Science and technology in Malaysia

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Country Reports: Science and Technology In Malaysia

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Introduction

This paper gives a country report on the science education at school level in Malaysia., the school and the community and the popularisation of science in the country.

Structure of School Education

Refer to figure 1.a , b

Science Education at the Primary Level

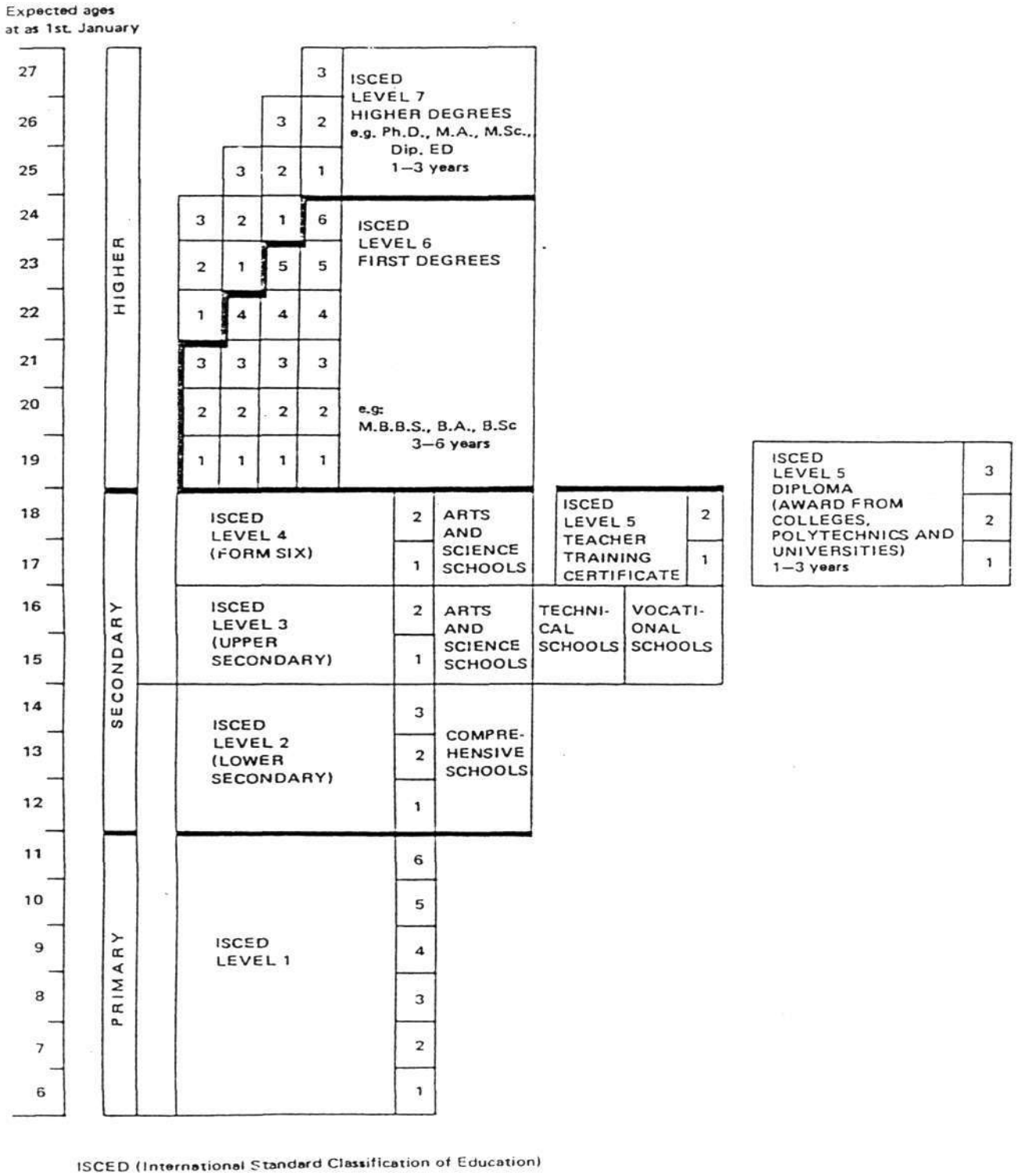
Science as an examination subject at the primary level was introduced in 1993. The first national science examination will be held in 1997. The formal science education begins at the primary level when the children are in standard 5 or the fifth year of the ISCED (International Standard Classification of Education) Level 1. This lasted for two years.

The goal of science of education is to help students learn science as a process (Huraian, 1993). Thus the emphasis is on scientific skills: the understanding of science as a process and making inferences, manipulative skills like how to handle a test-tube or how to use a telescope, thinking skills which is directed towards creativity and critical thinking. Attention is also given to the inculcation of values and development of attitude.

The content covers five themes:
The living systems,
The physical systems,
The material world
The earth
Technology.

