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EXPERIENCES IN IMPLEMENTING SCIENCE CURRICULUM REFORMS IN MALAYSIA WITH SPECIAL EMPHASIS ON DEVELOPMENT OF NEW COURSE MATERIALS

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Resource Paper: Experiences in Implementing Science Curriculum Reforms in Malaysia with Special Emphasis on Development of New Course Materials

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Preamble:

Educational development from elementary to university level has become part and parcel of national planning and development in Malaysia. The central government is spending a quarter of its annual national budget on education because it regards this outlay as a worthwhile investiment in the development of human resources which form the most valuable asset of any country. If educational development is carried out on sound lines it will not only meet the country's educational and national aspirations but also the demand for more scientific, technical and skilled manpower in order to keep pace with the rapid extension of rural diversification and industrialisation programmes.

There is free primary education for every child for six years after which he gets three more years of lower secondary education under the comprehensive system of education (ages 6 - 15). Lower secondary education (grades VII, VIII, IX), is general in nature, which includes mathematics and basic sciences as compulsory subjects and either Industrial Arts, Agriculture Science, Home Science or Commercial Studies as one of the elective subjects. Electives are provided as pre-vocational practical courses in order to assist pupils in adapting themselves to an environment which is getting strongly influenced by science and technology and to discover their interests and aptitudes. It is of interest to note that about 50% of boy classes at the lower secondary level have adequate workshops and equipment for Industrial Arts, thus indicating the priority given by the government to provide as wide a base as possible for science, technical and vocational education at the upper

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secondary level which consists of two years of specialisation and is terminal for about eighty percent of the pupils. The top twenty percent will spend two more years in either arts or science courses preparing for the university entrance examination.

Curriculum especially at the lower secondary level prior to the introduction of the comprehensive system of education in 1965 had a strong academic bias and certain changes on the curriculum have been and are being continually effected to cater to the whole spectrum of abilities and interests of pupils and to meet the objectives of the new system of education.

New science curriculum

In the light of recent development of science curriculum reforms in many advanced and developing countries, based on the use of new ideas, new local materials, the investigational approach and other more imaginative ways for science learning, Malaysia realised that the present general science curriculum which remained almost unchanged both in content and method of teaching for the last twenty years, had outlived its day. It does not provide a pupil with opportunities to develop among other qualifies the spirit of enquiry, a greater scientific outlook, his creativity, his ability to think objectively and logically, his self-reliance and independence, his appreciation of team work, and to satisfy his restless curiosity of the fast changing world.

Objectives

The new science curriculum should not only cater to the educational objectives as stated above but should also provide a sound foundation for training of large numbers of pupils in order to satisfy the scientific, technical and skilled manpower demands for the country's rapid socio-economic development. After a careful appraisal of tested new courses of several countries it was decided to launch a major pilot project in January 1969 to develop an integrated science curriculum based on the Scottish Integrated

Science course, for pupils of various abilities in lower secondary classes with the main objective of educating them through the medium of science.

The integrated science curriculum which Malaysia plans to develop, is one in which chemistry, biology and physics are combined together into a single course. Pupil learn by doing open-ended practical investigations which are based on the unified approach which stresses the fundamental unity of science and the basic principles common to all sciences.

'Science without tears'

It is 'science for all' with the 'guided discovery' approach for pupils to find out things for themselves by performing most of the exercises personally. This is a radical departure form the traditional method where pupils do a very small number of experiments to confirm the truth of known scientific laws and phenomena. The teacher has to remain in the background all the time organising his pupils to do experiments in accordance with laboratory worksheets supplied to them. They are left entirely to themselves to carry out the practical work. This type of 'self-learning' challenges them to think of what they have to investigate, observe and draw conclusions from what they have done. The teacher occasionally guides the slower pupils when they get stuck in their work. The needs of the brighter pupils are also catered for because there is provision of more difficult practical exercises at the end of each experiment. This is the basic strategy of the course.

New course content

The contents of the course are as follows:-

Year I:	Section I	Introducing science (some laboratory techniques and observation experiments)
	Section II	Looking at Living Things - idea of classification
	Section III	Basic Idea of Energy
	Section IV	Matter as particles in various forms, structure, idea of kinetic theory, applications.

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	Section VI	Cells & Reproduction - simple plants and animals
	Section VII	Electricity - ideas of current, voltage, resistance, electricity at home.
Year II:	Section V	Solvent to Solutions - idea of solubility digestion
	Section VIII	Some Common Gases - properties, air, photo synthesis, respiration
	Section IX	Heat Flow
	Section X	Hydrogen, Acid & Alkalis
	Section XI	Detecting Environment - sensory nerves
	Section XII	The Earth - structure, minerals, coal, oil
Year III:	Section XIII	Support & Movement - force work, energy, plants, animals, muscles
	Section XIV	Transport System - foods, digestive system, plants & animals.
	Section XV	Electricity & Magnetism

Topics are also to be developed by local key teachers and educators who have attended science in-service courses, such as Nuffield 'O' Level Sciences, B.S.C.S., P.S.S.C., CHEM and UNESCO Bangkok Chemistry Pilot Projects, etc. This is necessary as the Scottish Integrated Science provides only a two-year course for its system of education.

