Asian Programme of Educational Innovation for Development

Curriculum Development Centres 2

The Curriculum Development Centre of Malaysia

UNESCO REGIONAL OFFICE FOR EDUCATION IN ASIA
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Yeoh, Oon-Chye

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- to help strengthen national capabilities for the creation and use of educational innovations;
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- to promote the transfer of experiences.

APEID
ASIAN PROGRAMME OF EDUCATIONAL
INNOVATION FOR DEVELOPMENT

Studies of Curriculum Development Centres in Asia 2

The Curriculum Development Centre of Malaysia

Study prepared for the Asian Centre of Educational Innovation for Development (ACEID)

by
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Foreword

The Curriculum Development Centre became an operating agency in January 1973, and acquired the status of a full-fledged division of the Ministry of Education in May 1974. Its establishment was the culmination of over a decade of effort in curriculum development undertaken by the Ministry of Education. Within the next few years, the Centre will continue to evolve towards a more effective division responsible for curricular research, experimentation, development, and the implementation of curricular changes for the improvement of the quality of education in Malaysian schools. Though much has been done to conceptualize the tasks of the Centre and in the development of a strategy for effective and meaningful curricular improvement in the country, a great deal more remains to be done.

It is therefore timely that this case study has been conducted under the auspices of the Unesco Regional Office for Education in Asia in order to share our experiences in curricular renewal effort with others. The study is also significant in that an independent team of educationalists from the Faculty of Education, University of Malaya, has been invited to make an in-depth study of the activities of curricular reconstruction undertaken by the Ministry in order to provide fresh viewpoints on our curricular renewal efforts. In carrying out the study, the writers have worked very closely with the staff of the Centre. While the views expressed in the report are those of the writers, we commend the team for their depth of perception and analysis of the many complex and interlocking activities found in our curricular renewal efforts. The report has documented our successes and shortcomings in both past and present curricular renewal practices and we appreciate the writers' independent and frank assessment of our efforts. More important, the report has mirrored, in uncompromising terms, our concerns for continuing effort in the curricular development field. We wish to take this opportunity to express our thanks and appreciation to members of the study team for undertaking the case study and for the frankness of their views.

Director
Curriculum Development Centre
Ministry of Education, Malaysia

December 1975

This study is committed to the underlying value that curriculum development is about people, their well-being, and what they can become.

Acknowledgement

We wish to record our gratitude to Cik Asiah bt. Abu Samah, the Director of the Curriculum Development Centre, Ministry of Education for the invitation to conduct this case study.

Throughout the study, we have been most impressed and encouraged by the informal, open and honest exchange of views between members of the team and the different curriculum officers of the Curriculum Development Centre (CDC). This was in accordance with the expressed wishes of the Director who emphasized repeatedly the need for an objective and frank review of the CDC.

In this respect, the team was fully aware that the CDC could have accomplished the same task in a minimum of time. As such, the Centre's insistence on an independent look by others 'outside' the CDC is in itself an example of professional integrity and commitment to the responsibilities it has undertaken.

At every stage in the preparation of this case study, we have tried our best to honour the trust that the Centre has placed on us. Our fervent hope is that the case study will be useful, perhaps in a small way, to the CDC, the Ministry of Education, and to the efforts of Unesco, Bangkok, who had initiated similar studies in five different countries in Asia.

The study reported here is merely our 'first look' (and is therefore not intended to be comprehensive) at the CDC. It is based entirely on the interviews with the staff of the CDC. However, the opinion expressed here (and for other errors and acts of omission) need not necessarily reflect the views of the CDC. The realization of this study within six months would never have been possible if it had not been for the full cooperation of Encik Chew Tow Yow, the Deputy Director and each of the curriculum officers-in-charge of the different projects. To each and every one, we say *"terima kasih".*

Also, we wish to record our thanks to Prof. Madya Dr. Awang Had Salleh, the Deputy Vice-Chancellor, University of Malaya. The nature of this study was conceived at the time when he was Dean of the Faculty

of Education, University of Malaya. We still believe that the study could have achieved a more rigorous standard if Dr. Awang Had Salleh had remained to work with the team.

Now, it remains for us to submit respectfully this case study to the Director of the Curriculum Development Centre.

Dr. Yeoh Oon-Chye
Dr. S. Kanagasabai
Puan Rahimah bt. Hj. Ahmad

Faculty of Education
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Table of Contents

PART I

ORIGIN AND DEVELOPMENT OF THE CURRICULUM DEVELOPMENT CENTRE

1. Introduction

The Federation of Malaya,[1] prior to independence, did not have an overall educational policy or a national, standardized curriculum. By 1955, on the eve of national independence, the Government felt the need for a national education policy, and a committee was set up under the chairmanship of the then Minister of Education, Tun Abdul Razak to establish:

> a national system of education acceptable to the people of the Federation as a whole and which will satisfy the needs and promote their cultural, social, economic and political development as a nation, having regard to the intention to make Malay the national language of the country while preserving and sustaining the growth of the language and culture of other communities living in this country.[2]

The objectives of education perceived as important at that time were as follows:

1. To bring together the children of all races under the national educational system in which the national language is the main medium of instruction;[3]
2. To forge a common Malayan outlook 'through a common syllabus for all schools so that, whatever language they use, all pupils will follow the same curriculum;[4]
3. To enable all children between 6 and 7 years of age to find places in primary schools.

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1. The Federation of Malaya refers to what is known as Peninsular Malaysia today.
2. Malaysia. Education Committee, September 1955—April 1956. (Dato' Abdul Razak bin Hussain) *Report of the Committee.* Kuala Lumpur, Government Press, 1956, p. 1.
3. *ibid.* p.3.
4. *ibid.* p.3.

2. Curriculum Development Centre, Malaysia

The recommendations of this committee (which were enacted into law in the *Education Ordinance of 1957*) resulted in the following changes pertinent to school curricula:

1. Introduction of a common, Malayan-centred syllabus and common time-tables for schools;
2. Introduction of the study of the National language (Malay) and the English language as compulsory subjects in all primary and secondary schools;
3. Introduction of common public examinations at the following levels:
   a) end of primary education, and
   b) end of secondary education.
4. Establishment of an independent Inspectorate;
5. Establishment of a Language Institute to train teachers and conduct research in the teaching of the languages;
6. Reorganization and development of technical education, and
7. Reorganization and expansion of teacher education programmes.

In 1960 an Education Review Committee under the chairmanship of the late Encik Abdul Rahman Talib was set up to review the education policy set out in the Razak Report. This committee, in addition to reiterating the main features of the national policy as contained in the Razak Report, made several other recommendations which led to the following changes in the school system.

1. Raising of the school-leaving age to 15;
2. Introduction of universal, free primary education as from 1962; and
3. Provision of secondary education in the medium of Bahasa Malaysia and English only.

Later on, in 1964, the recommendations of the Comprehensive Education Committee resulted in the following changes:

1. Abolition of primary to secondary promotion examination, thus enabling each child to complete a total of nine years of education;
2. Diversification of the lower secondary school curriculum with the introduction of four practical pre-vocational subjects;
3. Provision of guidance and counselling facilities in schools; and
4. Provision of a diversified form of post-comprehensive education.

Establishment of needs

Under the First Malaysia Plan (1966–1970),[5] development of education was seen to be oriented towards the economic goals of the country. These educational programmes included:

1. The extension of the concept of basic education to include not only the primary cycle but also three years of lower-secondary education;
2. The reorganization of the pattern of secondary education with the introduction of ***comprehensive*** and post-comprehensive education; and

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5. Malaysia. *First Malaysia Plan, 1966–1970.* Kuala Lumpur, Government Printer, 1965. xvi, 191 p.

3. The shift towards a better balance between general academic education on the one hand, and vocational, technical and science education on the other.

Implications of these proposals resulted in:

1. A significant increase in the proportion of children entering lower secondary school in completing primary education;
2. The establishment of the public Lower Certificate of Education Examination (LCE) for the first time in 1967 (primarily to select about 45 per cent of the lower secondary enrolment for a further two years of post-comprehensive education); and
3. The urgent need to supply more qualified teachers, better school and instructional facilities, together with the need to reduce the proportion of drop-outs.

These were looked upon broadly as the means to consolidate further the national educational system with respect to the promotion of social, cultural and political unity and to improve the quality of education, especially in correcting the imbalances between the urban and the rural areas.

During this phase of the country's educational development, ***ad hoc*** committees (the Syllabus and Time-Table Committee of 1956 and the general Syllabus Revision Committee of 1964 together with their subject sub-committees) were set up to look into and review the scope and content of education. Curriculum development was viewed merely as the specification of subjects to be taught (including the hours of instruction per subject) and the development of subject syllabi or the revision of existing subject syllabi at the various levels of education.

In the early part of the First Malaysia Plan, a strong need for curriculum improvement and development (much more than the mere preparation of suitable syllabi) was already firmly

established. This was perceived as one of the means for improving the quality of education. All of these developments occurred at a time of great international activity and interest in school curriculum reform and renewal as a consequence of the post-Sputnik era.

More specific reasons in support of the *need* for curriculum improvement included some of the following events, namely:

1. The first LCE public examination in 1967 indicated the overall poor performances of students in science and mathematics, especially those in the rural areas.
2. The 1968 Report by the Federal Inspectorate[6] on *'Primary Education in the National Schools of West Malaysia'* recommends, among other things, that priority be given to remedial work for improving the standard of teaching and learning of science and mathematics in the Sekolah Sekolah Rendah Kebangsaan.
3. At this stage of our national development, the Government was already committed to the immediate aim of a centrally prepared curriculum, which would be suitable for use on a national basis. It was deemed prudent that a national curriculum would be more economical of effort in that central operations would make the most effective use of existing manpower.
4. A Ministerial Committee (establishment as a result of the Conference of Chief Education Officers on 16.8.66) under the chairmanship of Tan Sri Hj. Hamdan b. Sheikh Tahir (then the Chief Education Adviser, Ministry of Education) undertook a review of curriculum

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6. Malaysia. Ministry of Education. *Primary Education in National Schools: Malaysia Barat.* Kuala Lumpur, 1963, 186 p. This is a Report of the Federal Inspectorate of Schools on conditions existing in Sekolah-Sekolah Kebangsaan. The effects of teaching and learning with reference to the Standard V Assessment Examination are indicated.

planning in Malaysia and the means to implement curricular changes. The ***Report of the Committee on Curriculum Planning and Development*** (1967),[7] among other things proposed the need to establish a ***Central Curriculum Committee*** (CCC, a high-powered policy decision body) to assist the Chief Education Adviser in the organization of curriculum development in the nation. The Report defined the functions and responsibilities of the CCC of the Ministry of Education, and its relationship to the various other divisions within the Ministry and among other State Committees.

5. With the establishment of the CCC to co-ordinate and provide direction for national curriculum organization, the curriculum unit of the Educational Planning and Research Division (EPRD) functioned administratively as the 'power-house and the servicing agency for all curricular work', namely, to gather and collate information that will provide a sound basis for the continuing task of curriculum development.

6. Concurrently, during this period, the ***Teacher Training*** and the ***Schools Division*** of the Ministry of Education were already very much involved with the initiation of ideas to upgrade and improve the Primary and Secondary School Science Curricula. (Under the Schools Division, the Ministry had already initiated ***Projek Khas*** to improve the quality of primary science and mathematics teaching).

In the First Malaysia Plan, the need to improve the quality of education through curriculum improvement had already been established firmly. In formulating the Second Malaysia Plan

7. Malaysia. Ministry of Education. *Report of the Committee on Curriculum Planning and Development.* Kuala Lumpur, Dewan Bahasa dan Pustaka, 1967, 34 p.

(1971—75),[8] the Government had proposed, ***inter alia,*** the establishment of a Science Education Centre, Kuala Lumpur, to improve not only the quality of education (for the building of a progressive society oriented towards modern science and technology), but also the research, planning and implementation capability of the unit. The proposed establishment of the Centre reflected the importance attached to science and mathematics education in this country. The mission of the Centre was to assist significantly in upgrading the teaching of these subjects in the schools.

Thus, a nucleus of personnel with initial experience and thinking in curriculum reform and development had already been established in the Ministry. With the rapid educational changes undertaken in the First and Second Malaysia Plans, it will become increasingly clear to the reader that this simple beginning had laid the foundation for the subsequent rapid development of a national institution, the Malaysian Curriculum Development Centre. The network of relationships among the various Ministerial bodies concerned with the curriculum development at both the State and Federal level has been summarized in Figures 1 and 2, pages 9 and 10.

This sequence of events, namely the identification, evaluation and establishment of needs for curricular improvement in Malaysia was followed by the proposed establishment of the Central Curriculum Committee. This provided not only the impetus for concerted action and commitment by the Government in terms of the increase in the number of curriculum programmes, but also indicated clearly the urgency for the setting up of an institution with the corresponding infrastructure to implement fully these directives which had already been laid down. In the meantime, EPRD continued to act as the Secretariat to the CCC which consisted of one intermittant full-time staff (this was increased to two in 1971) and a foreign consultant

8. Malaysia. *Second Malaysia Plan, 1971—1975.* Kuala Lumpur. Government Press, 1971, 267 p.

planning in Malaysia and the means to implement curricular changes. The ***Report of the Committee on Curriculum Planning and Development*** (1967),[7] among other things proposed the need to establish a ***Central Curriculum Committee*** (CCC, a high-powered policy decision body) to assist the Chief Education Adviser in the organization of curriculum development in the nation. The Report defined the functions and responsibilities of the CCC of the Ministry of Education, and its relationship to the various other divisions within the Ministry and among other State Committees.

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8. Malaysia. *Second Malaysia Plan, 1971—1975.* Kuala Lumpur. Government Press, 1971, 267 p.

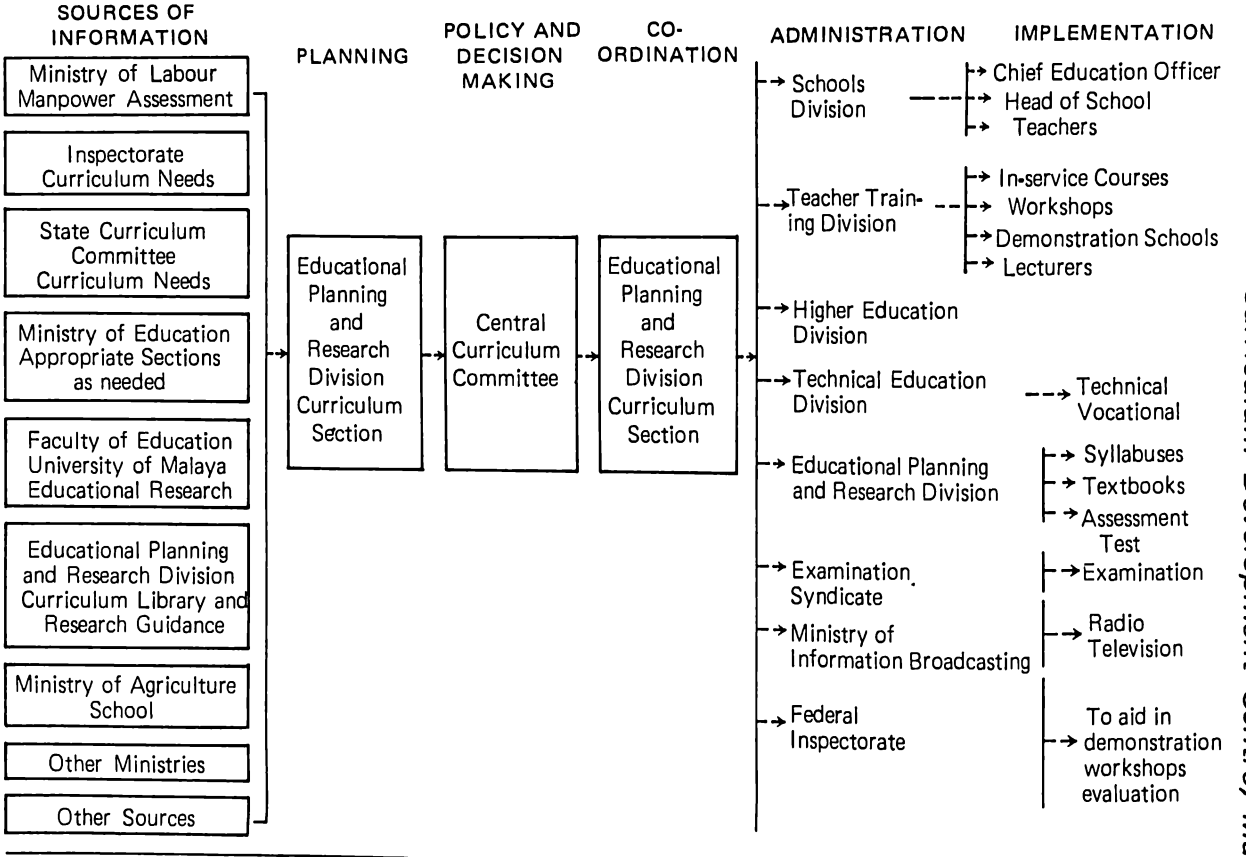
under the Ford Foundation. The staff for curriculum improvement work in the Schools Division was equally limited in number.

Much of the curriculum improvement programmes in the late 1960s in the EPRD were limited to the work of the ***ad hoc*** Subject Syllabuses Sub-Committees, mainly in subjects such as History, English (Primary) and Malay (Primary). Also, several Bahasa Malaysia programmes were already initiated by the Language Institute of the Ministry of Education. At the same time, approximately between 1967 and 1970, much activity was already underway in the ***qualitative improvement of Primary School Science and Mathematics*** (Projek Khas) in the Schools Division. It was through the cumulative work of this 'curriculum improvement programme' that the semblance of a Science Centre began to emerge in an informal way. At the second level, the Ministry had already begun to open its doors to 'exposure courses' in the teaching of the new sciences, such as the Scottish Integrated Science and the Nuffield Sciences, O—level.

All of these developments set the 'stage' for the proposed formalization and establishment of the National Curriculum Development Centre, and led the Ministry to submit its plans for the establishment of the ***Science Education Centre*** under the provisions of the Second Malaysia Plan.

In 1970/71, Encik Murad Mohd. Noor, together with the Unesco mission, brought shape to the initial conceptualization of the Centre. Under the assistance of two of the officers from EPRD and a foreign Unesco consultant attached to EPRD and the Schools Division, the proposal for the systematic setting up of the Centre was prepared and submitted to the World Bank for funding. The proposed Education Development Centre (EDC) project began in May 1971, following consultations with Unesco and the World Bank Study teams. Proposals were drawn up for a loan of M$2,386,000 from the World Bank to build and

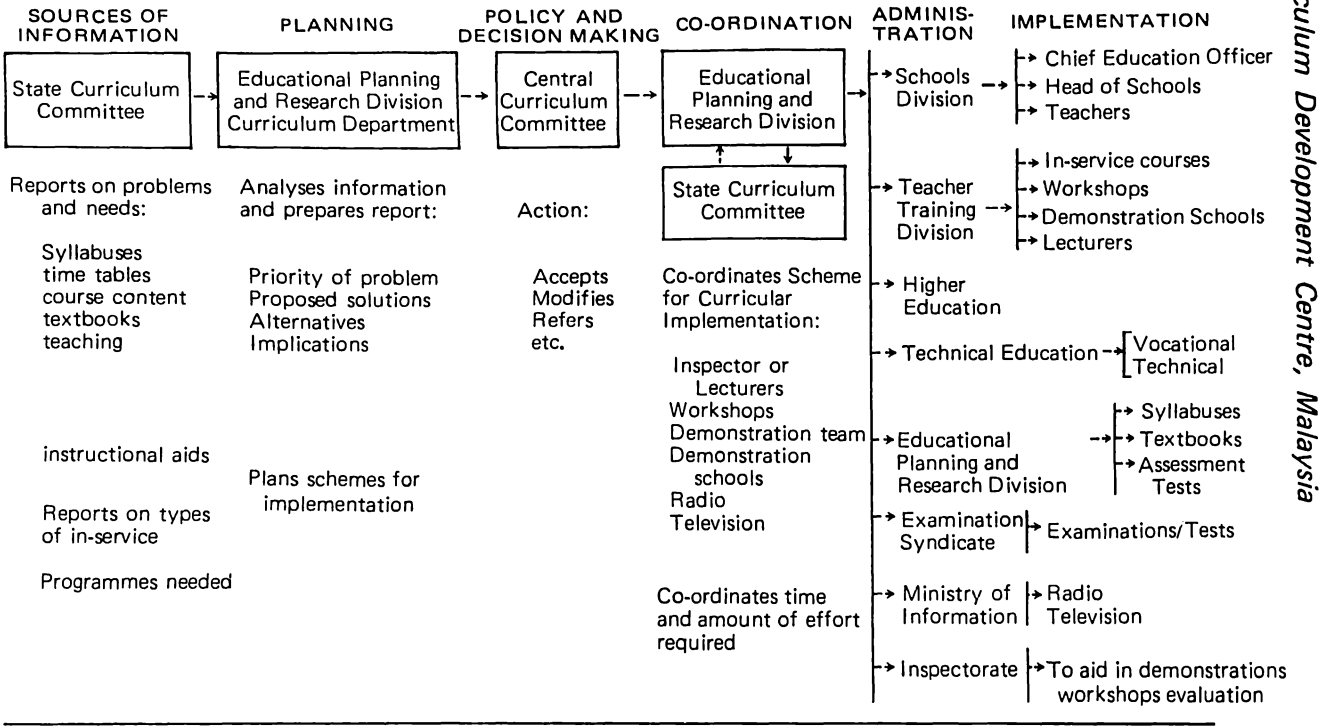
Figure 1. Process of Curriculum Development



Source: The *Report of the Committee on Curriculum Planning and Development.* Kuala Lumpur, Dewan Bahasa dan Pustaka, 1967.

