

THE USE OF LOW-COST SCIENCE EQUIPMENT IN SCHOOLS

Reference has already been made to the general trend in science teaching in the Caribbean - the development of programmes that rely heavily on adequate supply of equipment. Some of the items of equipment required are meant for teacher demonstration; for the student's handling and experimentation. However, very little seems to be known about what teachers actually do with the equipment they receive and how these items of equipment are stored and maintained.

Individual Student Experimentation versus Teacher Demonstration

It was generally agreed that both student experimentation and teacher demonstration are desirable and that in the classroom the proportion of time devoted to each is determined by a number of factors. These considerations include the availability of time and equipment, the aim of the experiment, the demands of the curriculum and the experience of the teacher. Of these, participants thought that the curriculum is the most important factor governing the choice of an experimental procedure, and that the other factors are likely to be adequately handled by the classroom teacher. The meeting therefore addressed itself next to methods by which schools could cut down costs.

It was suggested that the "station" or "circus" method of class experiments would reduce the number of items of equipment necessary and hence reduce costs. Further, the equipment for use by the student should, in general, be less sophisticated than that provided for the teacher. Apart from the fact that simple equipment is generally inexpensive, the use of such equipment tends to motivate the child to try to handle the apparatus.

Three categories of kits for students' use were recognized: those consisting of easily replaceable household items; those with components readily available in most laboratories; and specialized items (such as "quick-fit") that relate to specific areas of the curriculum. In practice the use of any of these types of kit imposes certain restrictions and difficulties. There is always the danger of losing essential items, particularly when they are small, and these are often difficult to replace. Even when spare parts are available, they may be difficult to fit unless adequate guides are available. Specialized kits are further handicapped by limited application.

Considering the total requirement for equipment in the Caribbean as a whole, participants agreed that the production of kits on a sub-regional or regional basis might be a viable proposition. Nonetheless, the earlier consensus that it would be premature to recommend the establishment of a regional production unit (page 11) was reaffirmed. Thus in line with the earlier decision, it was suggested that the needs and conditions in each country should be determined before a Caribbean-wide production programme could be structured.

Storage

Participants agreed that in the Caribbean the problem of storage of equipment is a major one. Various methods of dealing with this problem and the related

problem of safety of equipment in schools were discussed. These problems are considered especially acute in primary schools and in those secondary schools which have a science room rather than a fully furnished laboratory. It was felt, therefore, that the conditions prevailing in individual schools should govern the type of method selected. In general, the methods suggested ranged from pigeon-holed shelving to racks and compartmentalized boxes.

It was suggested that kits should be transported and stored in the same box so as to cut down losses and breakage. Boxes could be designed as cupboards for wall attachment if "dead space" exist in laboratories or science rooms. Mention was made of pilot schemes in Antigua where mobile storage benches have been made for use in primary schools at comparatively small costs.

The need to provide adequate bulk storage was also stressed and attention was drawn to instances where "uniport" materials have in the past been used to build storage rooms at reasonable costs. It was suggested that this type of construction could be investigated to assess its suitability and cost today, as one could easily be put up in a matter of days, using relatively unskilled labour.

Maintenance and Repair

It appears easier and cheaper to replace most pieces of damaged equipment rather than to repair them as only a few science kits have items that are amenable to simple repair work. Thus, apart from those items of equipment that can be recycled for use as substitutes, breakages generally tend to be discarded.

One way to overcome the maintenance and repair problems is to set up a maintenance centre in conjunction with a production unit so that complicated repairs can be undertaken. Another approach is to train teachers and students to do better than mere "hammer repairs". However, care should be taken to ensure that the burden of repairing equipment does not fall too heavily on the teacher or else it will cause further lessening of his motivation and thus drain his enthusiasm.

Much emphasis was placed on the urgent need to design and implement pre-service and in-service teacher training programmes in the use of equipment. These programmes should be designed to help improve the practical skills of teachers, and help them to distinguish between the jobs they can do themselves and those jobs that require an expert. As an example worthy of trial it was noted that in Guyana, science teachers are required to undergo in-service training in technical skills. In this Guyanese training scheme, "acting teachers" spend half their time in the classroom as teachers and half in workshops as technicians.

In view of the low standard and the rapid turnover of technicians currently available in the Caribbean, the Commonwealth Secretariat was asked to consider sponsoring a technician training course at the earliest opportunity. Participants emphasized that the course in mind is not the City and Guilds type which, according to many reports, appears to be unrelated to the present urgent needs of the Caribbean.