Time Allocation: Five periods of 40 minute duration per week for each year which consists of 39 school weeks.

Section III from Year I on 'basic ideas of energy' will illustrate the typical method of approach adopted in the integrated course. Pupils operate simple mechanical toys to study the various forms of energy - mechanical, sound, heat, light, energy of movement, potential energy, electrical, etc. No attempt is made to define the term 'energy'. Then a wide variety of simple exercises from winding a spring to melting steel wool strands using electricity from dry cells are carried out by pupils to study energy interconversions.

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Important applications of energy transformation are learnt through models which pupils can construct such as water-wheel generator, or Hero's engine and through the operation of small working models of steam engine, and motor/generator like bicycle dynamos, etc. The topic, 'Energy and living things' is next taken up with practical work on effects of heating various foods in air, etc. to relate energy stored in food and its release for use to in living things.

Worksheets for each exercise with simple instructions and questions and the necessary space for answers, etc., are supplied to every pupil for recording observations, etc. Class discussions on the results or findings of pupils at the end of their practical work will assist them to understand the concepts of science.

Pilot programme

The whole project will take six years. By 1974 all the 750 secondary schools in West Malaysia should be doing Integrated Science in lower secondary classes. The plan of operation is to use 22 schools as pilot schools for the first trial of the Year I syllabus and to spread the trial to all schools through a carefully planned programme as shown below.

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Pilot Programme in Secondary Schools

Tentative Plan for Implementation

(a) 1969 - 1974: lower secondary

(b) 1972 - 1976: upper secondary

Year	First lot of Pilot Schools (22)	Second lot of Pilot Schools (50)	Third lot of Pilot Schools (100)	All Schools in West Malaysia
1969	Year I (I.S.) Grade 7	-	-	-
1970	Year II (I.S.) Grade 8	Year I revised trial (I.S.)	-	-
1971	Year III (I.S.) Grade 9	Year II revised trial(I.S.)	Year I Twice-revised trial (I.S.)	
1972	Year IV S.C.Special (1st trial) Grade 10	Year III revised trial(I.S.)	Year II twice-revised trial (I.S.)	Year I final syllabus (I.S.
1973	Year V S.C.Special (1st trial) Grade 11	Year IV (S.C.Special) revised) trial)	Year III S.C.Special twice-revised trial(I.S.)	Year II final syllabus (I.S.)
1974	-	Year V S.C.Special (revised trial)	Year IV S.C.Special twice-revised trial	Year III final syllabus (I.S.)
1975	-	-	Year V S.C.Special twice-revised trial	Year IV S.C. Special final syllabus
1976	-	-	-	Year V S.C. Special final trial

Each year's syllabus after each trial will be revised as a result of feedback for the following year's trial and it will be finalised for implementation after three consecutive years of trial.

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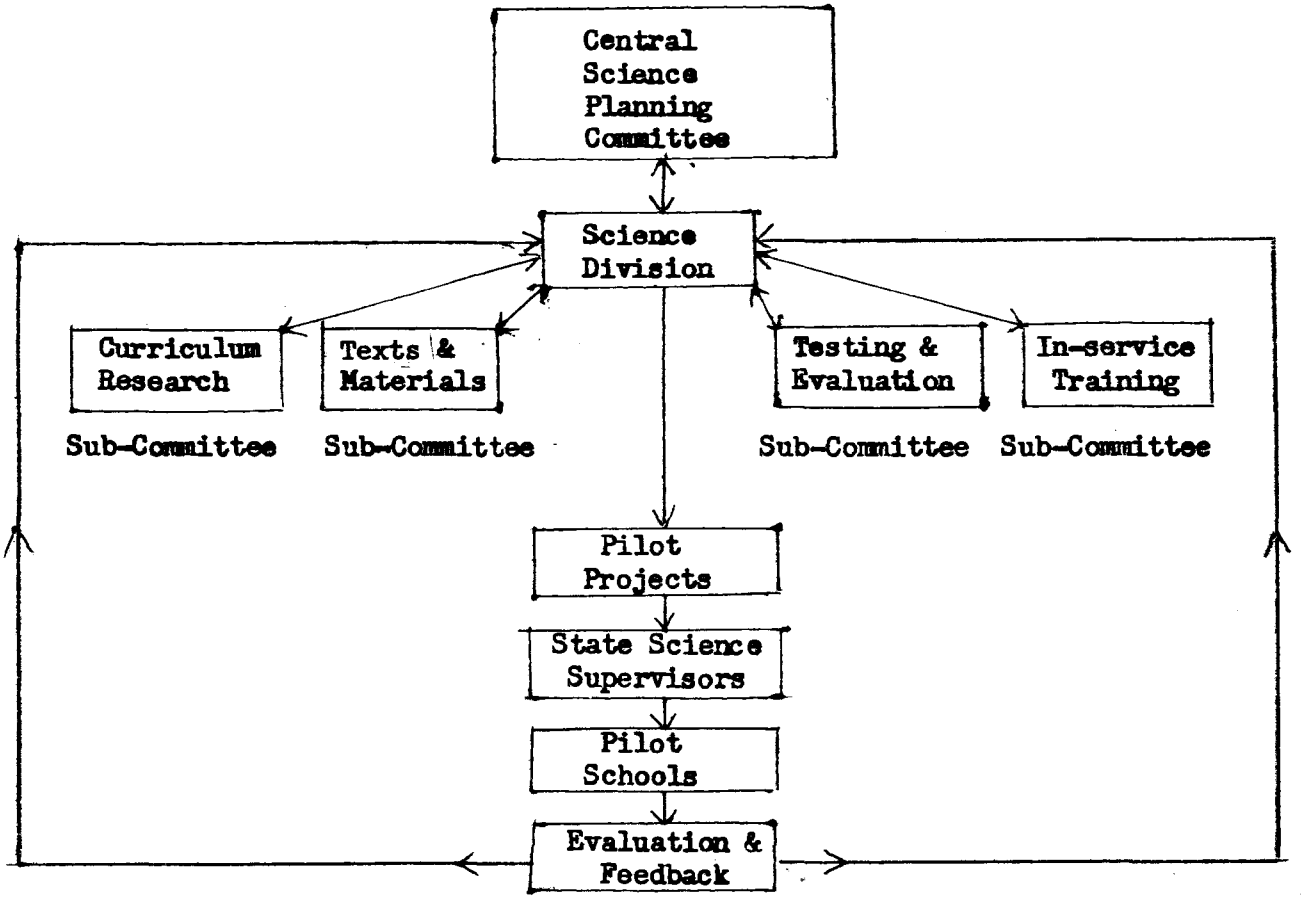
Experiences gained in conducting the pilot programme and in revising the Integrated Science courses will be utilised by curriculum writers to develop new science courses for upper secondary classes (Grades 10 and 11) for a five-year pilot project from 1972 to 1976.