→ Flow of information.

Figure 2. Process of Curriculum Development at State Level



Source: The *Report of the Committee on Curriculum Planning and Development.* Kuala Lumpur, Dewan Bahasa dan Pustaka, 1967.

--→ Flow of information.

equip the EDC, and this was approved in April, 1972. On 31 May 1972 a project paper was submitted to the United Nations Development Programme (UNDP) for financial assistance amounting to US$566,150 to cover costs of expert personnel services, fellowships and ***non-expendable equipment.*** The proposal called for the consolidation and expansion of the existing ***Science Centre*** (in the Schools Division) together with its infrastructure into the ***Curriculum Development Centre.*** It was initially conceived that CDC would emerge as the professional curriculum unit of the EPRD. While EPRD was more concerned with the 'Broader', macro-level educational issues (e.g. the problem of drop-out from school), the proposed Curriculum Development Centre would be more action-oriented, directed at the 'micro-level' of curriculum improvement and try-out mainly in the schools.

The list below summarizes the significant periods and events in chronological sequence that led progressively to the conceptualization and emergence of the Curriculum Development Centre, a name which was adopted officially by the Ministry in 1973. Prior to this, the proposed Centre was termed the Science Education Centre, while the World Bank had conceived it as the EDC. In the proposal entitled 'objectives of the EDC Project', the proposers indicated that the Ministry would consider renaming the EPRD as the EDC.[9] Hence EPRD has been perceived to be synonymous with EDC.

1966—1970: First Malaysia Plan

1967: — Introduction of a new comprehensive system of education.

— Extension of basic education to the lower secondary level.

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9. *Objectives of the EDC Project.* Kuala Lumpur, Ministry of Education (undated), mimeographed.

1967: — A balance between general academic and vocational, technical and science education.

— The first Public LCE examination results reveal the poor performance of rural students in Science and Mathematics.

— The ***Report of the Committee on Curriculum Planning and Development*** lead to the establishment of the CCC to direct the organization of curriculum development.

— Initiation of qualitative improvement in primary Science and Mathematics (Schools Division).

— Exposure courses to New Science Secondary School Curricula from the United Kingdom and Scotland.

1968: — Federal Inspectorate Report recommends the improvement of primary school Science and Mathematics teaching.

1969: — Schools Division establishes at Damansara a functional unit known informally as the Science Centre.

1970: — With the National Commission for Unesco, the proposal for the establishment of a Curriculum Development Centre (the expansion of originally the Science Centre) is formalized.

1971—1975: Second Malaysia Plan

1971: — Provision in the Second Malaysia Plan for a Curriculum Centre to organize the plan curriculum development. At this point, the Centre is already functioning as the EDC.

1971—73 — The World Bank loan for the establishment of the EDC is appointed and the latter subsequently renamed the CDC.

3. Institutionalization of the Curriculum Development Centre

At times, the story of the development of the National CDC is comparable to that of the chicken and the egg—namely, which came first? It is evident from the chronological listing of the foregoing events that long before the formalization of an institution such as the CDC, the general and specific functions of curriculum improvement and renewal had been undertaken by various divisions of the Ministry—the School Division, the Language Institute and the Curriculum Section of the EPRD.

With the implementation of the Second Malaysia Plan, the tempo of curricular activities in almost all of the areas of the educational system was increased. With an increase in the number of educational projects/curricular programmes, there was almost imperceptably a corresponding reorganization in the infrastructure and personnel directly responsible for the assigned tasks.

On reading the sections which follow, it should be remembered that, more often than not, the growth and progressive differentiation of the infrastructure of the Centre's organization did not precede, but rather came into existence as a consequence of ongoing services/projects. It would not only be difficult but also unproductive to try and distinguish the institutional functions from those of the complementary institutional structure. Like the chicken and the egg, they are not distinctly linear in relationship but rather cyclic in nature.

Functions and responsibilities of the Centre

In the provisions of the Second Malaysia Plan, the proposed Science Education Centre was conceived of as consisting of three units: the Biological Materials Unit, the Design, Testing and Prototype Equipment Unit, and the Special Science Unit.

Functionally, the three units dealt with the preparation of materials for practical laboratory work and tests, and the development of various equipment for use in the teaching of science. The special sciences unit would be mainly responsible for the development and modification of the science and mathematics curricula, the effective methods of their teaching in schools and the provision of in-service training, seminars and guide notes for science and mathematics teachers.

The Second Malaysia Plan which stressed scientific and technological education and academic streams, and the subsequent consultations with Unesco and the World Bank study teams had significant developments which led to the inception of the CDC in January 1973.

Presently, the CDC is charged with the following:

1. To identify and translate national needs and aspirations into curriculum specifications.
2. To plan and develop curriculum programmes for continuous, systematic and qualitative development in education.
3. To develop and produce curriculum materials such as syllabuses of instruction, teacher guidelines, pupil learning materials, evaluation instruments, audio-visual aids and prototype teaching and learning equipment.
4. To disseminate information on curriculum innovations and practices to teachers in schools and others in the community.
5. To organize pilot in-service teacher education courses in order to communicate innovations, changes and revisions to those concerned.
6. To conduct surveys and analyses of significant world-wide trends and developments in curriculum specifications and teaching practices.[10]

10. Members directly responsible for the drawing up of the proposal to the World Bank were Encik Chew Tow Yow, Cik Arfah and Dr. R. Salinger.

The major categories of activities undertaken by the Centre include:

1. Research into individual pupil differences; the physical, social, emotional and psychological development of children; the effectiveness of learning under different curricular organizations and programmes; and the nature and role of teachers within the school system.
2. *Evaluation* of existing curriculum programmes to ensure their relevance and effectiveness and to identify areas which require review and change.
3. *Development of curriculum programmes* for specific educational objectives, teacher-learning programmes and procedures for the effective and economical communication of these programmes and the innovation of teaching/learning materials to support learning.
4. *Testing* programmes and materials systematically before they are recommended for use in schools.
5. *Training* of administrators, teacher-trainers and teachers in the use of the new curriculum products. In-service programmes for teachers are conducted jointly by the CDC, the Teacher Training Division, and other Divisions of the Ministry of Education.
6. *Extension services* set up in various parts of the country to disseminate information on curriculum innovations and practices, to orientate teachers in the use of specific curriculum programmes and materials, and later on to encourage teacher participation in curriculum development.

The special Science Unit which emerged ultimately as a current development activity of the CDC is responsible for the following interrelated projects:

1. Primary School Science and Mathematics (Projek Khas);

2. Secondary School Sciences;
3. Secondary School Mathematics;
4. Prototype Equipment Research Production;
5. Population Education;
6. Compensatory Education Project;
7. Language Unit;
8. Social Sciences;
9. Resource Centre;
10. Curriculum Research and Evaluation;
11. Educational Psychology;
12. Integrated Primary Curriculum;
13. Curriculum for Pahang Tenggara;
14. Multi-media Self-instructional Teacher Education.

It should be noted also that the Biological Supply Unit came ultimately under the responsibility of the Examination Syndicate (in view of the specific centralized examination needs) while the Prototype Equipment Unit continued to grow into the existing 'Prototype Equipment Research and Production Unit' in the CDC.

The brief review of the CDC's functions, activities and assigned projects reflects readily the very rapid expansion in the expectations and responsibilities of the Centre since its official inception in January 1973. In short, the CDC is responsible for bringing the Malaysian curricula up-to-date and to ensure that they would meet the changing needs of the Malaysian society.

The multiplicity of educational projects reflects not only the diversity of tasks and responsibilities undertaken by the Centre, but also the major actions by the Government in its educational endeavour to consolidate the educational system and to bring about improvement in the quality of education. The objective is to enable education to be progressive (especially in the reduction of wastage rates throughout the system, more intensive evaluation and improvements of curricula and through

the achievement of a better balance between general education and science and technological education).

Infrastructure

These responsibilities and functions could not have been achieved without the provisions to establish a matching organizational infrastructure. The emergence of this institutional structure is best appreciated if viewed retrospectively in terms of how the Centre had emerged eventually as a distinct institution itself.

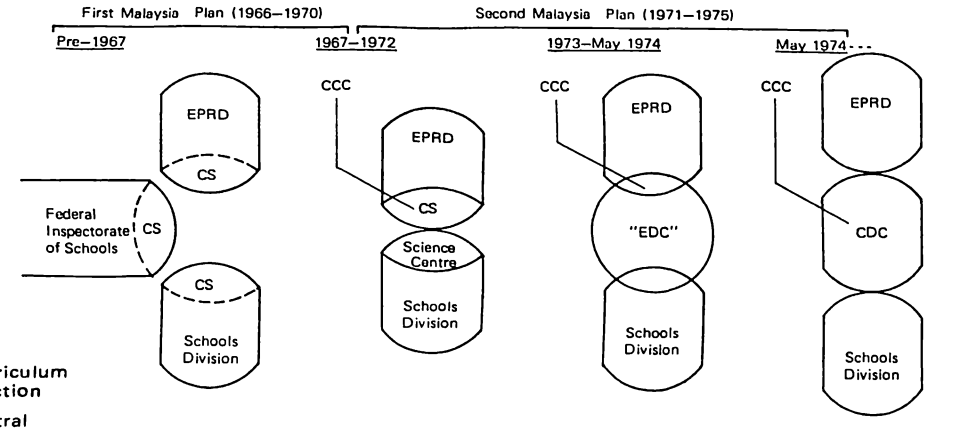
Figure 3 attempts to explain schematically the progressive evolution and subsequent differentiation of the Centre as a distinct entity under the Ministry of Education. It emphasizes the fact that the CDC was not created ***in vacuo,*** but that it had evolved ***in vivo*** over time from existing Ministry Divisions. Consequently, the organizational structure of the institution reflects that of the Ministry of Education, with a corresponding identification of personnel who merely 'moved over' from either the Schools or the Teacher Training Division and the EPRD.

At the inception of the CDC and until January 1973, the following structure satisfied the initial needs of the Centre, very much as what had been laid down in the Second Malaysian Plan.

Figures 4 and 5 indicate that a senior officer is the 'Project Co-ordinator' of the CDC. He is directly responsible to the Director of the EPRD, who continues to be advised by the Central Curriculum Committee, which is directly under the Chairmanship of the Deputy Director General of Education (formerly termed the CEA).

Functionally the Director of the CDC (initially called the Project Co-ordinator) is assisted by three senior organizers in the day-to-day co-ordination and supervision of the curriculum development activities. At this stage in the development, the Language Unit emerged as distinct from EPRD, and is presently

Figure 3. Progressive evolution and institutionalization of the Curriculum Development Centre[1] over four time-periods



Notes:

CS = Curriculum Section

CCC = Central Curriculum Committee

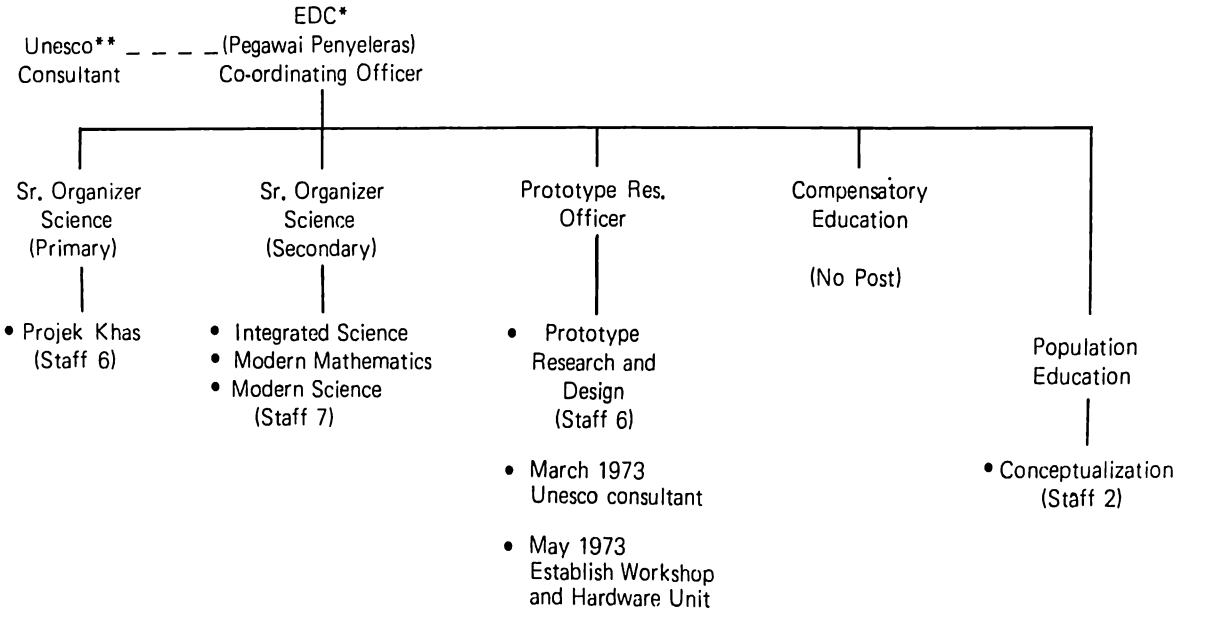
EPRD = Educational Planning and Research Department

Although the CDC is now a distinct entity, it continues to work closely (organizationally and functionally) with its parent bodies (EPRD, Schools Division and other relevant Divisions of the Ministry).

1. For simplicity in representation, the figure does not include other Ministerial Divisions such as the Federal Inspectorate of Schools (FIS), the Teacher Training Division and the Language Institute.

   In the period 1966–70, the FIS possessed a functional 'Curriculum Unit' which dealt with the school language curriculum programmes/syllabuses. With the establishment of the EDC in early 1970, the functions of the Curriculum Unit of the FIS was progressively absorbed by the Centre. The Language Unit of the CDC was initially housed at the Language Institute. However, with the establishment of the CDC in 1973, the Language Unit has moved into the buildings of the Centre in April 1974.

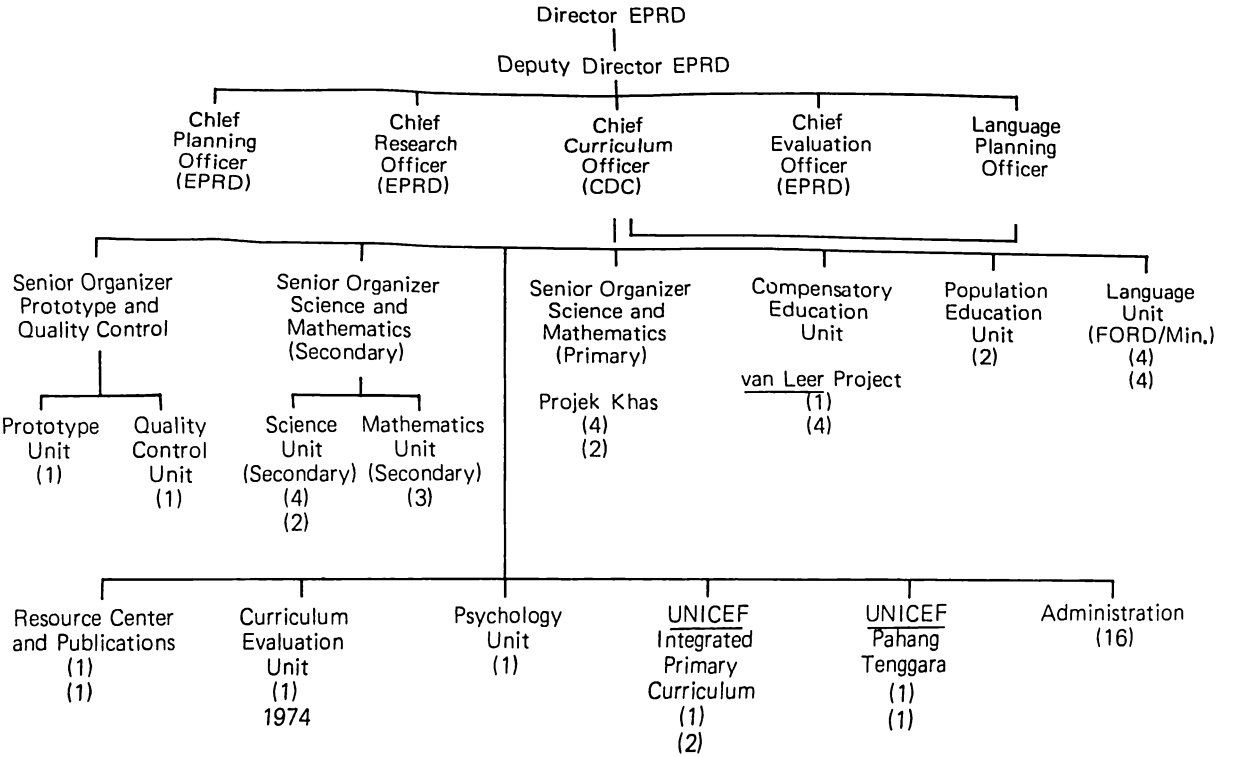
Figure 4. Organizational structure of the 'Science Centre' (1970–1972)



Notes * EDC was still an administrative component of the EPRD of the Ministry of Education.

** A Unesco consultant was appointed for a three-year period (October 1971–September 1973) to assist in the planning of the EDC project and to act as the specialist in curriculum development. Since then, the contract has been renewed until 1976.

Figure 5. Intermediate structure of the Curriculum Development Centre (by early 1974)



under the charge of the Language Planning Officer who liaises directly with the Director of the CDC.

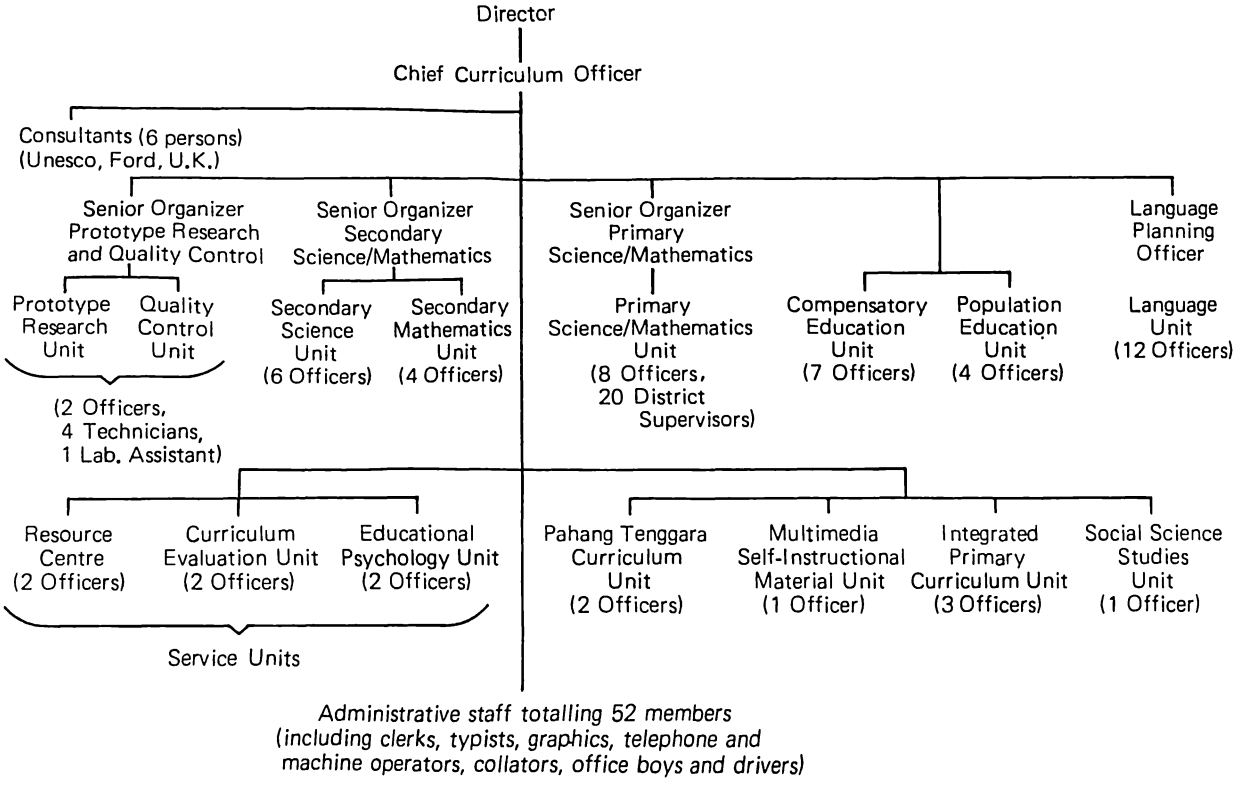
By 1975, the organization and structure of the CDC had emerged as an institution distinct from EPRD and the Schools Division. Figure 6 below illustrates the organizational plan as in 1975. The organization, functional autonomy and distinctive responsibilities of the Centre have now been fairly well defined. The Director of the Centre continues to be guided by the policy decisions of the CCC. As an institution, the CDC is at par with other Divisions of the Ministry of Education.

