

Science Education in Vanuatu

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Abstract

Science education in primary schools in Vanuatu will receive increased exposure due to the introduction of a science-based environmental component in the imminent Unified National Primary Curriculum. Localisation of science teaching at the junior secondary level is about to be boosted by the graduation of the first of two cohorts of ni-Vanuatu teacher trainee students.

The Context

Vanuatu is a nation comprising some 80 islands stretching over 1000 kilometres between 12 and 21 degrees S latitude with a population of approximately 150 000. The lingua franca is Bislama; however, French and English are the languages of instruction in schools, reflecting the Condominium status of Vanuatu before independence in 1980. Prior to 1980, the country was known as the New Hebrides and administered jointly by France and Britain.

Enrolments in both primary and secondary schools are consistent with an overall ratio of 62:38 of Anglophone students to Francophone students. With a population growth rate of 2.8% and free primary schooling, enrolments in primary schools will continue to place pressure on the provision of teachers and facilities.

There are some 270 primary schools catering for approximately 25 000 children. With a student:teacher ratio of 29:1, there are more than 830 teachers in primary schools. Most primary teachers are ni-Vanuatu who have trained at the Vanuatu Teachers College. A competitive national examination allows selection of approximately 22% of year 6 students for entry to the Junior Secondary school system.

The seventeen Junior Secondary schools, eleven Anglophone, four Francophone and two catering for both, support 28 streams (or year 7 - 10 cohorts). Approximately 3 200 students are taught by some 150 teachers in the 17 schools. Competitive national examinations allow selection of students for education beyond year 10.

Three schools, two Anglophone and one Francophone, provide approximately 160 places for year 11 - 13 students in academic courses. Vocational courses, mostly Francophone, are provided for a small proportion of year 10 leavers. In addition, a number of students gain scholarships for senior secondary study in overseas countries.

Science in the Primary Schools

At present separate curricula and methodologies inherited from Condominium days exist in Anglophone and Francophone primary schools. Few support materials for these curricula exist in most schools and those that do exist are often not common between the two systems. This presents many difficulties for teachers and children, not the least of which is a competitive common examination held at the end of year 6 which decides entry to secondary school.

Little science exists in present curricula; however, some Natural Science topics such as "Air and Water" and "Living Things" do appear under Social Studies or Environmental Studies in most schools

In 1990, PASEP project (Primary And Secondary Education Project) team members began work as advisers on a Unified Primary Curriculum for Vanuatu. This project is funded by the World Bank, AIDAB (Australia) and the Vanuatu Government and one of its aims is to prepare curricula and support materials in all subjects for all primary schools. Materials for teachers and children will be introduced progressively to schools between 1992 and 1994. The author is an Adviser in Environmental Studies in this component of the project.

Science topics are covered in the "Our Environment" section of the Social Studies syllabus in the new curriculum. Other sections are "Our Communities", Health/Nutrition/Agriculture and Religious Education. It was felt that

science taught under the familiar heading of Social Studies was less threatening to teachers, many of whom have little background in the subject.

Our Environment is recommended to be taught in four x twenty five minute lessons each week. The content of the section is arranged under four themes, Living Things, Matter, Energy and Interdependence. These themes reflect two general objectives of the curriculum, firstly that children become aware of nature and science as it affects them in their daily lives and secondly that they understand, develop and protect the environment in which they live.

Teaching methodologies recommended for the Environment section emphasise development of the skills of observing, classifying, communicating and predicting. Emphasised also is the necessity for extensive use of the outdoors as the primary source for learning materials, for practice at problem solving and for working cooperatively in groups. Concepts from the child's immediate surroundings are introduced at earliest levels and gradually concepts from further and further afield are introduced in later years.

Complementing the scientific principles in Our Environment is the almost completed Health/Nutrition/Agriculture, (HNA), Project sponsored by UNICEF with the cooperation of the ministries of Health, Education and Agriculture in Vanuatu. Detailed teachers' guides for each year level provide useful resources which reinforce environmental themes.