Organisation: The Central Science Planning Committee is responsible to the Central Curriculum Council of the Ministry of Education for advice to the Science Division of the Ministry of Education in the planning and implementing of school science and mathematics curriculum reforms. Members serving the Committee are drawn from senior science education officers from various professional divisions of the Ministry, state science supervisors, science inspectors, top science teachers, key curriculum developers, scientists and science educators from the University of Malaya. The flow chart below outlines the organisational set-up for curriculum reforms on a national scale.

Organisation for Curriculum Reforms



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Science Education Decade

It can be seen that the above science project for the secondary school level will take seven years to complete. In addition the Ministry of Education is planning to launch two curriculum projects in mathematics and science for primary (elementary) schools and another project in modern mathematics for lower secondary classes next year. Materials and new courses for these projects are being prepared for implementation. Malaysia could truly call the next ten years as her Science Education Decade. In view of the accelerated pace of curriculum reform for school science and mathematics the Science Division of the Ministry of Education with its limited facilities cannot cope with the demands for implementing continuous curriculum reform on such a wide scale.

Science Education Centre

A national science education centre to serve the needs of science curriculum development and reforms and continuous research and improvements of science teaching is the logical development and it will be established by the Ministry of Education next year. The centre can be housed in temporary buildings immediately on an available site already earmarked for the permanent centre. Funds will be sought from UNESCO and other sources to finance the project for the first five years. The main functions of the centre are summarised below:-

a. Science curriculum research and development.
b. Design of science laboratories and workshops.
c. Development of prototype equipment and apparatus.
d. Development of teaching aids
e. Research in and development of instructional materials including textbooks, guides, etc.
f. Guidance, examination and evaluation procedures
g. Organising and conducting in-service training of science teachers, supervisors, science education administrators and laboratory assistants for continuous up-dating of their knowledge and methodology.

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h. Organising pilot projects and conducting field-trials of new programmes.