As expected, the number of curriculum officers in the various units/projects has been increased following a corresponding expansion in the supporting services and the general staff (see Figure 6).

From the time of CDC's inception, it has received the services of six consultants. The consultants' areas of specialization are Psychology, Evaluation, Population Education, Language and Primary School Integrated Curriculum Units.

So far, the reader has been provided with a brief history of the CDC and its organizational framework. This skeletal framework of the CDC will serve as a guide for analysing the variety of projects and functions currently undertaken by the Centre. In this process of analysis (as shown in Part II of the study), the historical aspect of the Centre's growth and emergence will be further reinforced. More important, it is hoped that some of the identifiable trends in the mode of operation of the Centre can also be synthesized for a more critical review and comment. Finally, Part III summarizes the implications of what has been achieved and suggests new directions for the future.

Figure 6. Organization chart of the Curriculum Development Centre (as in 1975)



PART II

CURRICULAR PROJECTS AND FUNCTIONS OF THE CURRICULUM DEVELOPMENT CENTRE

1. Special Project for the Improvement of Science and Mathematics Teaching in the Primary Schools (Projek Khas)

Background

Origin: Circa mid-1968. Originated in the Schools Division, Ministry of Education. The project was first implemented in the schools in January 1970.

Funding: Asia Foundation financed $52,500 for the first year's expenses. The proposed expenditure over five years was estimated at M$444,500.

Problem: Following the Report of the Federal Inspectorate of Schools, the Ministry of Education established the 'Special Project' (Projek Khas) to improve the teaching of Science and Mathematics in the Sekolah-Sekolah Rendah Kebangsan, particularly those in the rural areas.

Project objectives

Target population:

All teachers of National Primary Schools with Bahasa Malaysia as the medium of instruction.

Objectives:

To provide some services and facilities to teachers with the view to improving the standard of the teaching of Science and Mathematics in the primary schools, particularly those in the rural areas.

Specific objectives are:

1. To prepare ***teacher guidesheets*** based on the existing syllabuses.
2. To implement these in the shortest possible time through trained key-personnel at the selected State ***centre of excellence.***
3. To set up a network of communication systems through in-service exposure courses, field visits and newsletters.

Innovative features

1. In order to implement the 'crash programme', Projek Khas decided to focus on changing the approach rather than the content of teaching. (This assumed that the teachers had greater confidence to try out the 'enquiry approach' on existing content which they were already familiar with).

2. The development of the ***teacher guides*** to accompany the existing syllabuses. To date, second editions of ***Panduan Mengajar Sains 1—6,*** and ***Hisab 1—6*** have been published and used in the schools.*

3. In-service training of teachers through the respective State Centres of Excellence which employed key-personnel (previously trained at the Federal level) to train/expose other teachers on the 'enquiry approach', and in the use of the ***Panduan Mengajar*** and the improvization of instructional materials. It was a strategy to diffuse progressively the in-service training to all teachers at the school level.

4. Employment of the mobile travel-van (equipped with the laboratory and instructional materials) to bring the services and facilities to the rural schools. (This has been established on a moderate scale since 1973).

5. Initiate the formation of (i) the prototype and quality control unit and, much later on, (ii) the self-instructional teacher-training multi-media modules. (These led to the establishment of two major services in the CDC by 1973, as a consequence of the activities initiated by Project Khas).

6. Maintain communication among the various levels of personnel involved in the Project through the Centres of Excellences and the extensive circulation of newsletters. These provided the forum for information and feedback exchanges. These are 'innovative' to the extent that (i) they were evolved as pragmatic strategies for the most realistic implementation of the 'crash programme', and (ii) the identification of the educational problems and national needs was indigenous in its concept.

Development

1. In early 1968, they acted as the Secretariat to co-ordinate the implementation of the Project. Four Education Officers (EO) were assigned to the tasks of Science and Mathematics Curriculum Development. Initially, the respective EOs were in charge of Primary Science and Mathematics, Lower Secondary Science, Upper Secondary Modern Science, and Modern Mathematics.

2. By 1969, the staff of four formed the nucleus of a Unit termed the ***Science Centre,*** charged primarily with the responsibility for the implementation of Science and Mathematics curricula reform, and secondarily,

* The guides specify for the teachers the objectives of the respective topics in the syllabus (for all of the six years) and the use of the learning materials for the 'enquiry approach' by the pupils.

the establishment of the Biological Supply Unit (under the Examination Syndicate).

3. Although the Science Centre had been sited separately at Jalan Damansara by 1969, it still remained a functional component of the Schools Division. The 'Centrè' Projek Khas emerged in 1970 (the year of its implementation) with a staff of nine officers, namely, one 'Head of the Projek Khas Unit' and four officers each for Mathematics and Science (drawn from the schools as well as the Teachers' Colleges).

At this stage of formation of the Science Centre a United States consultant (Dr. R. Salinger, then Director of US Peace Corps in Malaysia) was identified unofficially to advise the Ministry on the implementation of Projek Khas. Since October 1971, the consultancy has been renewed under Unesco auspices for a third, 2-year term of contract until October 1976.

4. **Development of the Panduan Mengajar**

The writing of the guidesheets in Bahasa Malaysia began in 1969, with a panel of four officers,* three local educators and one Peace Corps Volunteer.

In view of the great urgency 'to get the guides out to the schools as early as possible' (primarily to assist the teachers in teaching the existing syllabus), the ***Panduan*** was written without any intention of systematic try-out or revision prior to dissemination to the teachers. However, school inspectors and others experienced in the teaching of science and mathematics were asked to identify and to organize, if necessary, the learning experiences that were provided.

Using the existing school syllabus, the ***'Panduan'*** was designed to guide the teacher in the objectives, relevant content (concepts), materials and method of instruction (the enquiry approach). It was written with the understanding that almost all of the primary school teachers had very little knowledge of science, and also, that they had never been trained to teach science at all. Hence, the ***Panduan*** was developed to guide the teacher on both the content and the approach to the teaching of primary Science and Mathematics.

The enquiry approach for each activity begins with the specification of some of the instructional objectives for the teacher. The learning

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* The panel of writers were initially Encik Abu Hassan Bin Ali, Encik Kamarudin Hussein and Encik Van Dus Mohammed.

activities are supposed to be explored or conducted by the pupils with the guidance of the teacher. The teacher guides the pupils to find answers from their own experiences and to learn how and what to do with the instructional materials. Initial editions of 7,000 copies were printed locally on offset machines at the CDC. These were used by the teachers in schools and also by the Primary Teacher Training Colleges. The later editions of the ***Panduan Mengajar*** for Standards 1–6 in ***Sains*** and ***Hisab*** were published by the Dewan Bahasa dan Pustaka for sale to teachers and the public.

5. **Prototype materials**

By 1974, with the progressive development of the ***Panduan*** and as a consequence of the in-service training courses, Projek Khas began to develop and improvize its own 'prototype' instructional materials. These prototypes were the results of the ideas and materials suggested in the *Panduan.*

Organization and implementation

1. In-Service Training Centres

The idea was to decentralize the nation-wide in-service training programme. The innovations were disseminated in every State simultaneously over a period of time through the regularly organized week-end 'exposure' courses.

To achieve this end, Projek Khas in 1970 identified a total of 32 trial centres throughout Peninsular Malaysia. Each centre (known as the ***Centre of Excellence*** or ***Pusat Kegiatan***) was led by two experienced teachers (one in mathematics and the other in science) who had received previously centralized training at the Federal level. These teachers, termed key-personnel, would in turn train other primary teachers from schools that were adjacent to the Centre of Excellence. The Centre was the local point in the district where trained personnel, reference materials, basic equipment, workshop tools, visual materials and other resources were made available to teachers in the area.

From 1970 to 1974, a total of 28,539 primary school teachers had been exposed to the new approach. Initially, preference was given to rural school teachers. The teachers, whose schools were too far from the Centres, received an intensive six-day period of in-service training at one time while they were accommodated in the ***Asramah penuh.*** By 1975,

40,000 teachers are expected to have been exposed to these in-service training courses.

2. **Multi-media self-instructional teacher training materials**

In spite of the publication of the instructional materials in the *Panduan Mengajar,* it was evident that teachers were still in need of more assistance in both the content and the skills of teaching. The prototype materials that were developed gave rise to the idea of using multi-media modules of self-instructional materials to meet the teacher's needs. The module consisted of two or more of the following media, namely, printed texts, kits of materials, 35mm slides, sound tapes, 3-dimensional models and the teacher's manual.

These self-instructional modules are used by the *area supervisors* to learn by themselves how to improvise and make some of their own materials.

In the implementation of Projek Khas, the main emphasis was 'to get things going' in the schools by assisting the teachers with the essential services and facilities. For this purpose, besides the on-going in-service programme, Projek Khas also established in 1973 a mobile van equipped with a laboratory and materials to service the needs of the outlying rural schools.

Resources

The proposal submitted in 1969 for the five-year project to last until 1973 was estimated at approximately M$444,500. Of this amount, only M$52,500 was financed by the Asia Foundation.

The project anticipated that by 1973, about 20,000 teachers would have been re-trained. Apart from the capital expenses, a major component of the budget was devoted to travelling expenses and subsistence allowance of teachers and organizers at the week-end courses and vacation seminars. Other major items included salaries of supporting staff, and stationery supplies for the publication of the early editions of the *Panduan.*

Extension and diffusion

1. A mobile van to bring services and facilities to remote schools.
2. The development of prototype instructional materials.
3. The development (and dissemination) of self-instructional multi-media teacher training module for the teachers.

4. The newsletter, ***Berita Projek Khas*** is used as a channel for the communication and diffusion of ideas, views and opinions among teachers especially with regard to what children have 'achieved' in the Projek.

Evaluation

Being the first major effort in curriculum 'reform' undertaken by the Ministry and given the limited staff expertise, the priority of Projek Khas following its inception in 1969 was mainly to develop the Teacher Guides in Science and Mathematics for Standards 1 and 2 and, at the same time, to train the teachers in the use of these materials. Hence it was never intended to incorporate systematic evaluation as an equally important component of Projek Khas. In spite of this, the CDC Report of 1974 noted that 'qualitative evaluation based on visual and verbal communications' had been practised. It added that, '. . . it was hoped that portions of the earlier guide-notes (would eventually be re-written. . .'

More recently, the report on the 'Evaluation of Projek Khas Programmes' (1975) cited the preliminary findings of the teacher's Perception of Projek Khas. (Two other areas for evaluation, namely, the self-instructional multi-media module and the classroom climate generated by Projek Khas have yet to be assessed). This was the first systematic assessment of teacher's perceptions, derived from a 45-per-cent random sample of a total of 2,520 Standards 1 and 2 teachers (exposed to the ***Panduan Mengajar Sains*** or ***Hisab***) who responded to the 88-item questionnaire.

The findings were reported very briefly in terms of percentages of the responses to the different 'areas of concern'. Greater details are given in the Report, 1975, p.4–6.

Given such a 'systematic feedback', the available data could have provided a guideline for the revision of the ***Panduan Mengajar Sains*** and ***Hisab*** at Standards 1 and 2 level—if the evaluation had also further analysed the study so as to include:

1. A detailed compilation of the 'reasons' (if any) for anything that the respondents have rejected or accepted, (e.g. why 10 per cent of the teachers did not use the ***Panduan*** at all; why some had used it only partially).
2. A clear distinction and comparison between the 'perceptions' of teachers in the so-called 'rural' and 'urban' schools.

Data on the former criterion could have provided the 'empirical basis' for the revision of the ***Panduan*** in accordance with the problem encountered. The latter was crucial since the ***MAIN*** purpose of Projek Khas was to provide the means to improve the standard of teaching of primary science and mathematics in the country, with special emphasis in the *rural areas.*

Limitations

Besides the usual problems associated with administrative 'red-tape', finance and personnel (both in quality and quantity) the shortcomings of Projek Khas are perhaps best summed up in the appeal made by CDC in its report of 1974, namely:

> 'The time element . . . is not sufficiently recognized . . . as a crucial problem. The cost of curriculum development, even excluding the lengthy process of implementation, has to be paid out in time and not merely in terms of cash and personnel. The ultimate price of having to untangle the knots of mis-implementation as a result of hurried efforts will be more than whatever time saved in pushing through an ill-conceived programme . . . How do we convince these significant people that the younger the learner, the greater is the need for many pre-trials with actual children in live situations . . . ?

The experiences gained have prompted those concerned to suggest that:

> 'curriculum development would not be effective unless it is developed and tried out under actual classroom conditions even ***before*** writing the first draft . . . The ultimate goal of any curriculum development is to cause pupil change in the classroom . . .'

Projek Khas has learned many worthwhile lessons over the years. One of these is the need to build into the project a systematic feedback on all aspects of the programme's progress. Obviously it is not enough 'to cause a change' in teachers and pupils but also to evaluate systematically whether the behaviour change (if any) is ***stable*** and in the desired direction.

Curriculum Development Centre, Malaysia

After six years of effort in implementing ***Projek Khas,*** the Project has yet to answer this question objectively, 'Has ***Projek Khas*** improved the standard of teaching and learning in primary Sciences and Mathematics—especially in the rural areas'?

Thus, one of the issues is obvious. Having invested so much effort and time on the lives of one schooling generation, we must have objective evidence to indicate that all of these attempts have made a real difference in how children learn.

2. Secondary School Science and Mathematics Programmes

The programme for secondary school is made up of five projects, namely, ***Integrated Science*** at Forms I–III (in place of the General Science Syllabus), ***Modern General Science*** at Forms IV–V (in place of the 'traditional' Malayan General Science Syllabus), and ***Modern Biology, Modern Chemistry*** and ***Modern Physics*** at Forms IV–V (in place of the respective Malayan Pure Science courses).

The secondary school programme for mathematics is made up of two consecutively connected Projects; namely, the Lower Secondary Modern Mathematics for Forms I–III, and the Upper Secondary Modern Mathematics at Forms IV and V.

Background

Origin

1. ***Integrated Science*** (Forms I and II) is modified from the two-year Scottish Integrated Science Syllabus. It was first initiated in 1967.

2. ***Modern General Science,*** modified from the Nuffield Secondary Science and the Nuffield 'O' level Projects for the non-science Forms IV and V 'Arts' stream pupils, was first initiated in 1968.

3. ***Modern Biology, Modern Chemistry,*** and ***Modern Physics:*** These separate courses were modified from the respective Nuffield 'O' level Pure Biology, Chemistry and Physics courses for the Forms IV and V 'Science' stream pupils. They were first introduced in 1968.

4. Lower and upper secondary ***Modern Mathematics.*** These two projects were adapted directly from the Scottish Mathematics Group (SMG) for Forms I–III, and the English Schools ***Mathematics Project*** (SMP) materials for Forms IV–V. These replaced progressively the existing elementary and additional mathematics at the secondary school level.

Problem

It should be noted that few of the people who are now working at the CDC knew precisely how and why the various new curricula came into being, apart from the overall feeling of the need for change. This was due partly to the 'top-level' centralized decision-making process, and

partly to the lack of documentation of the official views that were subscribed to then. Nevertheless, the following were some of the significant events that have led to the full swing of the curriculum 'renovation' movement for the secondary school science and mathematics education programmes.

Prior to 1966, the Ministry University of Malaya Joint Committee on the Teaching of Basic Sciences had already expressed the opinion that the existing curricula were inadequate and needed urgent review to meet both the needs of the school leavers (Forms III and V) and those who remain to proceed to the university. Following the recommendations of the ***Report of the Committee on Curriculum Planning and Development*** (1967), the EPRD was directed to co-ordinate the curricula reform of the various secondary school science and mathematics projects. All of these occurred at a time when most developing nations sensed the urgency to 'catch up' with the countries who were more advanced (at least with a head-start) in their curricula reform.

Some of the officers recalled that the Malaysian Government was approached by the Overseas Development Authority (who already had some experience with curriculum reform in the African countries) to consider a change in the Malaysian Secondary School Science Curriculum. This led subsequently to the formalization of a negotiated agreement between the Malaysian Government and the United Kingdom (through ***CREDO***) to set up the administrative structure for such a curricular change. The overall mode of operation for introducing all 'new' curricula were broadly as follows:

1. With respect to each curriculum reform, the United Kingdom team of educators/tutors would assist the Ministry of Education in the development or modification of the curriculum and the re-training of the teachers;
2. The strategy included a combination of some of the following phases:
   a) Modification of the Scottish or English curricula materials;
   b) Progressive exposure, trial and/or phased-implementation in the secondary schools;
   c) Re-training of teachers in both the content and new approaches to the teaching of the new curriculum;

d) Use of the British key personnel to assist in the initial phases of the re-training of teachers and the modification of the curricular materials;

e) With the exception of Integrated Science, the trial and modification of the curricula before the teaching and learning texts and materials are progressively implemented in the schools; and

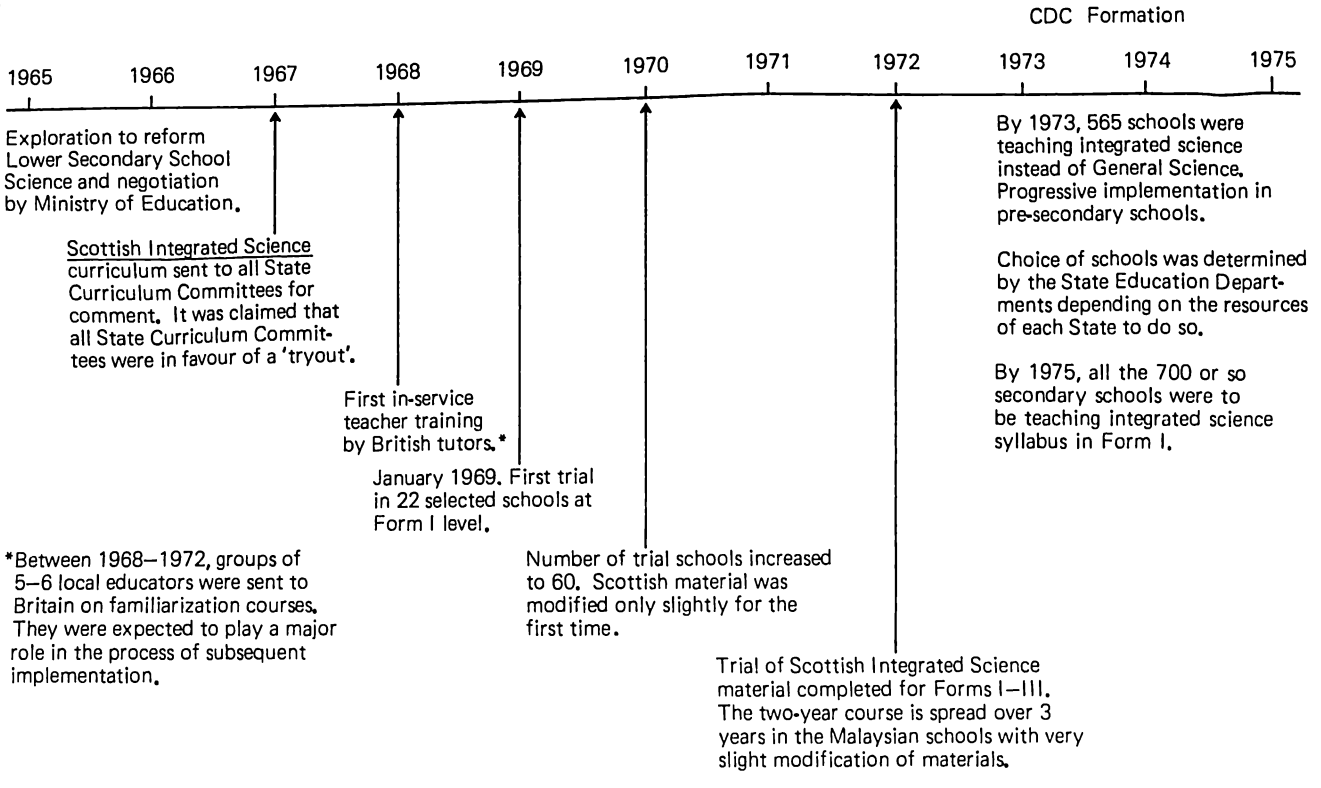
f) To obtain feedback during trials in schools for the revision of the trial materials in subsequent years.

In view of the time constraint, it was felt that one revision for each of the respective curricula was sufficient prior to the revised materials being published for school adoption. Even though it was understood implicitly that the Ministry of Education would evaluate the progress of the projects, it was not surprising that the systematic assessment was never initiated partly because of a severe shortage of personnel and for other reasons.

