

The Implementation of a Programme for the Improvement of the Academic Knowledge of New Teachers of Science

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ABSTRACT

The background of teaching science in secondary schools in Papua New Guinea is described in order to familiarize readers with the situation at Goroka Teachers' College (GTC) in the early 1980s where it was necessary to attempt to increase educational standards in science. Goroka Teachers' College was the main source of science teachers for secondary schools. A quarter of a century later these initial attempts at reform can be seen to have been a small step in the right direction.

The Implementation of a Program for the Improvement of the Academic Knowledge of new Teachers of Science

C.A. BUNKER and W.P. PALMER

Goroka Teacher's College, Goroka, Eastern Highlands Province, Papua New Guinea.

Papua New Guinea is a country of forests, mountains, swamps, and islands, with a population of about 3.5 million people, the majority of whom live in the highlands areas, first exposed to Western influence in the 1930s, 'first contact' patrols are still occasionally being mounted. Education remained almost completely under Mission control until after the second world war, when Australian Government influence in Education gradually became more important. W.E. Groves was appointed first Director of Education in 1946, and the continuing policy of blending traditional ideas with imported concepts follows from his early influence upon educational policy(1).

Following the Foot mission of 1962 the first secondary schools were opened, and initial planning for tertiary education was begun(2). Towards the end of the 1960s it became evident that Independence would not be long deferred, and in consequence what could almost be called a crash program of teacher education was implemented. Goroka Teachers' College (GTC) was opened in 1960 as a primary teachers' college, and was upgraded in 1967 to become the only secondary teachers' college, under the Department of Education(3).

During the late 1960s and early 1970s the expatriate teachers in primary schools were replaced by the first generation of National teachers, who had been very hurriedly trained, the secondary schools expanded, and large demands were placed upon GTC to, provide National teachers for the secondary schools. Curriculum change rendered necessary by this included, in science, the writing of new syllabus material, from which all quantitative work was removed. This situation continues to the present. The students entering GTC suffer from only having studied this non-quantitative curriculum material at school. At the stage corresponding to the later years of our

Provincial High School course, most other countries have been able to introduce a significant amount of quantitative material into the Science curriculum.

Partly because the students come from schools where the non-quantitative courses were taught, and partly because of the small number of hours which we are currently able to spend on science content teaching, there is no way in which our present diplomates could be considered qualified to teach a more quantitative curriculum similar to that in the schools of most other countries. Thus the schools are unable to implement curriculum reform, and the consequence of this situation, which is similar in other subject areas, is that material which in other countries is taught in the later years of secondary school is deferred to special highly selective 'National High Schools', or to Preliminary Year at university. Hayter(4) writes as follows, referring to the grade 10 mathematics syllabus:

Within the UK system I would have thought that the PNG syllabus by Grade 10* matched fairly well the stage reached towards the end of the third (out of five) years of secondary education for students aspiring to CSE level-say the middle half of the ability range.

* Grade 10 is the last year of Provincial High School education.

In the Science Department at GTC we recognised that no progress was being made towards producing diplomates capable of teaching more quantitative material, and that the introduction of more quantitative syllabus materials into schools would have to wait until we did produce such diplomates. The problem which we faced was that of finding a way to producing such diplomates within the existing framework of teacher training. Alternatives to the solution we finally chose include:

In-service courses of, say 6 months duration.

These had however been tried in 1981, eventually failing because of the unwillingness, of schools to release their teachers. Provision for these courses still exists.

'Lahara' or vacation residential in-service courses.

These suffer from not being properly integrated into tertiary educational system. Correspondence and in-service programmes for serving teachers, leading to an 'advanced diploma'. World Bank funding for a program along these lines is scheduled to start in 1984, but at least three years will elapse before implementation.

An additional year for those of outstanding ability.

From the start of the 1984 academic year a very small number (3 or 4) of our most academically able students will be able to transfer to the science Department of the University for one year of undergraduate study of science. This program will not necessarily however enable them to teach the material they learn, as the material will be chosen and taught without attention either to the possible content of reformed school curricula or to teaching methods. The innovation will also not produce a sufficient number of teachers to be able to have any significant effect upon the 101 schools in the country in any realistic time-span.

To explain how the problem was eventually tackled, we must first explain a little more about

GTC and its relationship with the University of Papua New Guinea (UPNG) and the Department of Education.

The College became a part of UPNG on the 1st January 1975, as a result of the recommendations of the Commission of Enquiry under Sir Allen Brown(5), and ran what were effectively 3 year courses from provincial high school level, teachers being trained in three subject areas, such as Science, English and Mathematics, chosen freely from about 10 subjects, some only available for students on particular courses. The Department of Education was happy with this arrangement, but tolerated changes initiated by the Science and Mathematics departments at GTC which resulted by 1981 in all students graduating in just two subjects. In this present situation students have 24 hours per week of lectures, of which 18 hours are devoted to academic subjects. This means that a student of Science has to learn all his Biology, Chemistry, Geology and Physics in only 9 hours a week spread over a 36 week year (8 of these weeks are spent in teaching practice). In this situation, an obvious way to increase the science taught to student teachers would be to eliminate the second subject, extension of the course having been ruled out on the grounds of cost.

These proposals, first mooted about 2 years ago, met unexpected opposition, both from within the college (which as part of an autonomous institution could implement its own courses) and from the Department of Education, for whom the College produces its diplomates. Within the College, opposition was based upon fears that an elite might be created, to the disadvantage of some departments, fears that the Department of Education would have difficulty in posting the more specialised teachers, and upon a 'gut feeling' that the political will might be lacking. We accordingly wrote a position paper showing that the new course would not operate to the disadvantage of other departments, and as a result of a visit to the Minister of Education, were able to show that the political will was emphatically in favour of the change.

The new course has run with effect from February 1984, initially for one group of about 20. Committee stages of the change were made in a little over 6 months from the time that the Minister made his statement. There are still some doubts and problems, originating in the middle management of the Department of Education, and concerned with posting, but we have every confidence that these will be overcome.

References

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