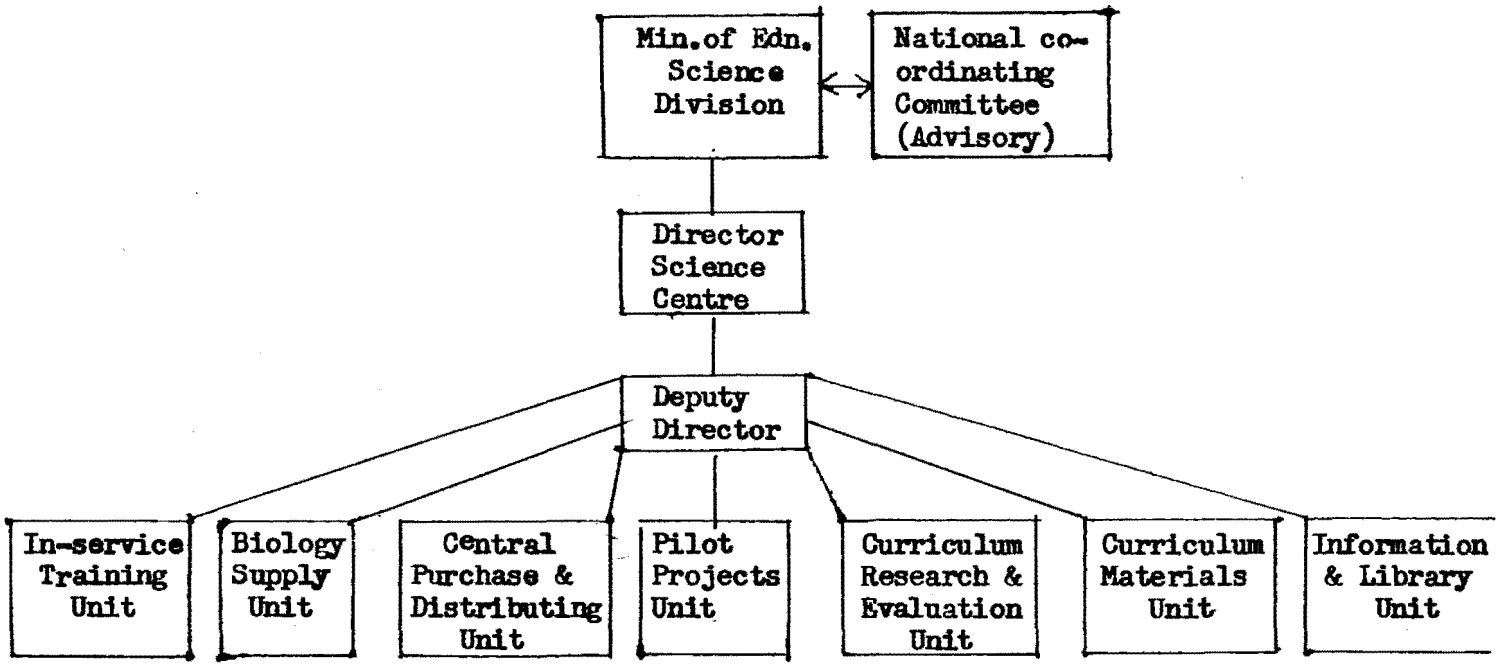
i. To serve as the library centre for information and reference on new resource materials and latest approaches for the improvement of science and mathematics teaching.

j. To set up a biology supply unit.

k. To set up a central unit for bulk purchasing and distribution of science materials and equipment to schools.

l. To exchange information and ideas with international and regional and other national science education centres.

The functional set-up is given in the chart below:-



As school and college education is centralised at the Ministry of Education it is more practical in Malaysia for the government than a local University to establish a national science education centre. Being responsible for the whole school education system it can easily provide sufficient funds for implementing pilot projects for the continuous improvement of science teaching on a national scale. A centralised system of education will have the advantage of accelerating the pace of implementing the new programmes once the Ministry is convinced by evaluation that they help the country to achieve its national,

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educational and social and economic goals. To ensure the prestige of the centre the Ministry will arrange with the local universities and probably with overseas institutions and international agencies for participation of their scholars in the fields of science, education, and psychology, in research and evaluation of new course materials and methodology.

State science centres on a much smaller scale, will be set up in either existing teacher training colleges or premier schools to serve as operation centres for implementing pilot programmes, conducting in-service training as more and more schools participate in the projects, and carrying out on-the-spot testing and evaluation. They will be under the direction of the National Science Centre.

In-service training

Re-training of science teachers is a prerequisite to the successful launching of any major project in science curriculum reforms using schools as trial centres. Under the bi-lateral assistance programme the British Government will in every August for three consecutive years, supply two teams of experienced tutors for the centralised in-service teacher training programmes concerned with the integrated science and upper secondary science projects. The first intensive four-week in-service course for sixty teachers, science supervisors and organisers was held in Kuala Lumpur, Malaysia in August 1968 by a team of four Scottish tutors. It was planned to enable every participant to carry out all the experiments and exercises meant for Year I of the Integrated Science course, to attend a series of discussions on the philosophy and various aspects of the course, to spend some workshop hours in the construction of a few science kits, and to try writing of test items and rewriting worksheets, with the object of using local materials and adapting the original worksheets to suit the language level of Malaysian pupils.

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This same group of key personnel will attend the in-service course in August this year to go through the Year II course before they carry out the pilot project for Year II next January. Similarly they will attend the in-service course for the Year III pilot projects in August 1970.

A certain number of promising teachers and state science supervisors from this group will be selected as tutors for additional teachers from existing pilot schools and teachers of the next batch of 50 additional pilot schools which will carry out the Year I revised curriculum in January 1970. The tutors will undergo a special course which will be conducted by Scottish advisers in Malaysia in November this year before they hold intensive in-service courses for teachers in new pilot schools at the end of the year at various centres. The number of local tutors will be increased very rapidly as more and more schools participate after 1970 in order to cope with more in-service courses which have to be held in the various states.

Pre-service training

To reduce the demand for remedial re-training and to augment the number of teachers for the integrated science course for the future, two local training colleges specialising in science subjects will begin their two-year pre-service training programmes in integrated science next year. The faculty staff of each college will also assist in writing and testing course materials for Year III, IV and V.

Nuffield Science

Concurrent with the present integrated science in-service training in every August is another in-service course in Nuffield 'O level' pure sciences for 20 university teachers and science teachers of upper secondary classes (Grades 10, 11, 12 and 13) in each pure science subject conducted by a separate team of British tutors.

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To overcome the risk that each group is working in a water-tight compartment certain talks and discussions on common themes and related areas in Physics, Chemistry and Biology are held for all participants. The aim is to select interested and promising participants to form a panel of writers for new course materials which have to be developed for year III of the integrated science for 1971 and years IV and V of the new science for upper secondary classes subsequently. It is a two-week course designed to 'expose' the participants to the philosophy of the 'Nuffield' approach using new course materials through a series of lectures, discussions and practical work based on a number of selected experiments from the Nuffield programme for each pure science group.