Curriculum materials for Our Environment consist of an overall Teachers' Handbook outlining teaching methodologies and course principles, and at each year level, Teachers' Guides detailing Major Ideas which illustrate the objectives and a series of Possible Activities by which the objectives may be achieved. Pupils' Books containing associated activities are provided for the children. A series of Teacher Resource Booklets containing background information is also envisaged.

Junior Secondary School

The present science course in junior secondary schools dates from approximately 1981 when the Science Panel, representing predominantly Anglophone schools, adopted in principle selective use of the Insight to Science (ITS)

materials developed by the Inner London Educational Authority as replacement for the UNDP developed (South Pacific) Basic Science course.

Francophone schools up to 1985 were mostly using materials developed in metropolitan France.

In 1984/5 a new national junior secondary curriculum was devised which would be common to both Francophone and Anglophone schools. In science, it was decided that the ITS materials could be selectively adapted to cater for most topics in years 7 and 8. Some ITS materials, complemented by texts and locally produced reference booklets, were adopted for years 9 and 10.

The syllabus adopted in 1985 has content based on four general themes, namely Energy, Materials, Living Things and Earth Science. It aims to promote knowledge and understanding, problem solving skills, practical skills and appropriate attitudes in the children. It is designed to be taught in approximately 3 hours per week over the four years.

The original ITS materials have been adapted, trialled, modified and translated on a continuous basis since adoption. Initially developed for use in London's many multi-racial schools, they are based on sound principles of learning and at the time of adoption in Vanuatu were believed to be the most suited to the context. Language, conceptual levels, coverage of topics and a methodology based on the use of workcards were considered to be appropriate to the special conditions extant in Vanuatu.

Workcards are activity based, highly diagrammatic, contain explicit instructions and questions for children to answer and are designed to foster group work. All of this allows the teacher flexibility in facilitating and monitoring student learning. However, the possibility of "recipe-book" science is ever present.

Specific and detailed Teachers' Guides for each term provide for an almost "teacher-proof" set of guidelines for achieving the objectives of the science syllabus. Details of experimental techniques, pre-activity preparation, classroom organisation and topic planning are given.

A lengthy and detailed "Introduction to the Programme" provides teachers with background information on the educational and psychological principles

underlying the course, hints on teaching methodologies, details of the importance of language in science in the Vanuatu context and information about using, storing and ordering laboratory equipment.

Laboratories vary greatly in terms of fixed facilities, as would be expected given the diversity of locations of schools throughout the Republic. Most, but not all, have gas and water connected. All have been given an initial, suitably comprehensive set of apparatus and consumables to teach the course and all have a modest annual budget for replacement items. Storage and maintenance present problems in many schools, given the moist climate.

The science syllabus contains detailed assessment objectives in each of the areas of knowledge and understanding, problem solving, practical skills and attitudes.

Assessment of children's achievement of the objectives of the course takes place at year 10 through two written examinations and two practical tests. The practical tests are administered and marked internally during the year and each provides 10 marks for the final assessment. The written examinations are administered at the end of the year and marked externally. A multiple choice paper provides 40 marks and a paper requiring short written answers provides 60 marks.

Overall, the science course can be seen as highly specified and detailed and allowing little scope for teacher initiative in following personal interests or the interests of children in particular circumstances. However, this specificity can be seen to be dictated to a large degree by the high rates of turnover of science teachers and consequent lack of continuity through the four years of children's secondary schooling.

Junior Secondary Science Teachers

The high teacher turnover amongst junior secondary science teachers results mainly from the relatively large number of expatriate science teachers on short term contracts employed in the schools. These expatriate teachers may be church-based missionaries in some church-supported schools, volunteers (for example, Peace Corps from the US and VSOs from New Zealand) or French

National Service personnel in Francophone schools. In addition, many ni-Vanuatu teachers move between schools for personal reasons or leave for private sector employment or overseas study.