Organization and implementation of various projects

The approximate time-line for the organization and implementation of the various projects is outlined briefly in Figures 7 to 11.

Figure 7. Progressive Implementation of Integrated Science



* It should be noted that at this early phase of decision-making, the appointment of a member from the Scottish Inspectorate of Schools to the Federal Inspectorate, Ministry of Education, had a direct influence on the Ministry in accepting and adopting the Scottish integrated science syllabus. Some of the reasons cited in favour of the Scottish integrated science were as follows: (1) the Scottish integrated science syllabus, worksheets and instructional objectives were already available; (2) Scottish integrated science was two years 'ahead' of Nuffield Science Development; (3) the Ministry was convinced of the ease involved in 'dove-tailing' the 'new' Scottish integrated science into the 'old' General Science Syllabus.

Figure 8. Progressive Implementation of Modern General Science

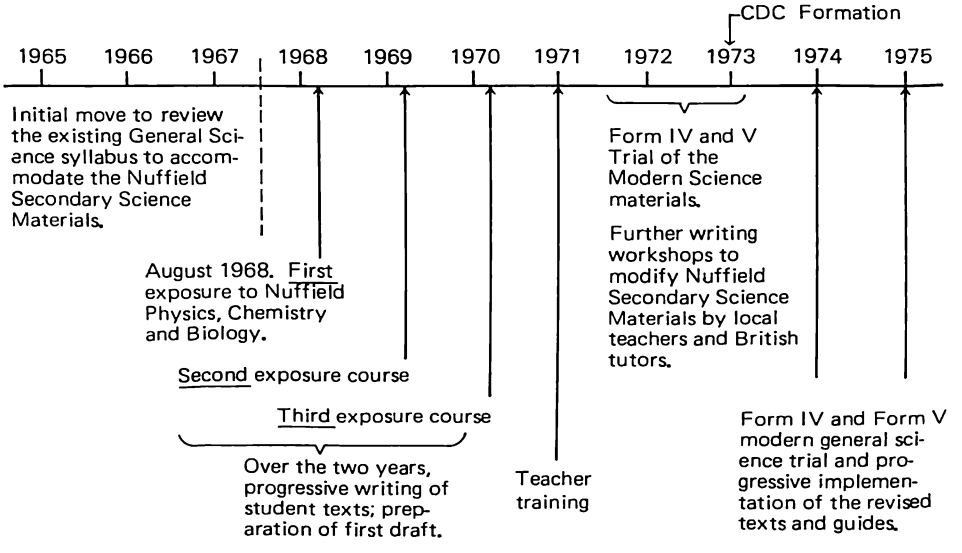


Figure 9. Modern General Science: Implementation Strategy

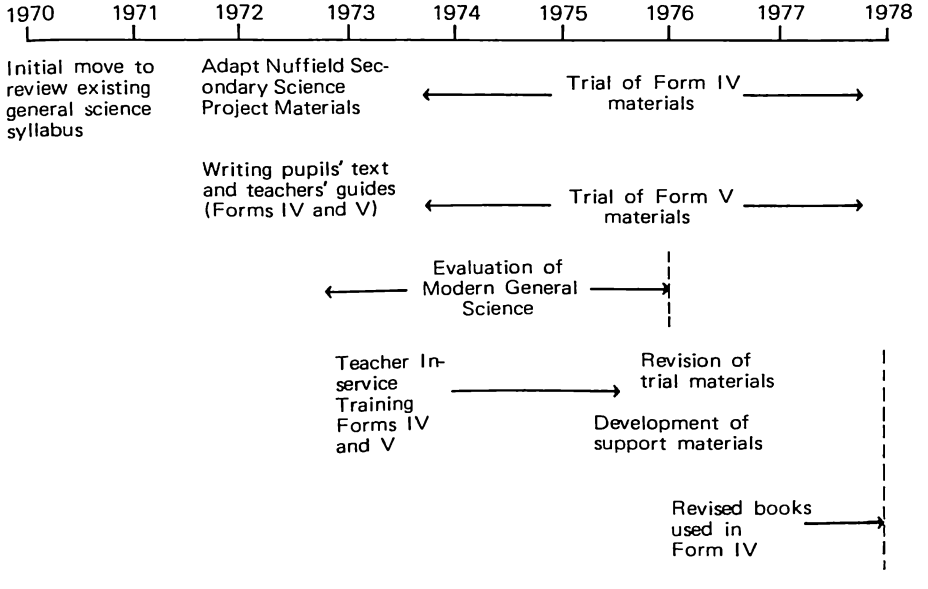


Figure 10. Progressive implementation of modern biology, chemistry and physics

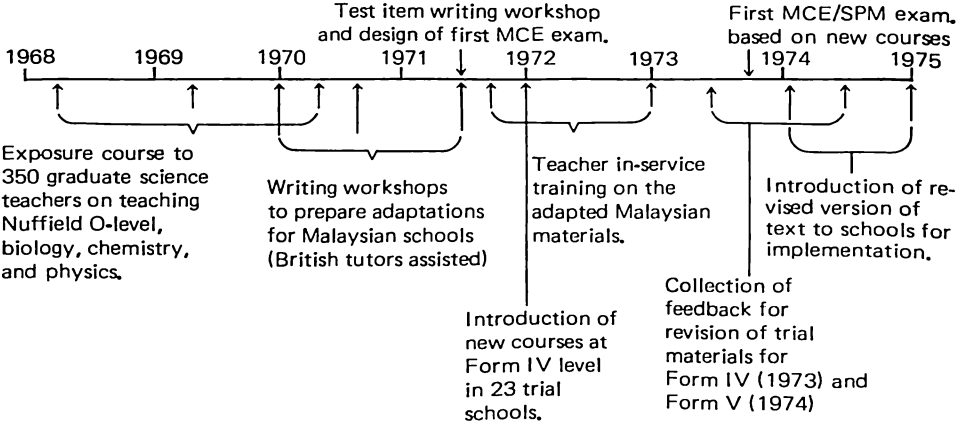
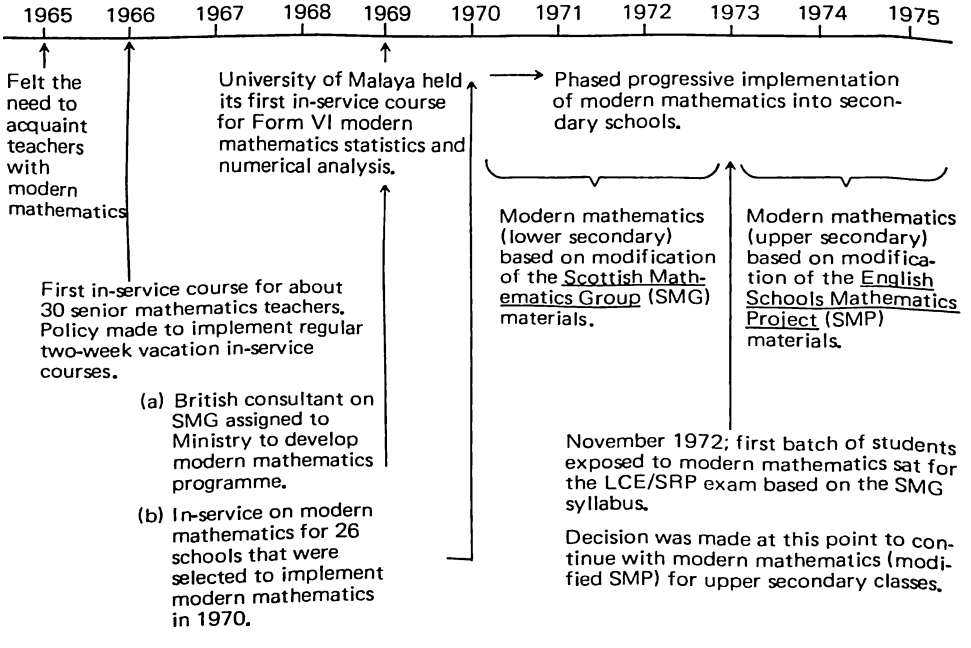


Figure 11. Progressive implementation of modern mathematics



CURRICULUM DEVELOPMENT; SUMMARIES OF PROJECTS

This section summarizes briefly some of the aspects of each of the curriculum projects listed in Figures 7 to11. The purpose is to document some of the strengths and weaknesses that characterize each project, and perhaps to provide also a basis for comparison across the diversity of projects.

Integrated science (Forms I—III)

A. **Rationale.** The reasons, if any, for the adoption of the Scottish Integrated Science (SIS) curriculum to replace the existing General Science programme were never given explicitly. According to the records, "a number of factors began to interplay in the resulting chain of events . . . The Scottish Integrated Science had been tried out for a few years in Scotland and was considered suitable for trial in Malaysia." (Chang Kwai, December 1973).

B. **Project objectives.** The need for curriculum change arose from the fact that (1) the existing general science syllabus had not been revised since the early 1950s, and (2) the world-wide 'movement' for curriculum change had a powerful influence on developing nations. Some of the criteria adopted to guide the curriculum reform emphasized that (a) the content needs to be up-to-date and made 'relevant', (b) the instructional approach should be consonant with modern philosophy and practices (c) the programme should be integrated as 'general science' to serve as a 'terminal course' for pupils completing the lower secondary school (Forms I—III) and (d) the programme should be teachable under local conditions.

C. **Specific innovations**

1. Integration of the separate sciences through inter-related concepts and in the organizational structure of the subject matter;
2. A programme is aimed specifically at Forms I—III or the LCE level;
3. The modification and the use of SIS worksheets as a guide to pupils and teachers, the structured activities assist teachers to identify what is required of them (as specified in the instructional objectives);
4. At each form level, there is supposed to be a 'balance' in the science activities involving knowledge in biology, chemistry and physics; and

5. Pupil-centred activities (often small group work) are employed to encourage pupils to explore, make observations and formulate tentative conclusions.

D. **Organizational strategies**

1. Instructional materials are borrowed from the SIS syllabus for modification to make them more suitable for local use.

2. 'Apportion and rearrange the two-year SIS syllabus into three convenient segments for Forms I to III', . . . 'and elimination of parts that have not been found to be suitable'. (It should be noted that only three of the 15 'topics' reflected the integratedness of the science content).

3. In 1968, exposure courses included,

a) Groups of 5–6 local 'key people' being sent to Britain to familiarize themselves with modern developments in science education (this 'study tour' continued annually with separate groups until 1973) and

b) Re-training of key-personnel and teachers by British tutors in Integrated Science teaching.

4. By 1969, 22 selected pilot schools began the teaching of Integrated Science in Form I. Through stages of progressive implementation, it is expected that all of the 700 or so lower secondary schools would have been taught the syllabus in Form I by 1975.

5. Teachers who teach Integrated Science are required to attend the two-week in-service training annually during school vacation for three successive years. Since 1971, the Malayan Teachers' College has begun to prepare their trainees to teach Integrated Science.

6. Pupil worksheets collectively in sequence for all the three years constitute the Integrated Science syllabus. As there were no teachers' guides, the teachers used the Scottish 'Memorandum for Teachers' initially for this purpose.

E. **Extension and diffusion**

1. The Integrated Science 'trial' worksheets were disseminated and tried out in schools through the process of 'phased progressive implementation' of the project.

2. After the initial three-year trial period of Integrated Science, the State Education Department decided independently in subsequent years

on the number of schools that could implement the new Integrated Science course. This depended to a large extent on the availability of material resources, such as science laboratory equipment and teachers trained to teach Integrated Science. To a small extent, schools had some autonomy in deciding whether or not they were ready to implement Integrated Science.

F. **Evaluation**

1. Systematic formative or summative evaluation was not incorporated as a part of the implementation process. Assessment was based on judgements made during visits to the schools during the trial period.

2. With effect from 1975, two research studies are currently being undertaken by doctoral students at the University of Malaya on different aspects of teaching and learning associated with Integrated Science.

G. **Resources**

1. The project is financed almost wholly by the Ministry of Education.
2. Some of the science equipment and materials were funded by UNICEF.

H. **Limitations and problems**

The following weaknesses of the project have been implied:

1. Rational reasons were not given for the adoption of the Scottish Integrated Science to replace the Malaysian General Science syllabus.

2. There was no clear delineation of national needs and existing constraints before the decision was taken to implement the project in the schools.

3. The workshops conducted have come to be used by teachers as a crutch for self-improvement.

4. Topic organization lacked thematic or conceptual integration—the nature of integration of the various science subjects is not explicit neither to teachers nor pupils.

5. The rapid change in both the content and approach in the teaching of Integrated Science has imposed a greater demand on the need to train laboratory staff in the management, maintenance and organization of the Integrated Science laboratory.

6. Even though it was not the intention, the progress of the 'phased implementation' could have been evaluated systematically to provide regular feedback for subsequent improvements of the programme.

Modern general science (Forms IV—V)

A. **Rationale.** Reasons have never been documented that would account for the adoption or adaptation of the Nuffield Secondary Science Project materials to replace the Malaysian General Science for the upper secondary school.

B. **Objectives.** The Modern Science curriculum is designed for the 'Arts' stream pupils who do not specialize in science. The emphasis is still General Science in scope, where the 'topics' in Physics, Chemistry and Biology are 'loosely sequenced'. Some specific objectives lay claim to the development of both the cognitive and affective outcomes in science learning.

C. **Specific innovations**

1. The programme is organized around 'topics' having either a physics, chemistry, or biology content bias.

2. As a General Science course, an attempt was not made to integrate deliberately the science concepts. This strategy made allowance for separate subject specialist teachers of physics, chemistry and biology to share in the teaching of Modern Science to the same class of pupils.

3. The programme focussed on learners being directly involved with the investigatory activities, leading to the use of the 'guided discovery' approach in science learning. Ideally, the teacher would guide the students in the making of alternative interpretations of the available data.

4. Placement of the different topics in Forms IV and V is supposedly determined by the perceived sequence of difficulty levels in the concept hierarchy.

D. **Organizational strategies**

1. The draft of the Malaysian Modern Science textbook was first introduced to Form IV in 1974.

2. Since 1968, selected groups of teachers have been attending exposure courses on the teaching of the respective science subjects using the Nuffield Secondary Science materials.

3. At the same time, the Schools Division was reviewing progressively the Nuffield text and materials. This was followed by the in-service training of selected teachers in 1971 to introduce the trial textbooks on Modern Science.

4. Forms IV and V trials were held in 1972 and 1973. The revision of pupils' textbooks was accomplished by a team of local teachers and

British tutors. The revised textbooks and teachers' guides have been tried out in 35 schools in Forms IV and V since 1974 and are currently being evaluated.

E. **Curriculum resources**

1. The British tutors helped to outline the Modern Science syllabus on the basis of the Nuffield Secondary School Science Project.

2. By 1973, pupils' textbooks and teachers' guides had been finalized in both Bahasa Malaysia and the English Language.

3. Equipment was basically of the Nuffield type.

F. **Extension and diffusion**

1. Implementation of the programme progressed in three different phases:

a) Initial exposure courses to the Nuffield programme;
b) Trial of the draft pupils' texts and teachers' guides in selected schools;
c) Use of the revised textbooks and guides for progressive implementation in Forms IV and V in all of the States.

2. Diffusion of information to schools and teachers through the ***'Berita Sains Moden'.*** This newsletter was first introduced in 1974.

G. **Evaluation**

Currently, a proposal for the comprehensive evaluation of the Modern General Science programme has been initiated. The initial aim is to obtain feedback that is urgently needed for the revision of the pupils' texts and teachers' guides in 1976. Four areas of revisions are planned, namely, the evaluation of the curriculum and learning objectives, teaching/learning classroom experiences, pupil cognitive achievement and teacher and pupil attitudes.

In the past, evaluation of the trial stages had been mainly informal and subjective in nature. It consisted of visits to schools and the personal judgements of the organizers with regard to the relative effectiveness of the programme that was under trial.

H. **Limitations**

None of these were cited in the published reports. However, many of the implicit and explicit shortcomings are closely parallel to those that have been encountered in the implementation of the Integrated Science programme.

I. Resources

1. The programme is financed almost entirely by the Ministry of Education;
2. Some of the laboratory equipment was funded by UNICEF.

Modern Biology, Modern Chemistry and Modern Physics

A. Nature of courses at Forms IV and V:

1. Modern Biology or Biology for Malaysian Schools.
2. Modern Chemistry or Chemistry for Malaysian Schools.
3. Modern Physics or Physics for Malaysian Schools.

All of these courses were implemented for the first time in the schools in 1972. Initially, only 24 schools were included. The number of schools in Forms IV and V increased to 70 in 1973. In that particular year, these pupils sat for a specially designed public MCE/SPM examination based on these new curricula.

B. Rationale

The reasons, if any, for the choice of modifying and adapting the Nuffield 'O' level pure science materials were not documented.

A logical reason was the need to modify the existing pure science syllabuses to provide the continuity to Integrated Science.

C. Objectives

These pure science courses should have an approach complementary to Integrated Science, and relevant in content to the Form VI science syllabus. Course content was geared to students who had elected to 'specialize' in the upper secondary 'science' streams.

D. Specific innovations

1. Certain sections of the Nuffield (UK) courses in Biology, Chemistry and Physics were selected. These, together with the 'Nuffield' approach to the teaching of the subject, were then developed into the two-year syllabuses for Forms IV and V. (The 'Modern' syllabuses were thus quite different from Nuffield 'O' level courses as the latter was basically a five-year programme).

2. The content for all of the courses was Malayanized while the new techniques and pedagogical approach of Nuffield were retained.

3. Between 1968–1971, the pupils' texts and teachers' guides for each of the courses were prepared in both English and Bahasa Malaysia.

4. Equipment/apparatus were patterned after the Nuffield-type. Comprehensive listing of apparatus required (in two separate priority lists) were supplied to the schools.

5. The establishment of 20 Science Centres in Peninsular Malaysia to service the needs of the schools. The number of centres per state depends on the number of schools that had opted for 'Modern' pure sciences.

6. Attempts were made to improvise and develop prototype apparatus. CDC has undertaken research and quality control in the making of prototype apparatus.

7. The approach is rather similar to that prescribed for Modern General Science and Integrated Science, namely, learning activities are pupil-centred. Observations and the making of interpretations are derived directly from laboratory-based investigation. The teachers will guide students into both the enquiry and discovery of knowledge of facts and concepts. The inductive/deductive thinking skills of students are optimized.

E. **Organizational strategies**

1. For each subject course, the concepts are organized around separate 'topics'. These topics are loosely connected and sequenced over the two-year period. For each year, the 'syllabus' gives some semblance of an overall coherent scheme.

2. Between 1968–1971, writing groups prepared draft editions of the pupils' texts and teacher's guide in English and Bahasa Malaysia.

3. The courses were introduced initially to 22 schools. In most of the cases, these were the same schools that had begun Integrated Science in 1967. By 1976, it has been projected that a total of 200 schools would be involved with the 'Modern' syllabuses.

4. In-service teacher training began in 1971 with 120 graduate teachers to teach Form IV classes. By 1976, it is anticipated that a total of 720 teachers would have been trained by the Ministry of Education.

5. Since 1972, pre-service training of graduate teachers has included preparation to teach the Modern Pure Science syllabuses.

F. **Resources**

1. Revised editions of pupils' texts and teachers' guides in Bahasa Malaysia and English for each of the courses, at Forms IV and V.

2. The establishment of the State Science Centres, equipped with selected apparatus and reference books, was aided by the Anglo-Malaysian Educational Collaboration (AMEC) Scheme.

3. Employment of British advisors/tutors to assist initially in (i) development of the texts and guides, and (ii) re-training of key personnel and teachers.

G. **Extension and diffusion**

1. Employs the strategy of progressive in-service training of teachers to meet the progressive implementation of the modern courses in a greater number of schools.

2. Popularization of the Malaysian texts and guides on Modern Biology, Chemistry and Physics.

H. **Evaluation**

1. The first draft editions of the pupils' texts and teachers' guides prepared in 1972 were rewritten based on 'feedback' from the trial schools and experience of teachers involved.

2. Plans for the systematic evaluation of the courses currently being implemented in the schools have yet to be drawn.

I. **Limitations**

None has been cited. The shortcomings common to the development of Integrated Science and Modern General Science are equally applicable here.

Problems encountered inherent in the development of these modern pure science courses include, (i) omissions of parts of the five-year Nuffield course to fit what are selected into a two-year pure science course, and (ii) consequent loss of the thematic concept structures that characterized the organization of the Nuffield 'O' level courses in Biology, Chemistry and Physics.

Modern mathematics

Modern Mathematics (lower secondary), adapted from the Scottish Mathematics Group (SMG), for Forms I—III

Modern Mathematics (upper secondary) adapted from the English Schools Mathematics Project (SMP), for Forms IV and V.

A. **Rationale.** The 'Brief Guide to Modern Mathematics in Malaysian Secondary Schools' (1974), cited the following reasons for the adaptations from SMG and SMP:

1. Forms I—III had already adopted the Scottish Integrated Science. To this was added the only Scottish-based modern mathematics project in existence. It was also perceived that SMG materials were not radically different from 'traditional' mathematics. (Two-thirds of SMG topics were comparable to those in 'traditional' mathematics).