Craft training

Another in-service programme was held at the Technical Teachers College, Malaysia last December for laboratory assistants of pilot schools in order to train them in making some kits and apparatus and storage cases involving simple handtools for the integrated science course. They were most enthusiastic as this was the first time they had ever attended a craft course of this nature. The aim is to assist pilot schools to make kits and apparatus, etc. at a fraction of the cost of imported kits and apparatus, thus saving their funds for purchase of more sophisticated and precision instruments and apparatus which cannot be manufactured locally. The training which lasted for 10 days will be held annually for laboratory assistants of new pilot schools.

Use of National Language in trial schools

The feature of the whole project is that the course is conducted in two languages - Malay for Malay schools and English for English schools. There has been no difficulty in the translation of the curriculum into Malay. The national language has been in use for science teaching for more than a decade.

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It is vital to the whole nation that Malay and English schools are selected as pilot schools for the project right from the beginning in order to ensure that all pupils irrespective of the medium of teaching take part in the project and benefit from the new course.

Progress report:- Visits to various pilot schools were made by the respective State Science Supervisors, the Federal Inspectorate, organisers from the Science Division and members of the Central Planning Committee towards the end of March in order to discuss with the teachers concerned the trial lessons they have carried out since the start of the new school term in January 1969. The reaction of the teachers to the new course was very favourable and their attitude was good. Total conversion to the new approach was not complete as anticipated but there was a marked improvement although there was a tendency for teachers to talk too much. Pupils were very much more active and interested than before because they were so much more involved in learning science by carrying out 'do-it-yourself' exercises. More frequent personal visits are necessary to encourage those teachers involved and to orientate heads of schools and heads of science departments in order to get fuller co-operation in implementing the project.

Considering that the project was on trial for the first term only teething troubles were expected. However, problems of organising practical work for large classes and communication with state organisers are being overcome.

Newsletter

The Science Division of the Ministry of Education keeps in touch with the pilot schools by means of monthly issues of the Integrated Science Newsletter which provides general information and collates reports from pilot schools regarding suitable substitute materials and experiments which do not work, local sources of materials and apparatus, and writing of worksheets for additional materials and other teething troubles. The response to exchange of information and ideas between the teachers via the newsletter is excellent.

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Multiplier effect

Two pilot schools are doing very well. The teachers concerned have been completely converted to the new approach. Their pupils have found science so interesting that neighbouring schools have requested the Ministry of Education to adopt them as pilot schools next year. It is expected that this multiplier effect will spread to other states in the course of the year. On the whole the trial has made a good start condidering the fact that the teachers concerned are non-degree college graduates who were so strongly entrenched in the traditional and authoritarian method of instruction.

Elementary Science Projects

The Ministry of Education has been most concerned with the poor standards of teaching of science and mathematics in Malay primary schools. Three basic factors contribute to the poor quality of science teaching, namely (a) the vast majority of teachers have not been trained in the teaching of science, (b) they lack the 'know how' on how to use simple everyday materials in science lessons and (c) they did not study science while at school.

The problem of retraining becomes gigantic as there are no less than 18,000 teachers in 2318 Malay primary schools in West Malaysia fully engaged in the teaching of science. But it is not insurmountable. The operational strategy used will be different from that adopted for the integrated science project.

A five-year national programme to modernise the teaching of pre-secondary science and mathematics in Malay will have its pilot project launched in January 1970. A two-pronged approach is adopted i.e.

(a) to supply science instructional materials in Malay such as guide sheets, handbooks etc. which would be of use to the teacher in the day-to-day lessons and

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(b) by providing (on-the-spot) training and guidance in the approach and use of such instructional materials by a team of trained key personnel (Field Force) who will travel to the rural areas to conduct classes with groups of 20 teachers three times a week.

The contents will remain unchanged but the treatment of the topics follows the same philosophy as that of integrated science.

Central Writing Team

A panel of four known as the Central Writing Team - two local teachers and two U.S. Peace Corps volunteers - is working full time on the writing of guide sheets for science for Grades 1, 2 and 3 in the first instance. At the same time another panel is also engaged full time writing guide sheets for mathematics. Writing of guide sheets is a tedious process as writers have to spend a great deal of time studying tested new curriculum materials obtained from various sources throughout the world before writing the guide sheets. It has been found necessary to increase each team to six members in order to get ready the instructional materials before the end of the year. The guide sheets will be pre-tested in six sample schools including the university primary school before they are finalised for the pilot schools.

Field Force

The Field Force members will work in teams of two and will base themselves either at the State Education Department or the State Science Education Centre. There will be eleven teams, one for each state and for a start 'schools of excellence' in the same district will be selected as pilot schools for retraining of teachers in Grades 1, 2 and 3. As the project develops it will extend the retraining to teachers in Grades 4, 5 and 6.

