements and competitions. [students might gain credits for these?]

. Involve priests and elders so that antagonism to science is reduced and the gap between new technologies (eg. in health) and local culture is reduced.

. Resources are needed and accounts of others’ experiences

. Sensitivity towards local culture and Worldview, combined with efforts to show how (small) improvements can be made, and gender differentiation lessened.
Key Sources of Information

- Choose appropriately from a wide range of resources, including IT.
- Provide workshops for journalists and scientists.
- Along with information, be open to questions from the public and be honest about possible difficulties.
- Collaboration between Commonwealth Countries.
- Open access to public through “science shops”
- Use of local drama, including puppet theatre and toys to promote understanding.
- Take advantage of existing groups (eg. Women’s groups, farmers’ groups).

Support required

- ComSec to lobby governments to help improve education of all kinds, including school science re-training courses and distance education for adults.
- NGOs and ComSec to help in identifying and distributing good resources. Database required.
- School governance and democracy to be improved.
- Industry/school links to be made at several levels to improve teaching through the development of new resources.
- An infrastructure is required to enable countries to provide training, installation, and maintenance for new information technologies for some schools, or school centres.
- NGOs to support local self-help groups where these arise and require more information.
- Help in compiling a list of Science and Technology policies and other initiatives in the area.
- Support the development of a “Needs Analysis” in each country which will identify problems and facilitate communication between people with relevant skills.
Responses to the 3 questions

1. We need collaborative research project among countries in the area. Networked action research carried out by teachers in their classrooms.

2. Teaching and learning materials to be shared require prior work, translation and/or annotation.

3. Micro and Macro initiatives require evaluation in terms of economic effectiveness (costed) and sustainability after its introduction in the medium and long term.