2. Forms IV—V Modern Mathematics was based on SMP (and not SMG) because

a) SMP materials were closer to the Cambridge Alternative C Mathematics syllabus;

b) The SMP new series of books were more designed for our comprehensive schools and were not too academic; and

c) SMP had a complete range of texts up to and including Form VI.

3. Assumed that local textbook writers would take into account the transition from SMG to SMP syllabus.

4. Mathematics education which was more relevant to the needs of this fast-changing, scientific and technological age.

B. **Objectives**

1. The goal is to 'change the traditional teacher of mathematics'.

2. Some of the changes in content at Forms I—III to include sets, binary number system, statistics, and vectors; at Forms IV—V, half of the content is new, and it includes topics on matrices, probability, linear programming and the slide rule.

3. Modern Mathematics employs the ***integrating themes*** of sets, relations, co-ordinates and graphs, and structure to provide a more unified approach to the organization of topics.

4. It subordinates teaching to pupil's learning, employing a large amount of pupil activity (new apparatus to aid learning) and 'guided discovery'. A stress is made on the understanding of concepts and their application to different situations.

5. Promotes pupil's interest and enjoyment in learning.

C. **Specific innovations**

1. Updating of some of the content. The remaining traditional content is thus treated in a 'new way'.

2. Adoption and adaptation by local educators of the SMG and SMP texts and materials and teachers' guides.

3. To instil in pupils an interest and liking for mathematics through greater pupil activity which has a direct bearing on learning.

4. Thematic integration of topics to provide a more unified organization of content.

D. **Organizational strategies**

1. The decision around 1965 by the Ministry to update secondary school mathematics to New Mathematics or Modern Mathematics.

2. From 1966 onwards, progressive exposure and in-service training of teachers to the new approaches in the teaching of Modern Mathematics.

3. By 1969, a British consultant from SMG was assigned to the Ministry to help to develop Modern Mathematics (lower secondary). In-service training of teachers in 26 selected schools was provided to prepare them for the implementation of Modern Mathematics in Form I in 1970.

4. With effect from 1970, phased progressive implementation of Modern Mathematics was introduced to Forms I–III, culminating in the first LCE/SRP examination based on the new syllabus in November 1972.

5. Between 1970–73, a series of textbooks used exclusively in Forms I–III were adapted from SMG texts by two teams of local educators on two consecutive occasions.

At Forms IV–V, texts printed in English and Bahasa Malaysia were modified by local educators from the SMP texts, X,Y and Z.

6. A teacher's guide accompanies each textbook. The guide includes the aims, notes, methods of teaching, solutions and hints to mathematics problems.

7. It is anticipated that by 1975 about 800 schools at Form I and about 70 schools at Form V level would have changed over progressively to Modern Mathematics.

For the majority of schools, they will continue with traditional mathematics in Forms I–III, while Forms IV–V will choose from the three Elementary Mathematics Syllabuses (traditional Mathematics, Alternative C).

At Form VI, students will continue with the existing 'traditional' additional mathematics, either at the subsidiary or principal levels.

8. In-service training:

a) At present all Teacher Training Colleges and Universities have included Modern Mathematics in their teacher education programmes. This should replace the need for in-service courses ultimately.

b) Since 1969, the Ministry has conducted in-service or refresher courses of a two-week period on Modern Mathematics during most school vacations for teachers. Initially, British tutors were used.

c) For the first time, an 'exposure' course was given to 40 Form VI Modern Mathematics teachers in 1974.

d) In the in-service courses, teachers have been exhorted to adopt the following 'philosophy':

Be practical, because pupils learn best from things which they do themselves;

Be relevant to student's experience so that mathematics becomes a real study of the real world;

Make it enjoyable and encourage investigation and discovery methods so that the pupils acquire an interest in and not develop fear of mathematics;

Be progressive by relating new results to old ones through reasoning processes which are appropriate to the pupil's age and ability;

Use modern contents where this fits in with the first four requirements;

Be both corrective of impoverished experiences and be adaptive to the variety of ability.

E. **Resources (support)**

1. Published texts in Bahasa Malaysia and English namely:

Hisab Moden untuk Malaysia (Modern Mathematics for Malaysia)	—	Tingkatan IV (Form IV)
Hisab Moden untuk Malaysia (Modern Mathematics for Malaysia)	—	Tingkatan V (Form V)

2. CDC produced teachers' guides to accompany each text.

F. **Extension and diffusion**

1. *Modern Mathematics Bulletin (Berita Hisab Moden)* in Bahasa Malaysia and English was circulated to schools each term.
2. In-service courses at the national level were conducted jointly by the CDC, the Schools Division and the Teacher Training Division.
3. ETV produced and broadcasted some of the lessons on Modern Mathematics for Forms I, II and III.
4. The Examination Syndicate produced sample SRP/LCE exam questions to guide teachers and pupils.
5. Periodic visits to schools to hold discussions with teachers and principals.
6. Fifteen Mathematics Centres were equipped with books aided by the programme.

G. **Evaluation**

1. Thus far, assessment has been informal through visits to schools, discussions at school level and at seminars, and pupil performance at the LCE/SRP examination.

2. The teachers provided feedback on questionnaires relating to pupils' texts and teachers' guides for subsequent revision.

3. More recently, systematic formative evaluation is progressively being used. These include some diagnostic achievement test on one of the topics of the Form IV syllabus, systematic classroom interaction analysis of teacher-pupil behaviour and on-going review of existing Mathematics syllabus.

H. **Limitations**

1. None has been cited although the National Seminar on Science and Mathematics Education (12–15 December 1973) proposed certain recommendations for the improvement of the Modern Mathematics programmes in particular. (The decisions of the committee that studied these recommendations have yet to be publicized).

2. Until now, it has been assumed and rationalized that the Scottish SMG materials were more appropriate for Forms I–III than the English SMP materials. There is no evidence yet to substantiate such a major and irrevocable decision when SMG was first introduced in 1969 to Form I.

Personnel-in-charge of the Secondary Science and Mathematics Programme, 1967—75

The foregoing sections summarized the diversity of curriculum activities for each of the Science and Mathematics projects.

At the level of implementation, all these projects relied extensively upon the services of the various Divisions of the Ministry of Education (The Inspectorate, School Division, Teacher Training Division, EPRD, Examination Syndicate) and to a limited degree, the assistance of the University of Malaya and the British Council. Nevertheless, it should be noted that in terms of the co-ordination and overall responsibility for the implementation and planning of all of these projects, the actual number of professional staff involved is relatively limited. Considering the kinds of expectations imposed on each of the projects, one may be inclined to conclude that staff-wise, most of the projects were perpetually understaffed.

Figure 12 attempts to summarize the total number of professional staff who were actually responsible for the various projects each year, since 1967.

Prior to 1973, the period was one of tremendous activity at both the planning and implementation phases. The responsibilities rested on the shoulders of three local Education Officers with the assistance of British consultants. When the CDC was established in 1973, only one of the three local officers remained with the centre to oversee the continuity of programmes. For the first time, the titled post for the Senior Organizer of Science and Mathematics (Secondary) was gazetted. Until then, none of the appointments were on a permanent basis.

With the institutionalization of the CDC, at least the staff manpower increased from two to six for the Sciences, and one to three for Mathematics. In the case of Modern Mathematics (lower secondary), most of the tasks rested with the visiting British consultant mainly because of a shortage in local personnel. The officer recruited in 1973 soon left for higher professional training in Library Science instead of Mathematics education. This post was replaced by an officer who had recently returned from the U.K. with an Advanced Diploma in Educational Studies.

Since 1973, the service of the local staff has been relatively stable with only two instances of staff turnover, one each in the Sciences and Mathematics. However, the services of the British consultants under contract are due to terminate in July 1976 (or about six months hence).

Figure 12. Full-time personnel in-charge of the Implementation of the Modern Science and Modern Mathematics Programmes

	1967	1968	1969	1970	1971	1972	1973	1974	1975
IS	→ ϕ	→ ϕ+1	→ 1	→ 1	→ 1	→ 1	→ 1[(a)]	→ 1+1	→ 2
MP		ϕ	→ 1	→ 1	→ 1	→ F_1	→ F_1	→ F_1	→ F_1
MC		ϕ					1	→ 1	b
MB		ϕ					1	1	1
MGS		ϕ						1	1
		1	→ 2	→ 2	→ 2	→ 2	→ 4	→ 6	→ 5
MM (lower)		ϕ	→ 1+F_2	→ 1	→ 1	→ 1+F_3	→ F_3+1	→ F_3+1•	→ F_3+1•
MM (upper)		ϕ					1	→ 1	→ 1
Total No. of Staff-in-charge/year		1	→ 4	→ 3	→ 3	→ 4	→ 7	→ 9	→ 8

Notes

IS — Integrated Science
MP — Modern Physics
MC — Modern Chemistry
MB — Modern Biology
MGS — Modern General Science
MM — Modern Mathematics, lower or upper secondary
ϕ — Education Officer from the Schools Division
— Refers to continuity of the same officer

a — A titled post for the Senior Organizer of Science and Mathematics (Secondary)
b — Officer away on study leave (1½ years)
F_1 — British Consultant for Physics
F_2 — British Consultant for SMG
F_3 — British Consultant for SMG
• — Refers to change of local staff

It does seem obvious that at this interim phase (1973—76), the CDC is very short of personnel. While the services of the visiting consultants can never be relied upon indefinitely, the various posts in the CDC should not only be 'gazetted', but also planned with a long-term view in mind. Apart from the wide range of skills knowledge and expertise demanded of the professional staff, it is also clear that long-term commitments of the staff appointed to their services is vital to the successful implementation of programmes and for the active promotion of viable, imaginative, rational, long-lasting curricular reform.

3. Multi-Media Self-Instruction Teacher Education Project

A. **Rationale and origin.** The feedback from the preliminary evaluation of Projek Khas (1972) established clearly that the primary school teachers were generally weak in their initial educational background. The majority of them possessed academic qualifications of Standard VI or below, and their professional re-training was long overdue. These teachers at the Projek Khas in-service courses often requested for urgent assistance in understanding the more recent concepts in Science and Mathematics, as well as in the more recent approaches to the teaching of primary Science and Mathematics.

It was obvious to the Ministry that the existing efforts in in-service training of Projek Khas teachers could not by themselves succeed without some supporting elements. Arising from this felt-need, it was then decided to develop and innovate an alternative approach that would supplement the on-going re-training programmes. The approach was innovative and differed from existing practices of in-service training in that the exercise was wholly teacher-centred. The teachers made use of the self-instructional materials which are designed to help them to instruct themselves towards some mastery of the basic Science and Mathematics concepts that are central to the 'effective' implementation of Projek Khas.

In June 1973, the proposal was put forward to undertake a project to develop and to supply multi-media self-instructional modules, geared to the needs of the Projek Khas teachers. An initial grant of US $39,500 was provided under UNICEF and work on this project began in August 1974.

B. **Objectives**

1. To develop instructional materials for the upgrading of selected substantive content in Science and Mathematics and pedagogic skills of primary teachers, that:

a) Can be used by individual teachers, on their own, with minimal initial introduction;

b) Will supplement the present in-service training;

c) will reduce the need for extensive in-service training;

d) could be produced at a reasonable cost.

2. To field-try the materials on a pilot basis to determine the most efficient method of their introduction to teachers, and

3. To make recommendations concerning further development and implementation of such materials, based on an evaluation of the initial trials.

C. **Project development**

For purposes of field trial, only two sample modules were developed initially. Under the charge of one CDC officer and two other members, the team proceeded to develop the modules consisting of the following types of media :

1. ***Print media*** : include programmed text supplementary readers, designed to upgrade the academic knowledge needed for primary Science and Mathematics;
2. ***Apparatus learning kit*** : specific low cost and improvised equipment such as ammeter, voltmeter, wire, bulb, etc.,
3. ***Teaching manual*** : to provide supplementary reading on 'how to teach', for example, questioning techniques.

Further plans include the development in due course of self-evaluation instruments, more improvised equipment and instructions or cassette tapes. (The initial intention to develop sample learning kits for children has been shelved on the advice of UNICEF).

From 1974 to 1975, the project activities undertaken were scheduled as follows:

1. A preliminary survey was completed in October 1974. From a list of 15 topic areas, five topics were identified. These were reported to be of a higher priority in terms of teachers' needs in their teaching of ***electricity, energy*** and ***our earth.***

2. The second survey (completed in December 1974) as a follow-up of the first was aimed at a detailed specification of the content and instructional skills which the teachers considered most urgent. For this purpose, the views of a sample of primary school teachers, college lecturers, district supervisors, ETV personnel and Federal Inspectors of Schools were obtained.

3. The early part of 1975 was devoted to the development and field trial of the module on electricity. The self-instructional booklets were tried out initially with ten primary school teachers. The evaluation of the trial materials included the interview and observation of the teachers who either used or did not use the materials. The materials were revised, given the experiences of the trial teachers. The programmed self-instructional technique was found to be basically viable. Programmed Booklets 1, 2 and 3 have been completed. Although modifications have been included, a final evaluation has yet to be conducted before the materials can be recommended for bulk supply and circulation. In the meantime, Booklets 4 and 5 are being prepared.

4. **The development of apparatus learning kits:** the kit of materials on the topic Electricity is being developed, but it has yet to be assessed by teachers. Cassette tapes on classroom teaching are produced to illustrate exemplars of pedagogical skills. Like the apparatus, the tape remains to be edited and tried out. In the meantime, a collection of a hundred 35 mm colour slides are available to further illustrate specific classroom events.

5. The teachers manual (on electricity) has been drafted to accompany the apparatus kit.

D. **Staff training**

The initial proposal provided for six curriculum officers and three assistants and these included the Projek Khas staff members. At present only one full-time curriculum officer is in charge of the project. However, training in terms of exposure courses has been given as follows:

1. Two curriculum officers attended the two-week 'Programmed Instruction' workshop at INNOTECH in 1974.
2. Familiarization tours were made to educational centres in Tokyo, Saigon and Penang (the Regional Education Centre for Science and Mathematics).

E. **Some problems**

1. Too many programme activities have been undertaken and they are very badly understaffed.
2. General and clerical support facilities are either limited or not available.
3. There is a lack of expertise in the preparation of self-instruction materials.

4. The Language Unit and Projects

History and organization

Early efforts in language curriculum and instruction pre-dates the establishment of the Language Unit itself. By 1969, language syllabuses committees were already in existence, with representatives mainly from the Inspectorate, the Teacher Training Division, and the Schools Division. Initial work was mainly *ad hoc* in nature for it was not until 1973 that the Language Unit was conceptualized.

Until mid-1973, the Unit was under the Teacher Training Division and its activities were co-ordinated by the EPRD. When the Unit became an administrative component of the CDC, the staff comprised of ten officers, namely one Language Planning Officer (the co-ordinator of the Unit), eight curriculum officers (four each in Bahasa Malaysia and English) and a librarian-cum-documentalist. In addition several practising teachers have been seconded to assist the Unit. Between early 1973 and mid-1975, the Unit was assisted by a full-time Ford consultant, Dr. T.S. Rodgers, and by several local university faculty staff on the research and development projects.

Until 26 September 1974, the Unit was sited physically at the Language Institute, Pantai Valley. However, the Unit was co-ordinated by the CDC in matters of service and administration. Where policies are concerned, the Unit answers to the Language Advisory Committee, chaired by the Deputy Director-General of Education. Official mandates are, however, from the Central Curriculum Committee.

Objectives

To co-ordinate all ongoing and future language projects of the Ministry of Education in order to ensure the maximum effectiveness of language learning and teaching in Malaysia.

The key objectives of the Unit are:

1. 'To devise a school curriculum of Bahasa Malaysia instruction which will provide at every level the means to use spoken and written Malay as an effective tool for the understanding of other subjects taught in that medium and at that level. In other words, to replicate insofar as

possible the best features of the English Language Curriculum in the former English-medium schools.

2. To perfect and disseminate, through key personnel and State subject supervisors, improved methods of teaching the Bahasa Malaysia curriculum:

a) In schools where the majority of pupils are native speakers of Malay.

b) In schools where the majority of pupils are not native speakers of Malay.

3. To adapt and extend the curriculum for teaching Bahasa Malaysia outside of the school system to adults, through intensive courses, University in-service courses, evening classes, etc., for as long as necessary.

4. To devise a school curriculum of English Language instruction so that desired levels of competence may be achieved by the average pupil at these levels: end of Standard 2, end of primary education, end of Form III, and at the end of secondary education, and to perfect and disseminate, through key personnel and State subject supervisors, improved methods of teaching the English Language Curriculum'.

The other specific objectives help to operationalize the major functions of the Unit. These include curriculum development, policy evaluation, establishment of aims, co-ordination of instruction, dissemination, school surveys, extension services, research, consultancy and scholarship sponsorship. (For details, see the CDC paper, 'Language Unit, mimeographed and undated).

Project development

Since its inception in early 1973, the Language Unit has been responsible for several projects. These are summarized briefly as follows:

I. BAHASA MALAYSIA

1. Bahasa Malaysia Primary Syllabus Review*

This is a longitudinal study, aimed at the assessment (by pre- and post-tests) of language learning of pupils from Standards 1–6. The study began with the assessment of Standard 1 pupils in 1973. While the data analysis is still being awaited, decisions have already been taken to increase the validity and reliability of the tests for subsequent years. The

* These were projects initiated before the establishment of the Language Unit. Since then, the remaining programmes have been initiated under the direction of the Language Advisory Committee.

Standard 1 evaluation instrument assessed the following areas of skil namely, (i) aural-oral; (ii) listening ability; (iii) sentence completion a (iv) reading.

2. Word frequency count*

This project was begun in 1970 under the chairmanship of D Asmah. From a variety of sources, 587,900 running words were recorde and of these, 25,600 were listed. When the project terminated in 197 the committee had edited 3,000 words for publication by the Dewa Bahasa dan Pustaka.

3. Unification of dialects*

Initiated in June 1972, the project was carried out by the 'Speci Sub-Committee for Active Use of Bahasa Malaysia in Schools'. The tas was aimed at preparing *speech, grammar* and *lexicon* teaching test However, the project has remained incomplete.

4. Bahasa Malaysia Syllabus for Forms IV and V

This project was started under the advice of Dr. Awang Had Salle in early 1974. A trial syllabus for Forms IV and V was evaluated in 2 schools. Currently, a review and revision of the syllabus is being unde taken.

5. Bahasa Malaysia TV series

The Language Unit has been actively involved in the design an production of a ten programme Bahasa Malaysia TV series (together wit teaching notes) aimed at Standard 5 pupils.

6. Bahasa Malaysia Examination

It is an ongoing exercise that is undertaken in co-ordination with the Examination Syndicate.

II. ENGLISH LANGUAGE

1. English Language Survey, 1971*

The survey was undertaken to determine factors that might contribute to the success or failure of lower secondary Malay medium students in the learning of English. Approximately 2,000 students from 64 schools were studied. A joint report on this survey by the Language Unit and EPRD has been submitted to the Language Advisory Committee.

2. The English Syllabus for Forms I—III (Trial Syllabus, 1972)

Following the assessment of the so-called trial syllabus '1972', the revised syllabus was drafted and approved by the Central Curriculum

Committee. The corresponding Teachers' Handbooks 1—3 were then prepared. (Handbooks 1 and 2 have been published).

An outcome of this project was the document entitled 'Aims for the teaching of English in Malaysia', which was circulated to all lower secondary schools.

For the interim implementation year (1974), the Language Unit prepared cross-references between the approved texts used in Malay medium schools and the new syllabus. These cross-references made in pamphlets have been sent out to about 800 schools.

3. English Language Syllabus for Forms IV and V

The project began in early 1975 and is aimed at establishing those skills emphasized in the existing syllabus. Teacher handbooks are then prepared on the basis of these skills that have been identified.

4. Ford Foundation Assisted Projects

The Language Unit was given the responsibility to co-ordinate the conduct of six projects that were approved in 1972. These were as follows :

a) Unified Language Course Project (Standards 1 and 2)

The project was launched in 1973, following some initial planning the year before with EPRD. Under the direction of Dr. Lim Kiat Boey, the project aims to co-ordinate the teaching of Malay and English together. This is conducted by bilingual teachers with language alternation techniques. The innovation employed the use of songs and games to teach structures in two different languages. In January 1974, the developed materials were pilot-tested in four trial schools under 'controlled' test conditions. In 1975, with some modification, this project will continue into Standard 2. At the same time, a bi-monthly teacher training programme was provided to prepare the trial school teachers.

b) Supplementary Readers for Lower Primary Schools

The project undertaken between 1973 and 1976 is aimed at producing about 200 book titles that have been tested to be of interest to Malaysian children in the lower primary schools. The panel of writers include teachers and CDC staff, with art assistance being provided by the Dewan Bahasa dan Pustaka.

c) Reading Disability Project

This was initiated in 1973 with the aim of analyzing the causes of reading failure, and then to develop materials and techniques for their

remediation. An experimental battery of seven diagnostic sub-tests has been developed for initial testing with pupils in Standard 1 in 30 selected schools. The project is under the direction of Cik M. Leong, Dr. P.S. Khoo and Puan Safiah Osman.

d) Readers from New Zealand

An adaptation of the series of readers (originally produced in New Zealand) by Mr. Jack Hobbs of the Federal Inspectorate was circulated to schools on a trial basis in 1973. An evaluation of both the original series and the adapted version was completed and the results forwarded to the Language Advisory Committee. A decision is still forthcoming.