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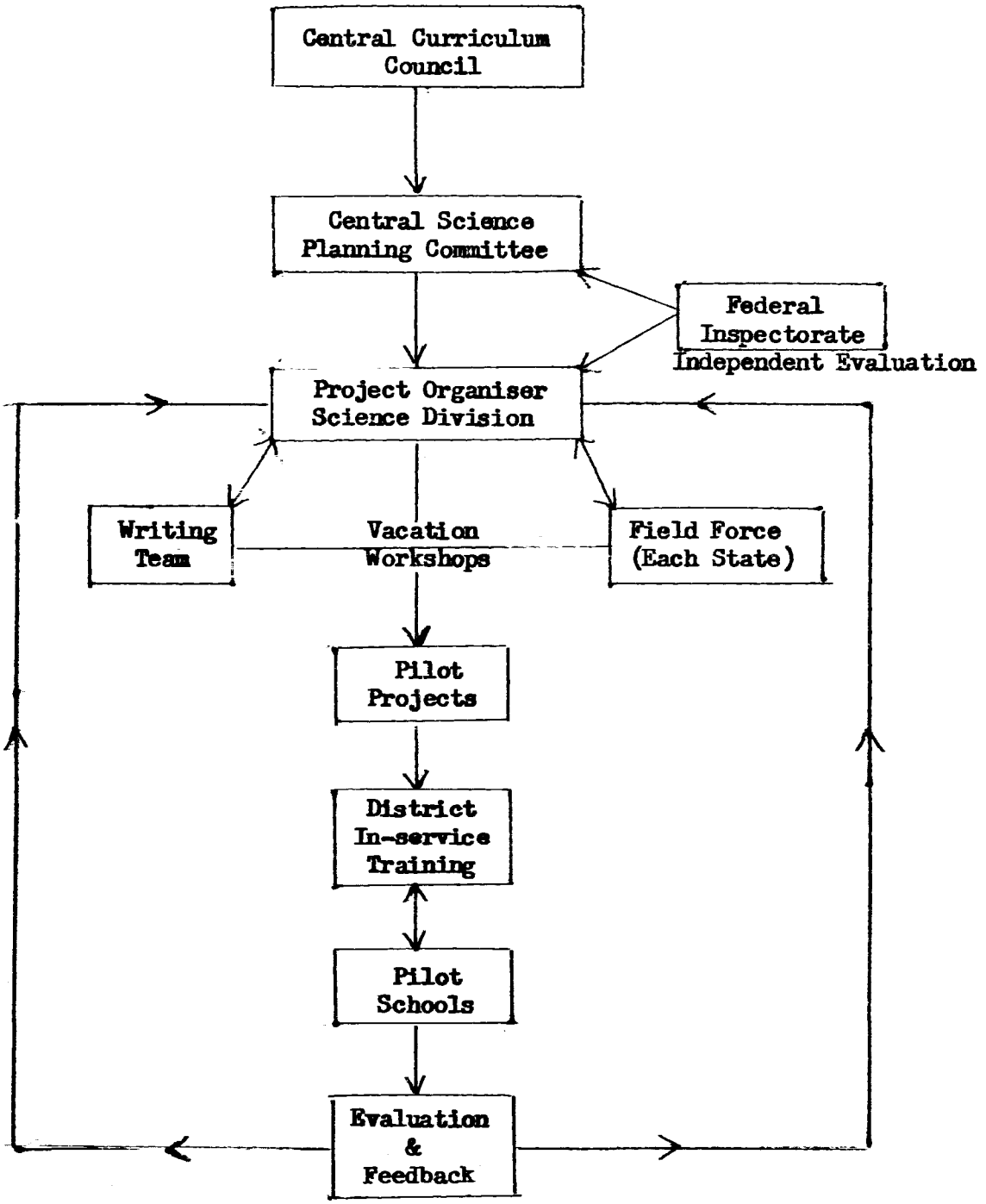
Organisation

The flow chart below outlines the organisation required for the project:-



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The table below shows the projected number of teachers to be retrained from 1970 - 1973 :-

Year	Number of Science F.F. Teams	Number of Maths F.F. Teams	Total No. of teachers re-trained in maths & science
1970	11	11	2,640
1971	18	18	4,320
1972	21	21	5,040
1973	21	21	5,040
		Total :	17,040

Financial assistance will be sought from UNESCO/UNICEF, foundations and friendly governments to meet the high cost of these two vital projects from 1969 to 1973. Asia Foundation has agreed to donate US $30,000 towards this fund for 1970.

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It is planned to assign ninety percent of the total teaching time for Science to pupil participation based on a series of open-ended activities and problem-solving situations using common indigenous materials. This strategy is the most realistic as the vast majority of pre-secondary teachers in Malay schools who have very poor 'know-how' of science teaching will require a great deal of time, patience and encouragement in changing their techniques of teaching as they themselves will be learning science in the proper way for the first time.

The feature of the project is that local key personnel, many of whom have already attended courses in modern curriculum development projects and studies in pre-secondary science and mathematics overseas, are responsible for the whole project including writing new course materials using the enquiry approach but based on local experience and local conditions and adapted to suit the contents of the present curriculum. It is a difficult enterprise, but the country is confident that with the guidance which may be sought from international and regional experts from time to time it will develop a modern science curriculum of its own to suit the needs of its pupils at pre-secondary level before the end of the next decade.

