

6. TEACHERS: INITIAL AND SUBSEQUENT TRAINING

Introduction

There is a shortage of competent teachers of mathematics at all levels. In some countries, the shortage is of qualified teachers; in all there is a dearth of good teachers, competent in action. In several developing countries, there are many teachers who have not been exposed to the new ideas and yet have to teach mathematics. In particular, there are primary school teachers who have little or no knowledge of the subject matter or of the approach which is now recommended in the teaching of mathematics in the primary school. There are tutors in the training colleges who themselves need to become acquainted with the new ideas and approach.

Throughout the world there is an increasing demand for mathematicians in administration, industry and commerce, where conditions of service are more attractive. The status and salary of the school teacher are less favourable than that accorded to comparable positions open to mathematicians outside teaching. The role of a school teacher appears to have little attraction for the high ability group, some of whose members might make good teachers of mathematics.

In developing countries some teachers receive no initial training at all, because of the expense to the countries not only of the training itself but also of the higher salary scale on which trained teachers must be paid. In others, mere shortage of teachers makes it unrealistic to demand initial training. There is also some 'brain-drain' arising from students who find their way to developed countries, achieve higher qualifications, and remain in those countries where conditions of employment are more favourable. Loss also occurs when qualified teachers of mathematics now in service in their own countries seek more lucrative forms of employment. However, there is a core of able and competent men and women in every country who have remained in the profession despite financial loss. Efforts should be made to examine further the reasons for the shortage of competent teachers of mathematics and practical steps taken to ensure a good supply of such teachers and to retain them in the profession.

Careful consideration should be given to the training of those students who, although they have so far not demonstrated the highest mathematical ability, have the qualities required of prospective teachers. Nevertheless teachers of mathematics must know mathematics and how to teach it; they must be competent to continue learning and doing mathematics.

Entry Qualifications

Entry qualifications into the training colleges for primary school teachers vary. In some countries a secondary school certificate (usually following eleven years of successful schooling) is required; in others slightly lower qualifications are required and the length of professional training is prolonged to three or four years. In other countries, the Primary School Leaving Certificate (obtained after six to eight years of schooling) is the required minimum qualification. A desirable entry qualification at which to aim for all teachers is the Secondary School Certificate or passes in five subjects at the General Certificate of Education (Ordinary Level). A pass in mathematics, while desirable, is not essential.

In countries where the average student applying to enter the Training College does not possess the desired minimum entry qualification, it is all the more important to have tutors competent to handle mathematics in the manner recommended in this Chapter. The experience of some countries shows that candidates who are older and have had some responsible experience since leaving school, are likely to prove good candidates for a course of training. But this should not be accepted as a rule, applicable everywhere.

Professional training for university graduates is highly desirable. Among other things, it assists them to form good attitudes to their profession, to learn about children and their ways of learning and to communicate meaningfully and effectively with their pupils. It should lead to a deeper understanding both of the aims of teaching and of the problems usually met in the classroom.

Initial Training

Training in colleges for primary school teachers usually combines professional training with academic study of a number of subjects including mathematics. There should be a mathematics course for all students which would give them a new insight into the mathematics that they would be expected to teach and the methods they might use, and a familiarity with the experiences through which children learn. There should also be an optional specialist course designed to stimulate students in their own mathematical pursuits.

At least some training colleges should provide courses for students without a university degree who intend to teach mathematics at a secondary school. Such a course could be a straight three-year course (as in some countries), which might lead on, immediately or at a later stage, to a Degree Course; or it could be a two-year course followed by a Mathematics Specialist Course of one year. Other variations are possible. Courses might be organised in which students specialise in two main subjects, one of which might be mathematics and the other a language (English, French, a local language, etc.) or some other Arts or Science subject.

There are two schemes for training university graduates to teach mathematics. The first is a degree followed by professional training; the other is a degree incorporating professional training such as B.Ed., B.A. (Education) or B.Sc. (Education), where the precise qualification depends on the university regulations applicable to the candidate. Each scheme has its advantages and both schemes are already being offered in a number of Universities and Institutes of Education. Some degree courses might be structured to cover mathematics and some Arts subject in order to offset the shortage caused when science graduates with mathematics move into other forms of employment.

Consultation between mathematics tutors in different colleges and countries is highly desirable. It is therefore suggested that opportunities be given to those teaching mathematics at colleges to benefit from bursaries or study leave periodically, in order to study new methods and new topics in teaching mathematics.

Suggestions for Action

1. A teacher, however well qualified in his subject or subjects, should train as a teacher. He thereby enhances his own competence and his status in the profession.

2. A teacher should join the teachers' association and avail himself of the opportunity of professional improvement offered by the association.

3. There is usually in every country a Mathematical Association and/or an association of teachers of mathematics. A teacher should at least join the more relevant association both for the contribution he can make to the association and for his self-improvement.

4. Mathematical journals and bulletins are sources of up-to-date activities and information. A teacher should subscribe to one journal or bulletin at least. Suggestions could be made to Libraries to carry suitable mathematical journals, bulletins and magazines.

5. A teacher should educate himself widely by reading mathematics books other than textbooks. There is an increasing number of cheap popular mathematics books written by eminent authors.

6. Mathematics teachers could inspire their pupils by organising mathematics clubs whose activities include excursions, mathematics evenings, games and so on, in which mathematicians from outside the school participate. That is a convenient way of introducing to the pupils mathematicians in industry, technology, administration and business and of widening the education of the pupils in employment opportunities.

7. A good teacher of mathematics must broaden his own education if he is to bring adaptation and relevance to his curriculum and teaching.

8. The primary school teacher, who handles all the subjects in his class, should be familiar with the environment, his children's interests and should have an eye for mathematics in everyday life.

9. A teacher should train and re-train. Opportunities for re-training are provided by one or more members of a University Department or Institute of Education, Ministry of Education, Local Authority, a professional association.

10. Research is not a preserve of University teachers. Simple observation, investigation and records by primary and secondary school teachers could lead to improvement in the teaching and learning of mathematics.

Selected Reading List

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