5. English ETV series

The Language Unit has been actively helped to design, write, and produce a ten programme English Language TV series aimed at Standard 4 pupils.

6. English examination

The Language Unit provides the staff who co-operate with the Examination Syndicate in the design of its assessment instruments.

7. English language campaign

The Language Unit is the Secretariat responsible for the planning and conduct of the varied activities associated with the English Language Campaign.

Dissemination

This is mainly through the *Berita Unit Bahasa* (Language Unit Newsletter), a quarterly newsletter.

Staff training

1. Weekly meetings are held at the Language Unit on techniques of research and data analysis.
2. Short-term fellowships at (i) the Regional English Language Centre (RELC, Singapore), or New Zealand and Australia (TESTL) and (ii) the Instructional Materials Unit at the East West Centre, Hawaii.
3. **Post-graduate training**
   a) At local universities, CDC staff is enrolled on a part-time basis for M. Ed. degrees;

b) At overseas universities, under various sponsorships, CDC staff is pursuing either Advanced Diplomas, Masters or Doctorate degrees.

Example	ESL	Linguistics	Psycho-Linguistics
Ford Foundation	2[3]	2[2]	1[1]
Commonwealth	—	2[4]	—
AMEC	1[5]	—	—

Notes:
1. Ph.D. in Psycho-Linguistics (expected to return in 1976)
2. M.A. in Applied Linguistics (expected to return in 1976 and 1977)
3. E.S.L. Certificate (returned in 1974 and 1975)
4. M.A. in Linguistics (returned in 1975)
5. E.S.L. Certificate (returned in 1974)

Limitations

1. Diversification of programmes demands more qualified staff and time to conduct the various studies.
2. Unavailable and/or insufficient number of staff with expertise in specialized fields, especially in the evaluation of language learning and socio-linguistics.
3. Much of the research work is hindered by the limited stock of reference materials for research purposes.

5. The Population Education Project

This was formally established as a unit within CDC, with the establishment of the centre on 1 January 1973.

Rationale

1. The Malaysian Government, being aware of the magnitude of the problem of population growth and the need for population control, set up a Population Project under the Economic Planning Unit of the Prime Minister's Department. The Ministry of Education was placed responsible for introducing population awareness programmes into the schools.

2. As 40 per cent of the Malaysian population are 15 years and under, it is logical that population education be introduced into the formal school curriculum.

3. This unit was therefore set up to plan and develop strategies and materials to introduce population issues and concepts into the Malaysian school curricula.

Background

1. In 1971, the Ministry of Education decided to study the feasibility of and the strategy for introducing population education to the schools. The Schools Division of the Ministry of Education established a committee consisting of Encik Chew Tow Yow as chairman and members from the Ministry of Education, Ministry of Health, NFPB, FFPA and Heads of Schools.

2. Two national workshops on population education (sponsored by the Ministry of Education and the Colombo Plan) were held in 1971 and 1972 to identify the objectives of population education, the curricular content by levels of schooling and the role of teacher training institutions.

3. In January 1973, an agreement between the Malaysian Government and UNFPA was reached making available a grant of US $1,059,000 for the Population Education Project commencing in January 1973 and ending in 1975 (this was later modified to terminate in 1977).

Project objectives

1. Long term: '. . . to create an informed citizenry capable of making responsible decisions with regard to population issues, and

population policy matters, and to develop in adults of the future responsible fertility behaviour as might be defined by the norms and needs of the Malaysian Society'.

2. Immediate: to prepare and implement population education in Malaysian schools, namely,

a) To develop curricular programmes and instructional materials in population education (with a view to educating pupils about population characteristics and processes, causes and effects of population growth and public population policies);

b) To produce these programmes and learning materials for use in the schools;

c) To orientate and prepare teachers to teach population education; and

d) To evaluate the effectiveness of (a) and (b) above (cited in 'Plan of Operations, September 1972, p. 5).

Project development

1. The project was initially planned as a four-phase programme, spread over three years, but has since been extended till the end of 1977 (a period of five years). The four phases include:

a) Planning
b) Development of teachers' and pupils' materials
c) Teacher orientation
d) Implementation in the schools

2. It was decided to introduce Population Education to all of the classes from Standard IV (Grade IV) to Form V (Grade II), not as a separate subject by itself but through the six subjects, namely Geography, History, Civics, Health Education, Science and Home Science. The strategy adopted was to incorporate topics/concepts into the existing curricula of these six subjects.

3. Teacher and pupil materials, including supplementary aids, were designed/developed in a series of writing workshop sessions that involved teachers, head teachers and project staff. These materials are currently being pilot-tested in a small number of schools.

4. Teachers, for the pilot-testing of materials, were prepared through orientation courses conducted initially at the Federal level but later on at the State level.

Information on the project is disseminated to teachers in schools through a quarterly newsletter entitled *Berita Kemajuan Manusia* (News of Man's Progress).

It is planned, beginning from 1976, to provide training for pre-service teacher educators and in-service teacher training on a national scale.

5. Evaluation of the project's activities take the form of:

a) Feedback through evaluation form returns from teachers who are involved in the pilot-testing of the materials and interviews of these teachers by the project staff; and

b) Evaluation of lessons observed in the pilot schools by the project staff themselves.

6. Innovative features of the project include the problem-oriented approach adopted, the multi-disciplinary nature of the project, and the fact that the materials are developed locally and modified after they have been pilot-tested in school situations.

Staffing

When the project was established in early 1973, the initial staff included a Project Director and two officers. In 1974, a Technical Adviser from Unesco joined the project, followed by two more full-time curriculum officers at the end of the year. Currently, the staff consists of four officers.

Limitations

1. There is a lack of co-ordination among the different curriculum development groups with respect to the integration of the substantive content of the population education curriculum into the various subject areas, namely the sciences and social sciences.

2. Owing to the multiplicity of duties of CDC staff, time and personnel are obvious constraints.

6. Social Science Studies

Objective

To plan, develop and revise the curricula for the social studies subjects, namely, Civics, History and Geography.

Origin

In line with the spate of curricular activities that were undertaken for the school Science and Mathematics curricula in the late 1960s, the Ministry of Education (through EPRD in particular) had also established the need to review the existing school Social Studies curriculum. Initially, priority was accorded to the Sciences and Mathematics reform. Nevertheless, EPRD had already initiated preliminary work on the syllabuses since 1970. With the subsequent establishment of the CDC, the project was formally taken over by the Social Science Studies Unit.

Functionally, the Unit began operations only in February 1975. At present, only one full-time officer is attached to the project.

Project development

1. The Civics Syllabus

Civics school curriculum is given priority over History and Geography in view of the socio-economic policies of the Second Malaysia Plan. Since 1970, EPRD has reviewed the civics syllabuses for Standards 4, 5 and 6. The implementation was completed by 1971. A major change was the incorporation of Civics into Local Studies for Standards 1, 2, and 3.

Since 1972, the provisional syllabuses for the lower secondary school (Forms I, II and III) have been revised and completed by 1974. The trial syllabuses are currently being tried out and evaluated in four pilot schools (two Malay medium and two English medium).

In 1975, the syllabuses for Forms IV and V are being developed and scheduled to be completed by the end of the same year.

2. History Syllabus

A review of the syllabus was initiated in 1972. The working committee was given the responsibility of revising the existing syllabus which was perceived to be too western oriented.

By the end of 1975, it is anticipated that totally new syllabuses would have been developed for Standards 4, 5 and 6 (upper primary school) and Forms I, II and III (lower secondary school). The revised syllabuses include development of teacher and pupil guides, the writing being done by practising teachers who are seconded from the schools.

Following this in late 1975, the revision of the syllabuses for Forms IV and V are expected to begin.

3. **Geography Syllabus**

As yet, work has not commenced due to a lack of personnel.

Relationship with other Units/Organizations

1. **Within CDC.** The Evaluation Unit and other CDC officers assist to implement and/or evaluate the pilot programmes.

2. **Others.** The officer-in-charge of this unit represents CDC on:

a) The Dewan Bahasa Committee (to develop supplementary readers);

b) A committee of 'Jawatankuasa Kabinet' which is geared to a study of the extent to which solidarity in higher institutions of learning has been enforced;

c) The Syllabuses Working Committee (together with other members from various departments and universities) to review and formulate 'new' syllabuses.

7. The Compensatory Education Project

Background and rationale

With the implementation of the Second Malaysia Plan, the Government is fully committed to overcoming the economic and social imbalances among its people. In the area of education in particular, the *Dropout Study* (1973) confirmed that the disadvantaged pupils did not benefit fully from the formal education provided in the schools. The need to improve the quality of early childhood education was indeed an urgent issue.

Following a period of intensive planning, the Ministry of Education (with financial aid from the Van Leer Foundation, Netherlands) launched the *Compensatory Education Project* in late 1972. The goal of the Project is not only to remedy the learning problems already in existence in the primary schools, but also to prevent such problems from arising in the pre-school years. Initially, the project activities are focused on the rural setting where it is perceived that the conditions associated with the problems of early childhood education are most acute.

Objectives

1. To develop, or adapt, existing diagnostic instruments in order to identify specific learning problems in terms of deprivation and disadvantage amongst a selected group of pre-school and lower primary pupils.
2. To develop suitable remedial curriculum materials in order to correct these deficiencies in terms of printed, manipulative and toy materials.
3. To build appropriate evaluation components into the respective programmes so that the progress (or lack of it) may be readily detected throughout the formative periods of development and trial in the pilot schools.
4. To conduct appropriate in-service training courses for the pilot schools (e.g. Tabika or Taman Bimbingan Kanak-Kanak and/or similar institutions).
5. To establish communications with other personnel or agencies within the Ministry of Education, or at inter-ministerial levels, so as to optimize all compensatory efforts towards enriching the child.

Project development

1. **Preparatory stage (January 1973—March 1974)**

The Workshop on Pre-School Education (2—15 April 1973) and the Seminar on Early Childhood Education (10—15 September 1973) helped the organizers to conceptualize the priorities for the Compensatory Education Project.

2. **Development-cum-Field Action (1974—75)**

The project consisted of three inter-related components, namely:

a) **The pre-school component** aimed at developing a pilot/pre-school centre at the CDC. It is used as a model to develop and try out new curricular materials as one of the means to compensate for the poor learning environment of children from the deprived areas.

b) **Social action component** aimed at improving the conditions in the school, the home and the community with the view to making the environment more conducive for the disadvantaged.

c) **The lower primary school component** aimed at identifying the learning difficulties encountered by low scholastic achieving children and then to develop and administer appropriate treatments under experimentally verified conditions.

Some innovative features

The following paragraphs summarize the innovative features that characterize each of the above components:

1. **The pre-school component**

a) Establishment of the pilot kindergarten at the CDC in order to gain direct experience with children who come from the lower socio-economic class.

b) The kindergarten class (held twice a week) is physically flexible and 'portable'. The parents contribute to the construction of some of the equipment.

c) The children's experiences are derived through home play, constructive play, imaginative play, water and sand play, music and movement, outdoor play and language activities.

d) The development of cheap, locally improvised curriculum materials. These include cassettes and a variety of improvised musical instruments, toys of a wide variety of sizes and shapes, printed books, and colour and monotone picture cards. Collectively, the materials were

introduced as the PECE (Programme for Early Childhood Education) package at the seminar, 18—19 September 1975. Agencies and individuals who are experienced with pre-school provided critical and useful input, particularly for the revision of the printed materials.

e) For each item in the PECE package, evaluation cards are currently being prepared for the purpose of getting feedback to guide the developers in the progressive improvement of the materials.

2. **Social action component**

a) Mass implementation of the PECE package

This involves the following innovations:

i) Mass production of the blocks and other materials of the PECE package by the Prototype Research and Quality Control Unit at CDC.

ii) Ten pilot pre-school centres in Selangor, Pahang, Trengganu and Kelantan have been identified for two purposes, namely, to field test the effectiveness and suitability of the PECE package materials, and in the process, provide in-service training and demonstration to kindergarten teachers and parents.

b) Child studies

The major concern was aimed at finding out the child's readiness for reading, numbers (recognition of numerical symbols), listening (attending), simple classification skills and learning Bahasa Malaysia.

The joint effort by some CDC and Faculty of Education staff has produced the diagnostic test, termed the ***Siri Kajian Kanak-Kanak Darjah I.*** The instrument has been pilot-tested with a sample of 220 pupils who came from both the urban/rural and average/deprived schools in Selangor.

3. **Lower primary school component**

The importance given to this component of the Compensatory Education Project is best described in the words of Tuan Hj. Murad, the Deputy Director of Education when he addressed the Seminar on Early Childhood Education in 1973:

> '... there is little good to be derived in putting the spotlight on the years before primary school if one loses sight of the improvements needed in the ***lower primary*** classes. In ***our*** context,

> perhaps this is the crucial area where we need to examine, since this area perhaps forms the foundation of our educational efforts'.

The study associated with the lower primary school component is directed at the following inter-related areas of concern:

1. **Determination of the types of learning deficits/difficulties**

a) Given the 1974 Standard 3 Assessment Test results in the subject of Bahasa Malaysia, English Language and Mathematics, the technical team analysed the pupil responses and then identified the different clusters and types of learning deficits for each of the three projects.

b) Remedial learning activities or programmes were developed accordingly. For Bahasa Malaysia, a series of Programmed Instruction Materials were developed. These were intended for use by Standard 3 pupils on an individualized basis, while their teacher monitored the pupil's level of achievement and progress. For the Mathematics and English Language subjects, a sample of primary school teachers were subjected to a fortnightly intensive in-service training on the use of the remedial activities (see Section 2 below).

c) For research purposes, the sample of primary school teachers and pupils was drawn from the national sample of high and low achieving schools, as measured by the 1974 Standard 3 results. The sample of control and experimental schools represented both the national schools and the formerly national-type (English medium) schools in the states of Kelantan and Selangor. The schools were distinctly rural or semi-rural in character.

2. **Treatment and research design**

a) The teachers from the sample of low achieving experimental schools were given either

i) Minimal treatment, whereby teachers were merely supplied with the written instructions on the use of the remedial activities for the different types of learning deficits in the respective subjects; or

ii) Additional treatment whereby the selected sample of teachers received intensive, fortnightly in-service interactions at workshops on the use and development of the remedial activities.

b) The sample of high and low achieving 'control' schools did not receive any remediation at all.

c) The differences, if any, between the pupil performance on the pre-test (1974 Standard 3 Assessment Tests) and post-tests (1974 and 1975 Standard 3 Assessment Tests) are used as criterion measures of the effectiveness, if any, of the various kinds of remedial treatments.

d) **Intensive workshops**

For the additional treatment group, the teachers of Standard 3 and the principals participated in ten centralized workshops on a fortnightly basis either in Selangor or Kelantan. At the workshop, the teachers were exposed to the remedial activities and learnt to diagnose the various types of learning deficiencies. In turn, the teachers also suggested alternative tactics for overcoming such pupil learning difficulties. Following each workshop, the teachers would return to their schools for two weeks to try out the remedial activities as planned. Along this pattern, the alternation between workshop and tryout in school was repeated over the period May—September 1975.

e) Given the above research design, the study attempted to find out whether or not,

i) the performance of pupils in the low achieving schools who had received the treatments hadin fact improved significantly;

ii) such pupils from the 'additional treatment' schools had performed significantly differently; and

iii) how standard 3 primary school teachers who had experienced intensive 'additional treatment' compare with the teachers from the 'minimal treatment' schools.

This study is not only concerned with the effectiveness of the remedial treatments on pupil performance on the post-tests (Standard 3 Assessment Tests) but also with the question of ***sustainability.*** Hopefully, these teachers will provide some indication as to whether or not they are able and willing to carry on following the departure of the project staff.

Analyses of the data for the Lower Primary School Component will begin as soon as the results of the Standard 3 Achievement Tests for 1975 are available from the Examinations Syndicate.

Regular feedback from the teachers who participated in the workshops indicated that they (a) found the technique useful; (b) have gained new experiences in providing remedial teaching to the weaker pupils, and (c) found the programmed materials for Bahasa Malaysia helpful to the weaker pupils.

Future plans for the Compensatory Education Project in the Lower Primary School

Funds permitting, the project hopes to extend into the following areas in 1976:

1. Pending the results of the 1975 study, the Programmed Instruction Materials for Bahasa Malaysia, and the collection of suggested remedial activities for English Language and Mathematics await to be revised;

2. Teachers who have attended the extended period workshops in 1975 can be used as key personnel to assist others from adjacent schools;

3. A follow-through on the performance and learning deficiencies of a sample of the 'weakest' pupils in 1975 who have now proceeded to Standard 4 in 1976;

4. With appropriate modifications, to extend the remedial treatment to samples of Standard 2 pupils;

5. To provide, as best as possible, a year-long treatment of the pupils' learning difficulties and to monitor their progress systematically over a period of time.

Problems encountered

1. The major problem concerns the ***shortage of personnel and time.*** Since CDC officers have a multiplicity of duties, there is a tendency to neglect the kindergarten.

2. Most of the officers do not have the necessary experience in the handling of pre-school children from deprived homes.

3. There is an urgent need to provide systematic observations of how the PECE package materials are being used by the children.

4. Teachers participating in the Lower Primary School Component of the project are unduly concerned about having to complete on schedule the existing school syllabuses. The remedial activities for really weaker pupils are looked upon as additional work and the perceived rigidity of the school time-table is a definite constraint.

5. Teaching styles and teacher attitudes and teacher background experiences differ vastly from one teacher to the next. The effect of these on pupil outcomes has yet to be accounted for adequately.

6. All personnel concerned with the Lower Primary School Project have suffered considerable delay in the payment of their claims for travel and subsistence costs incurred in the workshops. Delays of up to eight months in settling a claim for expenses incurred seems merely 'normal'.

8. Pahang Tenggara Project

Origin

The Second Malaysia Plan (1971—1975) cited the following records:

> Pahang Tenggara occupies 2.4 million acres in southeast Pahang. Nearly half is believed suitable for agriculture. This region, contributing the largest area of continuous potential agricultural land in West Malaysia will be the most important centre of new land development in the country for the next 20 years. An estimated 80,000 acres are to be developed during 1971—1975. The master-plan to be finalized in 1972 and designed primarily to guide the development of sustained-yield forestry and agricultural activities, will all provide an outline for the long-term urbanization and industrial development in the region and surrounding areas. (p.141, para. 440).

Objectives

The Ministry of Education is charged with the responsibility of formulating an appropriate educational curriculum for the Pahang Tenggara Project.

The need for a special regional educational system in Pahang Tenggara is based on the observations of the EPRD that 'the usual manner of ***extending*** an educational system is clearly inappropriate as a strategy in this development'.

Organization

1. The idea of having a special curriculum was first suggested by a group of consultant organizations from Canada,* who prepared the detailed Master Plan for the development of Pahang Tenggara.

2. Following this, EPRD of the Ministry of Education studied the various needs (see 'Rancangan Pelajaran Pahang Tenggara', by EPRD, Ministry of Education). A committee, the 'Jawatankuasa Pahang Tenggara' was then set up under the chairmanship of an officer in EPRD.

3. Subsequently, the matter of curriculum development was undertaken by the CDC, which established the Pahang Tenggara Unit on 1 January 1974 with two officers-in-charge.

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* The organizations include Foundation of Canada Engineering Corp. Ltd., Van Grinkel Associates Ltd., S.G. Gardine Engineering Services Ltd., and Charnell International Consultants Ltd.

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Project development

1. Initially, the project was planned to cover the period 1970–79. UNICEF financed specifically the development of the primary school curriculum.

2. The unit hopes that it will also account for the secondary school curriculum in due course.

3. By May 1974, a working committee consisting of members from the University of Malaya, the Prime Minister's Department, the Department of Social Development, Selangor and the CDC was formed to assist the project team.

4. The major activities and functions accomplished thus far include:

a) A detailed study of the original proposal plan for the development of the Pahang Tenggara curriculum.

b) Field studies and visits to primary schools in existing new land schemes (Federal Land Development Authority) and in the eastern portions of Pahang Tenggara.

c) Evaluation of the existing national syllabi for the lower primary school (Standards 1–3).

d) Conduct of workshops by the working committee to operationalize the 'new curriculum' in terms of the perceived needs of the children towards education when they are resettled in Pahang Tenggara.

The Progress Report of the Project in July 1975, noted that at present, less than 10 per cent of the students in the Pahang Tenggara area attained the acceptable standards in the Standards 3 and 5 Assessment Examinations. This has direct implications for the formulation of a 'new' model of curriculum for Pahang Tenggara.

Future plans and innovations

1. To continue to redefine and operationalize the objectives and nature of the curriculum for Pahang Tenggara.
2. To formulate tentative curricular 'models' which include teacher's and pupil's learning materials.
3. The try-out of the 'new' curricular materials in progressive stages, between 1976–80.
4. Concurrently, to conduct community workshops to involve the settler-community in the remedial programmes (for slow learners) of the work in school.