RECSAM

The regional project to establish a Regional Centre for Education in Science and Mathematics in Penang (RECSAM) as Malaysia' contribution to regional co-operation in the field of education was approved by the South East Asia Ministers of Education Council (SEAMEC) at its second conference held in Manila in November 1966. The participating member countries are Indonesia, Malaysia, Philippines, Singapore, Thailand, Vietnam and Laos.

The broad objective of the RECSAM is to help the participating countries in improving the teaching of science and mathematics in the region in order to lay the foundations for meeting the technically and scientifically trained manpower requirements of the region. It will start initially at the elementary and secondary levels and to involve teacher-training institutions and colleges of education, faculties of mathematics and science and other faculties of member countries as may be necessary in implementing the programme.

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RECSAM will give priority to projects which can through regional cooperation benefit member countries more than what could be obtained by similar expenditures at national levels and will complement and supplement national programmes in member countries. The Centre, by concentrating on programmes and courses for key personnel from various member countries, hopes to generate the multiplier effect of such training when they return to their countries to train thousands of their own science and mathematics teachers.

At best therefore the Regional Centre will act as a catalyst in stimulating action in the region and in disseminating the latest development in respect of science and mathematics teaching. The main responsibility of the Regional Centre is to mobilise the best talents, both within as well as outside the region for the furtherance and improvement of science and mathematics education in the region.

The Project Office was set up using the old library building of the Malayan Teachers College in November 1966 under the direction of the Steering Committee for the Centre. Funds for the operation of the pre-permanent phase was provided by the U.S. Government through the South East Asia Ministers of Education Secretariat based in Bangkok, Thailand. A series of meetings of the Task Force, National Seminars, Regional Seminars and Steering Committee were held at various dates between 1967 and 1968 to prepare and refine draft development plan of operations, including programme activities and the funding plan of US$8 million for the first five years of operation of the Centre for the approval of SEAMEC which accepted in February 1968, the fifty-fifty funding scheme as proposed by the U.S. Government. The proposal states that the funding of the total costs of all SEAMEC projects, should, in so far as is possible, be based on at least 50% from U.S. Government, and the remainder should be underwritten by the host country of each of the projects. The host country may seek additional assistance from non-U.S. Government sources.

SEAMEC at its fourth conference in Djakarta, Indonesia in January 1969 approved the development programme for RECSAM and supported the funding plan as proposed by Malaysia for the first five-year budget (July 1970 - June 1975)

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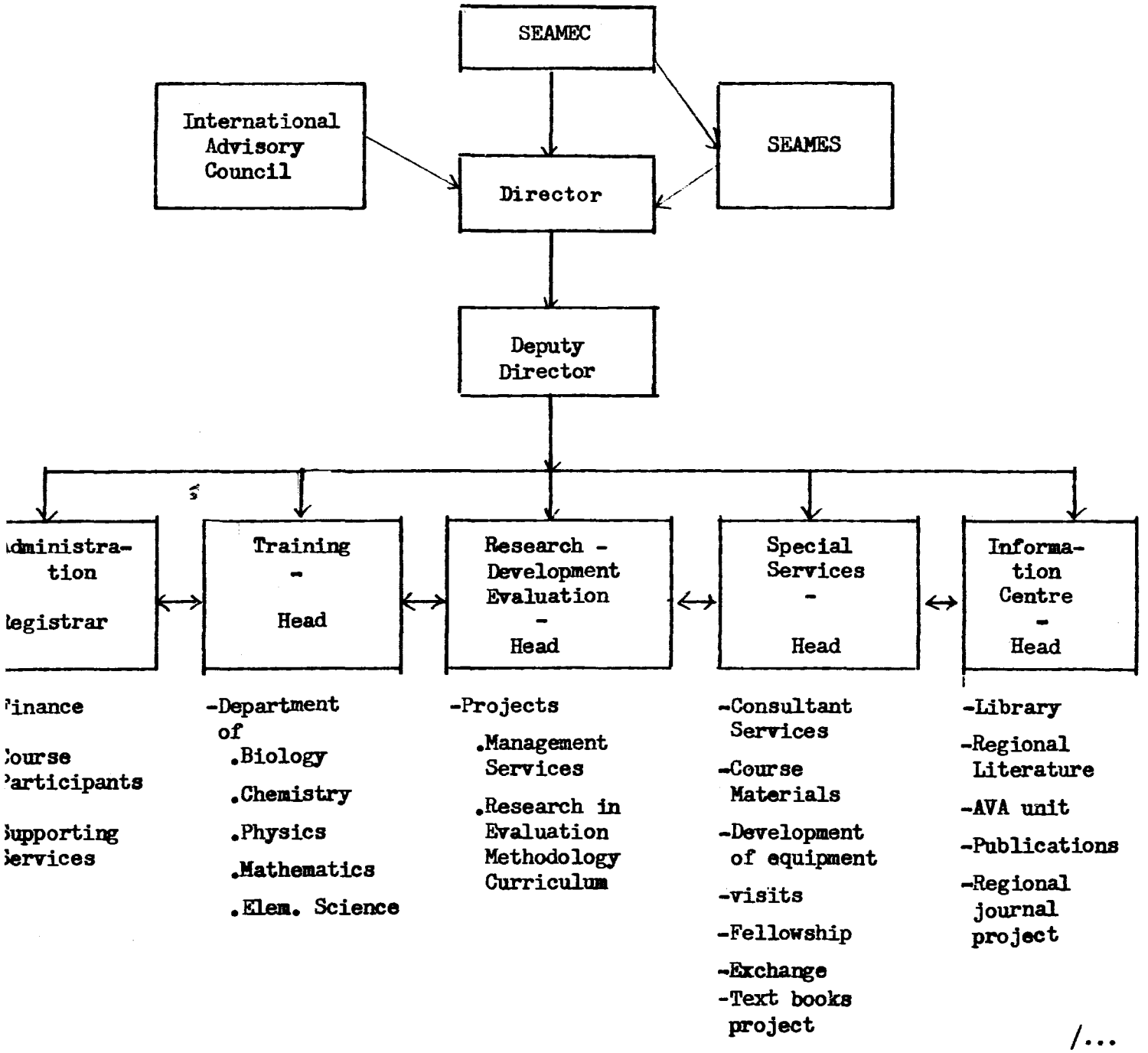
(a) Capital costs & equipment	US$2,830,000	- U.S.G. Contribution
(b) Operational costs	US$2,657,000	- Malaysia Contribution
(c) Special Funds	US$2,658,000	- US.G. 50% - SEAMEC 50%
Total	US$8,145,000	