Most locally employed junior secondary science teachers have received qualifications from overseas institutions including USP and UPNG. Often these qualifications have not included formal teacher training and these teachers have learnt "on the job". The overseas qualifications have also proved attractive to employers in the private sector and teacher retention is a problem.

Teacher turnover should be reduced as the graduates from the first local Anglophone junior secondary teacher training program enter schools in 1993 and 1994. In addition, the Ministry of Education is endeavouring to guarantee tenure of a minimum of three years for teachers in each school. These changes should improve stability and enhance the teaching of science in the future, as teachers should be prepared to invest more effort in schools to which they have a greater sense of belonging.

In-service work for teachers is predominantly accomplished in a one week residential conference setting which takes place in the May vacation period. All teachers are transported to and accommodated at the conference at Ministry expense and are expected to attend. Extensive workshops and demonstrations are used to model desirable practice and many administrative details are finalised.

Science in Post-Year 10 Courses

Academic courses post year 10 are conducted at three locations. At Malapoa College, the former British Secondary School established in 1966, many of the staff teaching post year 10 courses are expatriate UK teachers provided under a UK aid program. At Matevulu High School, established in the 1980s under the PASEP Project, many of the post year 10 staff are Australian teachers provided under Australian aid programs. At Lycee Louis Antoine de Bougainville established in the 1960s, most senior staff are French nationals, many fulfilling National Service obligations.

Upon completion of years 11 and 12, students at Malapoa and Matevulu sit

for the International General Certificate of Secondary Education (IGCSE), administered from the UK. In science, the students study Physics, Chemistry and Biology. Students at the Lycee study for the Baccalaureate, also in the separate sciences.

During 1992, a Year 13 course, based on Pacific syllabi and examinations, has been introduced and there are plans for these courses to filter down to years 12 and 11 in the near future.

Teacher Training in Science

Most primary teacher trainees are recruited from year 10 to year 12 school leavers into both the Anglophone and Francophone courses conducted at the Vanuatu Teachers' College. Courses at the college are presently being rewritten to take account of the new Unified Primary Curriculum. College primary teacher training staff have been closely involved in the development of the Unified Curriculum and will introduce new skills into their courses. Science related skills and understandings form a significant part of the new courses.

A small number of local Francophone secondary teachers have been trained for the past few years in a program centred at Lycee Louis Antoine de Bougainville. This Centre de Formation des Maitres du Secondaire uses an attachment system where trainee teachers work closely with experienced teachers before a probationary teaching period.

1991 saw the commencement of the first local Anglophone junior secondary teacher training course to be conducted for ni-Vanuatu at the Vanuatu Teachers' College. The course is designed to speed localisation of the secondary teaching force and is another component of the PASEP Project. Teachers in the first intake are being trained in English and Social Science or Mathematics and Science. The majority of the intake were year 12 leavers; however, some primary teachers are upgrading to become secondary teachers.

In the science component, fifteen students commenced a two year Mathematics/Science course leading to the award of a Diploma of Secondary Teaching after a probationary teaching year and further inservice courses. A second

intake of fifteen students entered the course in 1992. Students elect to major in either Mathematics or Science after the first year of the course. The author is responsible for delivery of the science component of the course. Whether further intakes to the course will take place is uncertain at present.

It is believed that the entry of two cohorts of locally trained junior secondary teachers will overcome many of the present difficulties in adequately staffing all posts in junior secondary schools, particularly in science and mathematics.

Conclusion

Science in primary schools in Vanuatu should improve markedly as a result of the imminent introduction of a new, modern and unified curriculum. A critical factor in its success or otherwise will be the type and quality of inservice experiences provided for primary teachers.

A number of factors seem to be combining to enhance the teaching and learning of science at junior secondary level and with the imminent entry of an enthusiastic group of local teachers, the future in this area seems reasonably assured.

Less certain is the fate of science at senior secondary levels. For the foreseeable future, this area will continue to rely on expatriate teachers provided by aid donors and there is always a degree of uncertainty regarding these commitments due to variations in economic conditions in the donor country.

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