Implementation of these plans are subject to continuous feedback and accumulation of information arising from the on-going assessment of the aspirations and the socio-economic and cultural aspects of new settlers who move into Pahang Tenggara. The goal is mainly to find out 'suitability' of the new curriculum (which include changes in syllabi, facilities, teaching methods and teacher expertise) with respect to the needs of the population who is subject to the rapidly changing agro-based industrial environment which Pahang Tenggara hopes to achieve in due course.

Relationship with other Units/Organizations

1. Within the CDC
   a) *A Compensatory Education Unit* which is currently working with (a) the pre-school TADIKA in rural areas, and (b) the development and trial of remedial materials to overcome specific pupil learning difficulties.
   b) The *Psychology Unit* in the development of a 'reading test'.
   c) *Evaluation Unit* to assist in the continuous evaluation of the project.
   d) *The Integrated Curriculum Project* to help in implementing the ideal of subject-integration with a corresponding change in teaching strategies.
2. Within the Ministry of Education
   a) EPRD continues to act as the co-ordinating body;
   b) The schools division is responsible for the conduct of in-service courses and the training of teachers in remedial education.
3. Others

This includes the utilization of expertise from the universities and other ministries for a concerted multi-disciplinary approach to the understanding of this long-term problem in Pahang Tenggara.

Limitation

This is one of the most challenging and ambitious projects that is currently being undertaken by the CDC. The results of its efforts in formulating a new curriculum for Pahang Tenggara will have immediate and lifelong consequences on the next generation of individuals.

Curriculum Development Centre, Malaysia

As such, the project should perhaps examine more thoroughly and in greater depth the validity of having to create a new curriculum. Even if this is the case, it is quite obvious that the project at present has mainly 'prescriptions' about what would and should be done. There is a glaring omission of a detailed operational plan to ensure/secure a continucus, sensitive and valid formative and summative evaluation of the 'try-out' between now and 1980.

9. Prototype Research and Quality Control Unit

Rationale

In the early stages of the science and mathematics curriculum reform, one of the major problems encountered by the Ministry but seldom resolved satisfactorily concerned the availability and/or suitability of the types of apparatus being introduced in the schools. Imported equipment was often too expensive, while locally manufactured products were either unavailable, or relatively inferior in quality. The need to overcome the lack of equipment, especially in the rural schools, became increasingly urgent.

Objectives

Prior to the existence of the CDC, the activity of improvising instructional materials was already well established as one of the many concerns in the 'Science Centre'. The Prototype Research and Quality Control Unit was established formally in 1973 with the inception of the CDC. Some of the purposes of the Unit include the following:

1. To design and produce, on a small scale, prototype science and mathematics apparatus for use in the schools, employing, where possible, cheap locally available materials. Ultimately, the Unit would include the production of materials for non-science curricula as well.

2. To assess the quality and usefulness of the science apparatus and other instructional materials that are marketed commercially, and then to advise the Ministry accordingly.

3. To evaluate and maintain control on the quality of the apparatus/materials supplied to schools by the manufacturers through the Central Supplies Unit of the Ministry (as a member of the Central Tenders Board).

4. To investigate the needs of the schools for teaching and learning audio-visual aids.

5. To promote the production and use of materials (non-print media) other than the textbook on the part of the teachers.

The primary function of this Unit is to design and construct prototype materials for trial and evaluation in the schools. The revised

product, if proven viable, is then leased to commercial agencies for mass production.

Developmental activities

For the first year of operation in 1973, the Unit functioned with only two local curriculum officers, assisted by a Unesco consultant (Mr. Montgomery, between April 1973—August 1974) from the United States. Then the main task was to set up a machine workshop and to equip it with the basic machinery. The initial purchase of the equipment was financed by UNDP aid. At this juncture, the Unit also assisted the Science and Mathematics Curriculum Units in the dissemination of the UNICEF science apparatus to the schools.

Staff training at this stage included apprenticeships of two months' duration in the Public Works Department workshop and the Malaysian Railway workshop respectively. RECSAM also assisted in the training of one of the officers on the improvisation of science and mathematics equipment. Two local staff members subsequently toured educational centres with equivalent functions in Australia, the Philippines and Thailand.

By 1974, two of the seven members (one consultant, three officers, three technicians) of the Unit proceeded to the United Kingdom (under AMEC) for further training in the areas of secondary school science (at the London Institute, Chelsea) and educational technology (at the University of Birmingham). In mid-1975, a third officer went for a specialized four months' training in AVA in the United States (University of California).

The major activities of the Unit in 1974 and 1975 included,

1. checking the quality of apparatus supplied by manufacturers to the schools;
2. conducting a study to convert a standard classroom to an integrated science room (laboratory) at minimal cost. (For details, see ***Integrated Science Room Project,*** Occasional Paper No. 1, CDC, January 1975);
3. conducting of an in-service course on the production of science apparatus for the Modern Science programme;
4. assisting in the production of materials in other projects, such as population education, compensatory education and some of the language projects.

Dissemination

1. Prototype equipment and apparatus that have been developed, tested, and revised are ultimately mass produced by commercial agencies for distribution to the schools.

2. Reports on the developed products (e.g. the Ray Optics Kit, Piaget Kit, etc.) are published in the CDC's Occasional Papers.

3. 'Technopen', the official newsletter of the Unit keeps schools informed about a variety of information, such as updated price listing on common items of apparatus, changes and innovations in apparatus design, and new techniques in the use of instructional materials in the schools.

Specific problems

1. The Unit has reached the stage of growth where it encounters conflict between its major function as a unit that services the needs of other projects and the need to promote its own projects, increasingly independent of the other units.

In view of the limited qualified staff and the increasing demand by the Centre's projects, it is likely that the Unit will continue to maintain its service functions as operationalized initially.

2. The Unit has experienced difficulty in maintaining and repairing the machinery that are manufactured in the United States. The absence of local agents to supply the spare parts is a major problem.

10. The Evaluation Unit

Origin

The Unit was established in January 1974. Since then, it has a staff of only two local curriculum evaluation officers who had received some initial training in Britain (for a year) or at RECSAM for a brief period of three months on the techniques of curriculum evaluation. The Unit at present is assisted by a consultant, under the auspices of UNDP.

Initial functions

The function of evaluation is very much the concern of both the CDC and the EPRD. Likewise, with the other divisions of the Ministry of Education, such as The Federal Inspectorate of Schools, the Examinations Syndicate, etc. Hence, overlapping of evaluative functions by the various divisions is not only inevitable but also desirable so long as work is not duplicated in anyway. The CDC perceives its role in evaluation as 'microevaluation' in nature, focused most of the time on the formative assessment of ongoing curriculum projects undertaken by the Centre.

The functions of the Unit are initially as follows:

1. The testing and measurement section assists the curriculum officers in the various projects on the construction of assessment instruments. These may include questionnaires, interview schedules and various types of achievement measures.
2. The curriculum evaluation section is concerned primarily with the ongoing assessment of the various aspects associated with the implementation of the Centre's projects or programmes.

Some of the activities

In the brief history of the Unit, it has provided assistance to CDC in the following ways:

1. Assisted in the training of new members of staff on procedures of questionnaire construction, data analysis and report writing.

2. Participated with other curriculum officers in developing evaluation plans for Integrated Science, Projek Khas, Population Education,

Pahang Tenggara, Integrated Primary Curriculum Project, Form I Science Television Programme, and classroom observation of Modern Mathematics at Form IV level.

3. Collated feedback on the content and problems associated with the implementation of the Civics Syllabuses from teachers and principals, the National Unity Department and other institutions (e.g. the Universities).

4. A survey of the primary school head teachers' opinions on Projek-Khas.

Problems encountered

1. The demands by the diversity of projects for evaluation is excessive. Time is also a major constraint.

2. There is a very serious shortage of staff, both in quantity and quality, and in terms of expertise and practical experience. Knowledge and training, with rare exception, have been mainly theoretical in nature.

3. Local members of staff appointed to the CDC are currently undergoing postgraduate training, thus adding to the acute shortage of qualified personnel.

11. The Resource Centre

Origin

The Resource Centre as a focus for the documentation of CDC records and the library service function was formally established only in 1974.

Prior to this period, the nucleus for such a Centre began with the progressive accumulation of curricular materials and records under the Special Project (Projek Khas) for primary Science and Mathematics. A library such as this started in 1969 with a selection of reference books that were either requisitional from or donated by the Asia Foundation. By the close of 1972, the catalogue recorded a collection of about 2,900 titles, mainly in the areas of mathematics and science education. These included elementary school science curriculum instructional kits (e.g. the kits for Science Curriculum Improvement Study or SCIS from USA).

Development and functions

1. **Staffing.** It was not until early 1974 that a full-time librarian and an assistant were appointed to take charge of the Resource Centre. Prior to this the collection of materials and books, which until then had never been systematically catalogued, was in the hands of Projek Khas. By early 1976, one of the local curriculum officers is expected to return to the centre, after having received specialized training in Library Science.

2. **Resources.** Following the initial 'stocktaking' of the existing resources and the establishment of space for the Resource Centre, attempts were then made to requisite and build up a basic collection of references in areas which were obviously lacking, namely, curriculum development, psychology, research methodology, evaluation, educational philosophy, pre-school education, population education, language education, and social studies.

At present, the Centre subscribes to 40 journal titles, preference being given to those that are directly relevant to the diversity of projects at the Centre. Included in the records is the collection of local governmental reports and manuscripts pertaining to education. The collection receives books and materials regularly from the United States of America,

Britain, Australia, New Zealand, Canada and Regional Centres such as RECSAM, RELC and INNOTECH, as well as Unesco.

Since 1974, the purchase of books and magazines was funded almost entirely by UNDP. From 1976 onwards, the budget for the Centre will be accounted for in the Malaysian Government's budget, aided by a World Bank loan. Periodical book gifts from the British Council, the Asia Foundation and USIS will continue to make a significant contribution to the growth of the Centre.

With the reorganization of the Resource Centre, a major concern is to establish a working and learning space that is conducive for both CDC officers, and in due course, for teachers who undergo training at the Centre. Inter-library liaison with other organizations, colleges and universities are already well established.

3. **Functions.** The major functions of the two members of staff include:

a) Documenting all the annual and periodic progress reports from CDC.

b) Preparation of information booklets about CDC.

c) Preparation of the accession list (containing abstracts of journal articles) for circulation within CDC.

d) Dissemination of information to staff on overseas leave.

e) Maintain and up-date the file of readings for CDC officers. The file, titled, ***Fail Bacaan*** (Reading File) brings together important relevant articles that are selected for circulation among the staff.

f) To maintain records of the writing sessions conducted during CDC in-service training programmes.

g) Where possible, to assist CDC staff in literature search towards the preparation of curriculum materials and papers for seminars.

h) Maintain the working papers submitted by CDC staff and to assist in the audio-taping of educational addresses/talks by key visitors at the Centre.

i) Assist other divisions in the Ministry of Education at seminars, particularly in the display of CDC materials.

j) The building up of the collection of references on Malaysian culture and history.

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k) Maintain a record of the important newspaper reports pertaining to public educational pronouncements in the local press.

All of the functions listed above, except (g), are *ancillary activities* performed by the Resource Centre officers.

PART III

MODES AND CHARACTERISTICS OF CURRICULUM DEVELOPMENT

1. Movement to Reform

In Part II, the chronicle of curriculum projects and the strategies employed by the Malaysian Curriculum Development Centre encapsulates, in a nutshell, a period that should rightly be called the ***decade of curriculum reform movement in Malaysia*** (1965–75).

The brevity of the recorded events for the respective projects fails to do justice to the magnitude of each of the problems faced, and the urgency with which these projects have been implemented, often under considerable pressure of time and limited human and material resources. Consequently, the approach in establishing these 'reforms' has been characterized by the implementation of numerous 'crash programmes'. Throughout the period, the politico-socio and economic implications for educational management and intervention were not only real but demanding as well. In such a context, the challenge is indeed an exhilarating one, in the sense that the curriculum worker is at the frontier of a society in transition and undergoing rapid change. Often the need to be pragmatic in our strategies has imposed upon us the reality of having to be contented with the second, or even the third best alternative. Professionally, this may be satisfactory but undoubtedly frustrating at the personal level.

Nevertheless, there is something to be gained by having to work under conditions that are less than ideal. If nothing else, one may learn to understand and appreciate the complexity of a problem and may be less bold in offering over-simplified judgements. This is crucial because any possible solution to a problem will need to account for both immediate (short-term) and long-term consequences. For the short-term solution, the innovativeness of the strategy depends upon the extent to which it is ***educationally sound, economically feasible,*** and ***socially acceptable.*** Although this can be said to be the tactical strategy that is adopted by a majority of CDC projects, nonetheless, in the post-1973 period (following the founding of the CDC), the Centre has shown progressively more concern for the effect of the short-term strategy on long-term consequences.

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Part I of this study has already outlined and identified the major social and political circumstances that catalyzed our developing nation towards adopting a highly increased pace for educational change and social reconstruction. Some of the innovations undertaken by the different projects have been summarized in Part II. The intent in Part III is to review some of the influences, influencers and results of this 'curriculum reform movement' and where possible, to identify the features that characterize the different modes of curricular reform. For illustrative purposes, two projects are examined to emphasize the change of strategies that have been operational, prior to (pre-1973) and following the formation of the Malaysian Curriculum Development Centre.

2. Social Priorities and Educational Goals

It is not a coincidence that the first decade of the nation's educational reform should match as much as possible the aspirations of the First and Second Malaysia Plans. These were periods of renewed political activity and socio-economic awareness. High among the national priorities was the need to ***unify*** (the different ethnic and cultural groups through a common language), to ***standardize*** (the introduction of a uniform national curricula), and to ***equalize*** (the imbalances in the educational and economic opportunities among the people) the multitude of differences that were perceived to be factors that tended to demarcate, distinguish or polarize the people within the newly emerging nation.

Undoubtedly, these were the major societal priorities that propelled the intellectual inventiveness of the nation's educational managers to formulate curricular strategies to meet the challenge. The mission has always been to ***consolidate*** the national educational system with the view to promoting social, cultural and political unity, and to improve the ***quality of education*** with the intent to correct imbalances at all levels and fields of national endeavour.

The goals of social reconstruction, and to a lesser extent, economic advancement thus came to be the imperatives that guided our efforts. The process of education through the schools is not only the ***means*** for achieving these desired ends, but also, the main target ***of*** change and ***for*** change. As such, all of the curricular projects are attempts at educational innovation that are designed to match the means of educational intervention to the desired ends.

3. Modes of Operation in the Curriculum 'Field'

Against such a context of rapid social change, the Ministry of Education through the CDC is charged with the responsibility to innovate, develop and implement appropriate educational intervention programmes. Most of these are directly or indirectly curricular in nature, involving the definition of educational ends and the engineering of means to achieve them. Collectively, we may look upon the curriculum workers at CDC, their expertise, and their activities as constituting the curriculum 'field'. Operationally, CDC is visibly engaged in four kinds of activities, namely, (a) the planning of educational programmes towards the attainment of objectives; (b) the development of systems of instructional materials; (c) the training of teachers; and (d) the supervision of these teachers. Given the diversity of projects listed in Part II, it may be possible to discern the nature and limits of the curriculum 'field', even though it is relatively undefined.

To consolidate our effort for such a purpose, we have limited ourselves to a discussion of only two projects. Using Projek Khas (PK) and the Lower Primary School component of the Compensatory Education project (LPS-CE), we intend to illustrate the similarities and differences in the activities and emphasis that may be regarded as symptomatic of the pre-, and post-1973 periods in the curriculum reform movement.

It should be remembered that PK is the pioneer in the Ministry's effort at curriculum reform. With the experiences gained, it laid the foundation for subsequent educational reform. Initially, its activities in the curriculum 'field' work gave it the perceived image of the curriculum 'Science Centre'. This in fact became the catalyst that led eventually to the founding of the CDC, in which the 'field' was widened to encompass the whole domain of formal education.

In comparison, LPS-CE is one of the most recent of the projects. (Others of an equally recent origin include the Population Education Project, Integrated Primary Curriculum Project and the Pahang Tenggara Project). Compensatory education, although conceived in 1972, was not operational for various reasons until early 1975. Relatively along the time dimension, LPS-CE is a distinctly post-CDC project, reflecting a different line of approach to curriculum reform.

Both the projects are distinctly ***indigenous in origin*** when compared to the major curricular revision programmes for Integrated Science,

Modern General Science, Modern Pure Sciences and Modern Mathematics which were all adoptions and/or adaptations of the Scottish and English science and mathematics curricula.

The needs established for PK and LPS-CE are very clear. As educational intervention programmes, they are geared to the problems and needs of the low achieving pupils, particularly in the deprived or disadvantaged 'environments'. The programmes are consonant with the aspirations and ideals of our educational system that is committed to improving the quality of education for one and all.

While PK was concerned with primary Science and Mathematics across the entire six years of elementary school, LPS-CE in the pilot phase of experimentation (1975) is concerned with how best to ameliorate some of the learning deficiencies of Standard 3 pupils, based on their performance in the three criterion subjects, namely, Bahasa Malaysia, English Language, and Mathematics. In both cases, the rationale for the desired change is also clear. PK was focused wholly upon aiding and improving teacher competence through the prepared teacher guide notes and intensive teacher re-education. Following these, PK assumed that the subsequent pupil-learning in the primary science and mathematics classrooms will be correspondingly enhanced. In contrast to this direct intervention in changing the teacher's behaviour, the approach to LPS-CE is less prescriptive, and is concerned more about the immediate as well as the long-term outcomes. Compensatory education thus began with a series of intensive interactions with teachers, pupils and principals, keeping a watchful eye constantly on the validity, adequacy and consequent outcome of the remedial efforts.

1. **Projek Khas**

Under the pressure of the sudden and rapid increase of pupil enrolment in the primary schools, together with the need to improve the 'quality of education', it is thus understandable that the only viable alternative open to the Ministry of Education to handle the tasks with any degree of confidence is to maximize the area in which it is most experienced and competent. By the late 1960s, the Teacher Training Division, the Schools Division, and the Inspectorate had considerable experience at least in the area of teacher education. Equally important was the network of the infrastructure that was already in existence.

It seemed logical therefore to solve the curriculum problem by directing its efforts at the component of teacher re-training. Given the

limited material and human resources, it became expedient and even necessary for the Ministry to direct the project from 'above'. Hence, in all of the teacher in-service workshops, teachers were directed to attend and receive re-training either at the Federal level, or at the 32 different 'Centres of Excellence' (under the responsibility of the key personnel). Characteristically, all of the curricular work and teacher re-training were not only Ministry-directed but Ministry-centred as well. Often, there was a maximum input of time, money, manpower and intellectual effort by the relatively few curriculum officers. This was definitely so in the initial stages of writing the teachers' guides, the production of materials, and the conduct of in-service courses.

Over time, it was not surprising that teacher's expectations should increase and they came to depend more upon the prescriptive teachers' guides. At the most, teachers merely provided an occasional feedback on the use (if any) of the guidesheets. Accompanying the guides, appropriate cheap instructional materials were developed, tried, and subsequently used both at the in-service centres and in the schools. Enthusiasm in this respect led to the improvisation of prototype equipment that were deemed suitable. By that time, the 'Science Centre' had taken over the direct responsibility for innovation, including the revision of text materials, production of science kits, publication of the newsletter and the supervision of the teachers. Over and above all these was the attempt to establish the beginnings of the 'Resource Centre' and the mobile laboratory van.

In spite of these phenomenal achievements (not forgetting that concurrently, between 1969—75, the Ministry had also launched the other projects to 'improve' secondary school science and mathematics progressively on a nation-wide scale), the organizers were quick to acknowledge some of the existing shortcomings.

The long-term effect of having provided such a centrally directed and administered programme for the primary school teachers was that they in turn reacted with increasing detachment, resulting in the polarization between practice on the one hand and decision-making on the other. A problem such as this could not have been anticipated. If at all, given the intensity of treatment by the Ministry, it might even be logical to have speculated otherwise.

This observation was confirmed by some of the findings that were reported in the 'Evaluation of the Science and Mathematics Education in

relation to the Mid-Term Review of the Second Malaysia Plan' (Sim ***et. al.,*** 1973). Among other things revealed in that survey, it was pointed out that both teachers and pupils had developed progressively a passive attitude and an unquestionned acceptance of orders or directives. When called upon to explain their role, teachers at all levels perceived themselves as ***implementers of directives*** only. Hence, the teachers were wholly detached from the need to know or to understand the why about what they were doing. Sub-consciously, the primary school teachers depended increasingly upon the Ministry to take the initiative. Also, from the interviews with the teachers, it was evident that those in Projek Khas had used the ***Teacher Guidesheets*** more as a crutch than as a guide to aid their own understanding of what and how pupils learn. The paternalistic or over-protective mode of the teacher preparation programme also implied that teachers were perceived to be unwilling or incapable, or unable to be relied-upon to help themselves.