The chart below shows the functional organization of the Regional Centre:-



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Project Proposals

Specific project proposals have been scheduled for the first five-year operational phase of the Centre after they have been processed carefully by the Task Force and international consultants.

Training Division:-

Offers five seminars and 43 courses for a total of 1122 key personnel in various science subjects.

The Research - Development - Evaluation Division:-

Provides a total of 59 courses for 1152 key personnel.

The Special Service Division:-

Provides services as outlined in the chart above.

The Information Centre:-

Will produce and distribute newsletters, bulletins, etc. on the activities of the centre and a regional journal and AVA materials. It will establish a reference library and provide library service to member countries.

Review of Programmes

It is planned during its first operational phase to review and evaluate the project activities that have been conducted annually as it is anticipated that new problems and needs may arise consequent to the progress of curriculum reforms in the member countries. Flexibility is thus provided in order to serve the member countries more effectively.

Faculty Staff

A total of 10 professional members of the Faculty Staff including the Centre Director will be recruited from Malaysia. An equal number will be appointed from member countries in order to mobilise the best talents within the region for the Centre.

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Services of professional officers and international consultants in the new methods and techniques of science learning and teaching from outside the region will be sought for the Centre in order to help in the implementation of the project activities during its first five formative years. This will also provide opportunities for the Centre's professional staff from member countries to qualify as international experts who on return to their countries will direct curriculum reforms at the national level.

Capital Development

The permanent buildings of the Centre costing about US$2.8 million will be built in a 14-acre site adjoining the Malayan Teachers College, Penang. Phase I of the building project consists of one hostel block for 60 persons and the Dining Block which will serve as a temporary centre administration unit and classrooms, will be ready in early 1970. The cost is estimated at US$515,000. Phase II consisting of (1) administration building, (2) information, library and audio-visual aids centre, (3) first teaching block, (4) first laboratory block, (5) second laboratory Block (6) two more hostels and (7) staff housing scheme will be ready in early 1971. During the present interim period the Centre conducted its first regional course in BSCS Biology as adapted by Philippines last May, using laboratory and classroom facilities and supporting services of the Malayan Teachers College, Penang. It is also scheduled to hold two courses and a seminar for national administrators in the latter part of 1969. In addition, arrangements are being finalised with the UNESCO Chemistry Pilot Project, Bangkok to hold the course 'Chemistry Pilot Project' study at the Centre at the end of 1969 as a joint venture whereby consultants and experts are provided from the UNESCO Chemistry Pilot Project to assist in conducting the course at no expense to the Centre. This is the collaboration the Centre is always striving for with UNESCO and other international and national organisations as it is of mutual benefit.

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RECSAM when it is fully operational in 1970 will become one of the largest international centres in the world devoted to the improvement of science and mathematics teaching. It will provide a total of 102 courses in the first five-year plan, excluding seminars, covering all aspects of science and mathematics curriculum development and reforms. No other international centre has been planned to conduct such a comprehensive range of courses designed to accelerate the pace of improvement in science teaching in any region. The Centre rightly deserves a lot of financial support from international organisations such as UNESCO, foundations, universities, friendly governments, and commerce and industry in its task. It also needs professional support from UNESCO so that it can become a full-fledged international institution in Asia for research and development in science teaching.

Bibliography

1. 'Integrated Science', a paper by Science Division Ministry of Education, Malaysia - 1968.

2. 'National Science Education Centre', a paper by Science Division, Ministry of Education, Malaysia. December, 1968.

3. 'Special Problems in the Teaching of Science in Malay Primary Schools' a paper by Science Division, Ministry of Education - February, 1968.

4. Reports of meetings of Steering Committee of RECSAM, Penang Project Office, 1967 - 1969.

5. Improving the Teaching of Science with Particular Reference to Developing Countries - Working paper by Dr. A. V. Baez, October, 1967.