Another glaring omission was the absence of direct pupil-involvement in validating the development of the teacher instructional materials, based on trials directly involving pupils in the classrooms. Admittedly, there is a real credibility gap between what is prescribed as 'inquiry approach' in the instructional activities of the teacher's guide and what the children actually did when they were in the classrooms. This issue was aggravated by the fact that the materials in the guidesheets were recommended in terms of the teacher and the school. Consequently, most of the prescriptive and descriptive efforts, in fact, were in terms of what the teachers did or should do, or did not or should not do. Not surprisingly, the concepts of 'inquiry' or 'discovery' were never too meaningful to the teachers.

Findings from the Evaluation Report (Sim ***et. al.,*** 1973) also indicated that while primary and secondary teachers tend to conceive the 'act of discovery' as an activity, it was, however, not so much in terms of mental activity involved but often in terms of the associated physical activity. Furthermore, the Report cited that,

> (teachers) do not come to grip with the crucial issues, such as those pertaining to the careful differentiation of specific arrangements needed to ensure that every pupil, as well as the teacher, would be able to engage in meaningful inquiry. (p. 80)

On the issue of 'built-in evaluation', the project had decided at the very beginning to exclude this as a key component of the curriculum

reform. Consequently, after six years of implementation, PK has yet to answer this question, namely, 'in what ways and to what extent have the children in the rural areas improved significantly in the learning of primary science and mathematics'?

In spite of these intended omissions, (a lesson which PK has come to appreciate), it is most heartening to note that in comparison to other modern science programmes (Integrated Science, Modern Sciences, Modern Mathematics), the teachers at least have perceived most favourably the consistent contribution made by PK towards all of the four priorities of the Second Malaysia Plan (Sim *et. al.,* 1974, p. 54). On this global criterion alone, the project organizers can say with justifiable pride, 'right on'!

2. The Lower Primary School component of the Compensatory Education project (LPS-CE)

Even though PK is directed entirely at primary teacher re-education, nevertheless, it was in every respect a full blown curriculum reform undertaking which is committed to the entire dimension of the primary Science and Mathematics curriculum and instruction. In this respect, LPS-CE is relatively modest in its scale of operation. The compensatory nature of the programme is aimed initially at the criterion performance of the pupils in the Standard 3 diagnostic examination in Bahasa Malaysia, English Language and Mathematics.

The project is designed to serve a two-fold purpose. The first concerned the programme of ***remediation,*** while the second is a strategy that encouraged direct ***'grass-roots' involvement*** by all concerned. Toward these ends, a continuous process of formative evaluation is incorporated in the exercises to ensure that the treatments are adequately assessed. In these respects, LPS-CE adopted a cyclic, step-wise empirical approach to the development of the remedial curricular activities.

In the recent history of curriculum reform at the CDC, a heuristic approach such as this towards the successive approximation in resolving curricular problems is distinctly a new innovation. Some of the more significant innovations that seem to characterize the more recent mode of operation included the following features:

1. The ***workshops*** are occasions when the school teachers and the curricular officers work co-operatively and with a high regard for one another as equals. Their deliberations were organized progressively toward the development of remedial instructional activities. The roles of

instructor and learner were dynamically inter-changeable. Often the project staff learned from the teachers about how to approach the primary school learning problems more realistically than the organizers could offer. In return the teachers benefitted from the rich interchange of ideas among themselves and with the organizers. Since the teachers had a very personal involvement in formulating and devising the remedial materials and activities, they were consequently more valuative of the activities probable usefulness. Also, they were more committed to use them (when they returned to their schools) and to put them to the test.

By redirecting flexibly the instructor-learner dynamics constantly at the workshop, the open exchange and interactions set the stage to sustain the spirit of 'berdikari' (self-reliance by learning to stand on one's own feet) among all the participants concerned. Over the 20-week period, there was a recognizable change in the teachers' openness and confidence to express their views. To some who were more contented to be the silent listener, the new experiences and freedom of teacher involvement in pedagogical decision-making must have been an eye-opener indeed!

2. The ***group dynamics*** at each of the workshops was deliberately orchestrated to ensure a high probability of teacher-participation and hopefully, subsequent commitment on their part. Each of the nine fortnightly workshops (over a period of 20 weeks) is about seven hours in duration (usually four hours in the morning and three in the afternoon). From the beginning, the very kind of classroom and pupil-based activities (e.g. learning to diagnose empirically from the error analyses of the pupil performances on the Standard 3 diagnostic tests), made it patently clear to the participants that the essential aim was rather to ***assist, to help each other*** than to prescribe the methods or activities. Working in fairly homogenous sub-groups on different assigned tasks, the teachers and other participants soon learned to assist and learn from one another. Admittedly, in the first few workshops, the organizers took the 'leadership' role. Towards the last three workshops, the teachers worked in groups on different tasks in each of the subject areas, and then pooled and shared their ideas in those workshops that were wholly conducted by the teachers themselves. It was indeed a worthwhile experience for the teachers and the organizers to come to realize that when conditions are supportive and facilitative, the primary school teachers can be relied upon to help themselves.

3. The ***mini-trial*** is the means to test the effectiveness of the remedial curricular materials that the teachers have helped to develop. For this purpose, following each workshop, the teachers and the principals of each school had the intervening period (between two workshops) of about ten days to tryout the materials with their own class of pupils. It should be noted that prior to this, the teacher had made the error analyses of the pupils' learning 'deficiencies', and thus she was quite aware of the weaknesses of the different pupils in her class. Through this process of mini-trial with 'real' pupils, the pupils themselves have become an integral and inseparable part of the curriculum development process. Throughout the mini-trials, the pupils' performance, and likes and dislikes helped to decide and validate the usefulness and effectiveness of the remedial activities. The most crucial component is the emphasis on the ***humanistic intent*** of the educational reform process. By holding oneself accountable to the pupils (and secondarily to others) this added the ***moral*** dimension to the work and responsibility of the curriculum worker. For once, the primary teachers who participated in developing the remedial activities felt a personal commitment and responsibility in what they were doing. In short, it was no longer a matter of 'implementing a directive'. All of the participants have felt, at various times, that the effects of the curriculum interventions were as much the responsibility of the teachers as it was that of CDC.

The teachers, principals and organizers have begun to look upon themselves with a renewed sense of respect and confidence. Indeed, ***curriculum development is about people, their well being, and what they can become.***

For these teachers who have been involved in the Lower Primary School Component of the Compensatory Education Project, their contribution to the curriculum development work can no longer be value-free or value neutral!

4. The ***remedial activities.*** There were several aspects to the remedial activities. An overall aspect is, however, very clear; none of the suggested remedial activities were prescriptive and neither were they dictated by CDC. Rather, the development of any remedial activity is based initially on the logical analysis of pupil errors, followed by the class teacher's suggestions, inventions and creations (at the workshops). It is only those that are agreed upon by the collective decision of the majority that they are then tried out with the pupils (especially with the

group of lowest achieving individuals). Subject to the pupils' performance on the specially designed criterion measures, feedback is thus obtained on the usefulness of the remedial activities.

During the initial phase of the project, given the error analyses of the pupil-performance, the workshops have managed to devise some useful remedial curricular materials for five categories of 12 specific types of learning deficiencies in Bahasa Malaysia, and five categories of 30 specific types of mathematics learning deficiencies, and then two categories of about 26 specific types of learning deficiencies in the English language. The types of learning deficiencies for the various subjects are summarized in the separate Interim Reports by Koh Boh Boon, Khoo Phen Sai and Lau Kem Cheong respectively. Based on the fortnightly written feedback (on questionnaires) and through casual discourse with the workshop participants, almost all of the teachers and principals conceded that the most valuable part of the workshops was their direct contribution to the detailed analyses of the possible learning errors, and also, to the development of the remedial intervention activities which they have tried and tested themselves.

5. ***Progressive evaluation.*** In the more recent curriculum development efforts, CDC has gradually acquired the insight into the value of including systematic evaluation as an integral part of the curriculum reform process. For this experimental study on the learning deficiencies of the low achievers, feedback on the relative effectiveness of the remediation process was obtained in several ways, namely, (a) use of the pre- and post-Standard 3 criterion Achievement Tests; (b) administration of pupil remedial criterion tests to measure immediately the effectiveness of the remedial activity in helping the pupils to overcome the learning deficiency; and (c) teacher questionnaires to elicit information about what they thought of each workshop, and the classroom experiences that their pupils have been exposed to during each fortnight of the mini-trial.

6. ***Participation of the principals.*** The decision at the initial phases of the project to include principals in the curriculum development process was one of the most crucial components that contributed to the overall enthusiasm of the teachers. Visits to the sample of trial schools bear out the observation that an interested and supportive principal can make a great deal of difference to the work of the class teachers and to the life of the pupils. Apart from everything else, the principal learned to empathize with the concerns of the CDC and her teachers. She was no

longer an extension of the arm of the bureaucratic administration and throughout the period of the group interactions, the principal was no different in status from any other participant.

Like all curriculum endeavour, LPS-CE had its share of shortcomings. Some of these have been listed in the summary of the project in Part II. It should be stressed that while the project had hoped to assist the weak pupils, nevertheless, no one ever pretended that it was at all possible for the project to remedy in less than six months what had been the result of many years of past neglect, both in the home and in the school. As the project enters into the later phases, with the longitudinal study of these same weak pupils, it may be possible, in time, to know if the long-term remedial treatments had any significant positive effect.

In the meantime, what is equally important is that the CDC has accomplished something it had never attempted before, namely, in meeting the hopes and realization of those teachers (participants in the project) that the Ministry of Education do indeed care sufficiently to ***help them to help themselves*** and in turn, ***to help the pupils.*** As indicated in the Interim Report (Khoo, 1975), in the last resort, . . . it is the teachers who have to help themselves, if they care to fulfil their professional obligations. A catalyst has been used to bolster teachers' confidence and improve their ability but the process is yet incomplete'. (p. 5).

4. The Emerging Curriculum 'Field' for the CDC

In using PK and LPS-CE as exemplars to illustrate the two contrasting modes of curriculum reform in this decade, we can now recognize at least two distinct types of curriculum activities. One of the modes embodies those components that are wholly Ministry-centred, where the teachers, pupils and principals are the passive beneficiaries. The alternative mode has set new 'limits' to the curriculum field where, characteristically all of the parties concerned worked and shared cooperatively, and with a renewed commitment and moral responsibility to the pupils. The focus of accountability has shifted. This indeed has set new standards—moral and ethical—on the responsibilities of those whom we have entrusted our school children. CDC has just learned a new type of leadership role. It is no longer sufficient to point out merely the direction and set the pace. Neither must they follow precedents, obey regulations, and merely move at the head of the crowd at all the times. Perhaps there is yet a lesson to be learned from the wisdom of Lao-Tzu, who once said, 'To lead the people, walk behind them . . . When the best leader's work is done the people say, 'We did it ourselves'!

In our closing remarks, we wish to offer the following points of observation. At best, they are our first approximations of what we feel are desirable in the advancement of the curriculum 'field' of the CDC.

1. A time for consolidation

In the short period of time, the multitude of existing and new curriculum projects at the CDC is encouraging at first sight (perhaps even impressive), and yet frightening. Without exception, each project had immediate and long-term irrevocable implications on the present and future generations of our citizens. Consolidation does not necessarily mean the discarding of projects, although this may not even be a bad idea, if we know what deserves to be thrown out! Rather, it calls for a more careful ***investment of time*** for the highest possible returns. Since the total amount of time per day is an invariate, it is all the more crucial to ***spend time*** now as an investment, in order to ***save time*** in the long run. To avoid a dissipation of the curricular efforts at the CDC, it needs seriously to examine and re-order its priorities across the range of

projects and also within each project. CDC should take on a new role to assist the Ministry who, in turn, has to establish and define or redefine the educational needs in more precise terms. In time investment, CDC should watch out for the delicate ***balance*** between the fact that it has been so pre-occupied with being 'efficient' and ***doing things right*** on the one hand, and ***doing the right thing*** on the other hand. The latter is concerned with the validity of whatever that has been undertaken. Rightly so, it sets the upper limits for efficiency.

2. **Investment on built-in evaluation**

The CDC has reached a stage in its moral obligation where it can no longer avoid having to answer this question: 'Given that a curriculum has been effective during the treatment period, does it last? Is it used? Does it make a difference in how people function'? Eisner (1972) maintained that 'Such a question will be difficult to answer but there is also no doubt that these questions must be addressed if we are to know if schooling is more than just a game'. For any project that is undertaken, it is mandatory that some systematic evaluation (both intrinsic and formative/summative) must be incorporated. The reason is quite obvious. Can we pretend to be above accountability—accountable not merely to the establishment, but more important to those who are in our charge, namely, the pupils? The answer, whatever it be, lies hidden in our valuation of our own work ethic, and moral responsibility towards what we do to others and, most of all, our concern for the wisest investment in the time available.

3. **Indigenous Curriculum Reform (ICR)**

In the brief decade of curriculum reform in Malaysia, the frontier of education has moved rapidly towards the principles and ideals that underlie 'learning to be' (Faure, 1972).

In this period of 'masyarakat berdikari' (self-reliant society), it is a timely reminder that the CDC should adopt and project a new leadership role in the domain of ***Indigenous Curriculum Reform*** (Khoo and Yeoh, 1974). We will continue to learn by standing on the shoulders of perceived giants, for example, as in the adoption and adaptation of the prized curriculum programmes of the 'developed' nations. This we have done almost exclusively in the past and even in the present. However, can we afford not to venture into new alternatives that may be equally viable, and certainly more lasting in the lessons that can be learned?

Even when we have succeeded in adapting a programme, we should still be acutely critical of it because, even at its best, that is only a copy of the 'original'. Be it indigenous or imported, CDC should be aware of the inherent danger of being lulled into the complacent acceptance of global platitudes and rhetoric, without any empirical validation to support such claims. In this age that is characterized by change, we must avoid working for the future in the mirror focussed on the past.

The first step in the practice of ICR is to ask ourselves critically what we ***need*** (for the children, our future citizens) as distinct from what we have been made to want. For purposes of educational and social reconstruction, our needs lie partly in the clarification of our national objectives as set out in the Second or in the forthcoming Third Malaysia Plan (1976–80). CDC should monitor the extent to which the objectives thus identified correspond to or are matched by those emphasized in our existing curricular projects.

As a full-fledged Malaysian Curriculum Development Centre, it should pledge itself to the practice of these virtues:

> To the question of your life
> you are the only answer,
> to the problems of your life
> you are the only solution,
> and to the construction of your success
> you are your own architect.

4. Regional co-operation

By now, it is quite obvious that the task of curriculum reform is infinitely complex, and in most instances, long-term in character. Malaysia will always need the short-term aid of visiting consultants. However, through no fault of the donor country, our long-term programmes can be hindered drastically by the departure of the foreign expert at the end of his service. This is undesirable especially when all of our curriculum projects have long-term commitments, with implications of lifelong effects. On the other hand, it can happen that a programme(s) is created or sustained with the view to prolong almost indefinitely the perceived indispensibility of the visiting consultant. It is quite surprising that among all of the CDC officers, the individual with the ***longest*** record of continuous service (long before CDC was even founded) is held by the visiting consultant that is entrenched upon a series of short-term contracts.

While still relying on help from outside this region, it is clear that the CDC must expand its network to account for the available expertise within the ***Asian region.*** There is no necessity to identify specific countries. It is well known that many of the neighbouring countries do have scholars of international and national standing. This is definitely a possible source that has remained untapped. Since the founding of the CDC, there is also an emerging trend in terms of working co-operatively with different faculties in the various local universities. This practice is also sufficient. It is quite obvious that a few of the major SEAMEO Regional Centres have not been utilized, if at all, they have been underutilized. For example, the innovations currently undertaken at RECSAM in the indigenous curriculum reform of the primary Science and Mathematics programmes is a possible adjunct to what CDC is doing. Likewise, some of the English Language activities at RELC could also be scrutinized for possible contribution to the Malaysian efforts. INNOTECH is, of course, another indispensable source of expense.

Basically, ICR means greater commitment presently to the advancement not only of Malaysia but, wherever possible, to promote international co-operation of curricula exchanges within the Asian region. In this respect, with Malaysia as the major contributor to RECSAM, it should be highly desirable to look upon the curricula reform there as a natural 'extension' of the CDC.

5. **Debureaucratization of curriculum development**

In the review of the multiplicity of the CDC curricular projects, an obvious observation has emerged. The curriculum 'field' is marked by a progressive bureaucratization of the entire structure, functions as well as personnel working within the system. While the existence of a hierarchy is inevitable, it is undesirable when it reaches the stage that personnel are 'seconded' or 'recruited', or even 'promoted' out of CDC, simply because the system does not provide for further promotion opportunities. Apart from everything else, the CDC cannot afford to lose its expertise (and curriculum development work is very specialized in some respects), especially when the member of staff has undergone systematic training over a period of time.

Beyond the mundane issues of service conditions under the Ministry of Education, all of us, at different times, unknowingly perhaps, have become the servant of the system whose operation is largely impersonal in nature.

We need to be awakened to the awareness that in our daily tasks as educators, we have been co-opted into the service of a bureaucratic, monolithic, increasingly dehumanized educational system. Until and unless we change our own orientations radically by asking ourselves, 'whom do I really serve'? we may never be able to work for humanistic ends (Yeoh, 1973, 1974).

6. A plea: an affair with the CDC

To humanize the curriculum reform movement, it is perhaps timely that we heed the pleas and views of those we claim to serve so well. Cited below is what a primary school principal had to say about the CDC, after she had experienced 20 weeks of close interaction and involvement in the LPS-CE workshops. At the closing ceremony of the Phase I of the Project, she made the following plea:

> When I first heard of the CDC, the name did not mean much to me. I felt that it was an extravaganza . . . (now I must say that the Centre has improved its own image by this workshop which has contributed much inspiration to me . . . (it is) the beginning of an affair between the CDC and us (teachers)
>
> (Sr. A. Mangalam, 1975)

5. A Concluding Remark

By August 1976, the new complex of buildings for the CDC will be ready for occupation. It is claimed that the building provides not only a multitude of facilities to match the intended future functions and responsibilities of the CDC, but also to provide the physical environment supposedly conducive to professional interaction. When these are completed, it will be another milestone for the CDC. Of course, it will also be yet another 'interim phase' in the lifelong process of curriculum reform.

The challenges that lie before the CDC are immeasurable. Staffing is still a very urgent matter. Research grants, outside those aided by the Foundations, are barely adequate to meet immediate needs, not to mention the need to sustain long-term projects which are ever on the increase. Whatever the problems or aspirations, the real test of the effectiveness of the Malaysian CDC is whether or not it will be another 'bureaucracy', or one that is keenly awake to humanistic ends. Operationally, it may be nothing more than to sustain the spark to keep the 'affair' between the CDC and teachers alive.

We conclude confidently that given the dynamism of CDC's past and the present, CDC will no doubt attempt to keep the 'affair' between the Ministry and the teachers alive and well.

Throughout this study, we tried to recognize impartially some of the problems in order to rebuild a curriculum-planning field that can effectively serve humanistic ends. To this goal we commit ourselves and offer this Report as a positive comment.

References

Eisner, Elliot W., "Emerging model for educational evaluation", *School Review* 80 (4): 573–590, 1972.

Faure, Edgar, (ed.). *Learning to be: the world of education today and tomorrow.* Paris, Unesco, 1972. 313 p.

Khoo Phon Sai, *Interim Report – Mathematics: Projek Imbuhan bagi Darjah III, 1975.* October 1975, mimeo.

_____. and Yeoh Oon Chye. "Indigenous curriculum reform – why"? *Massalah Pendidikan* 5: 11–18, April 1975.

Koh Boh Boon. *Interim Report – Bahasa Malaysia: Projek Imbuhan bagi Darjah III, 1975.* December 1975, mimeo.

Lau Kam-Cheong. *Preliminary Report – English Language: Projek Imbuhan bagi Darjah III, 1975.* November 1975, mimeo.

Sim Wong Kooi and others. *A position paper on the evaluation of science and mathematics education in relation to the mid-term review of the Second Malaysia Plan (1971–1975), final report.* /Kuala Lumpur?/ 1973.

Yeoh Oon Chye. *Humanising primary science and mathematics education, a paper read at the SEAMEO-RECSAM Seminar for Senior National Administrators on the 'Development of Southeast Asia Primary Science Project', 12–16 March 1973.* Penang, /1973?/

_____. *Man and society: redirection in biological science education, a paper given at the Asian Association for Biology Education (AABE) in collaboration with the Science Teachers Association of Singapore (STAS), 5th biennial Conference, 10–15 June 1974, Singapore* /1974?/

PUBLICATIONS RELATED TO CURRICULUM
Available from Unesco, Bangkok

1. *Teacher education and curriculum for development, 1975*
2. *Science in basic functional education: approaches, methods and materials, 1975*
3. *Science in basic functional education: links with real-life situations, 1975*
4. *Curriculum development for work-oriented education (in collaboration with NIER, Tokyo) 1976*
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9. *Integrated science in the junior secondary school in Sri Lanka (in collaboration with IBE) 1976*
10. *Curriculum for development: analysis and review of processes, products and outcomes, 1976*
11. *School science education in Indi... ment Centres series, No. 1), 19...*
12. *Implementing curriculum change...*