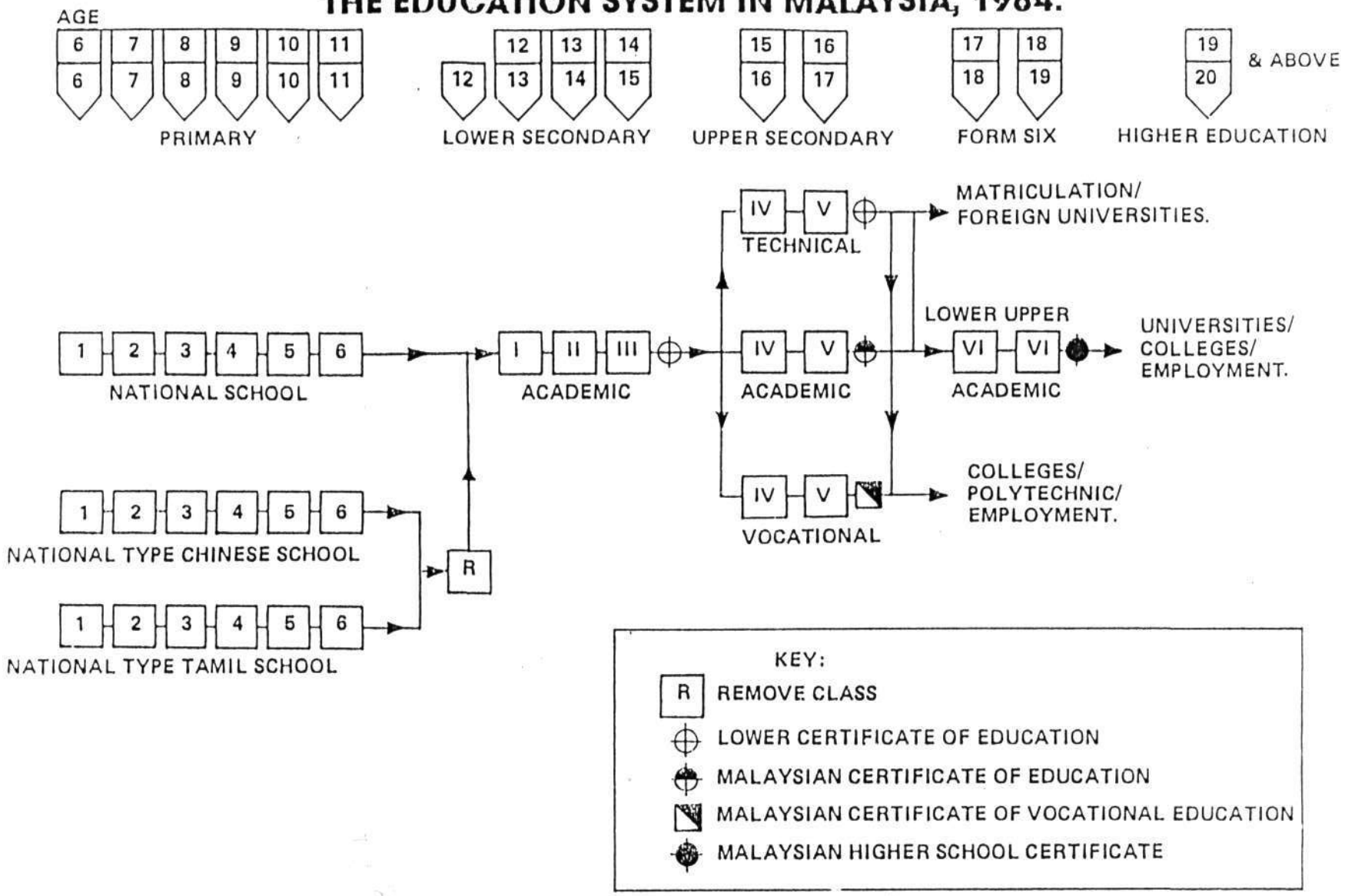
The teaching learning methods adopted include:
guided inquiry,
discovery
project group work,
experiments that promotes discussions and use of simulations

STRUCTURE OF FORMAL EDUCATION



ISCED (International Standard Classification of Education)

THE EDUCATION SYSTEM IN MALAYSIA, 1984.



The Structure of the New Primary Curriculum

Area of Study	Components	Subjects	
		Phase I	Phase II
Communication	Basic Skill	Languages Mathematics	Languages Mathematics
Man % His Environment	Spiritual Values and Attitudes	Islamic Religion & Moral Education	Islamic Education & Moral Education
	Humanities and Environment		Science Local Studies
Self Development	Living Skills		Living Skills
		Music Education	?Music Education
		Art Education	Art Education
	Art and Recreation	Health & Physical Education	Health & Physical Education
	Co-curriculum		

role play that consists of activities that are modelled after reality. These include spontaneous activity and application of rules in decision making, and conceptual development.

Most schools have laboratories and there are also mobile libraries. The organisation : at the district level, then the resource teachers who are experts and very well experienced teachers.

The agent responsible in preparing the modules are Centre for Curriculum Development, Ministry of Education Malaysia. The centre provides the in service teacher training. They get the co-operation of the state science supervisors. University lecturers normally provide the consultation services.

Science Education at the Secondary Level

Enrolment Rate in Government Assisted Education Institution in Secondary Level
Age of students: 12+ - 14 + - at lower secondary

15 + - 16 + at upper secondary

The enrolment for science education at both the lower and upper secondary levels are as shown in figure . Figures and give the curriculum for secondary schools. Science is a compulsosry subject for all students at bothe the lower and upper secondary levels. It is only at the upper secondary level that some form of specialisation takes place. Pupils can opt for either the traditional academis program or for the technical or vocational program. It is only in the last couple of years that the vocational and technical programs are gaining popularity simply because of the economic value of the graduates.

ENROLMENT IN SELECTED YEARS

Lower 2)	1988	1989	1991	1994
Total	1117000	1132600	1142500	1295100
Enrol. Rate	83.42	82.86	83.43	82.89
% male	50.6	50.4	50.2	50.17
% female	49.4	49.6	49.8	49.83

Upper 2)				
Total	728 800	730500	748100	789900
Enrol. Rate	49.29	49.09	48.56	55.09
% male	49.4	49.0	48.4	47.74
% female	50.6	51.0	51.6	52.26

The Integrated Secondary School Curriculum At the lower Secondary Level

Core Subjects	English, Malay, Islamic Religious Education or Moral Education, Mathematics, Science, History, Geography, Physical and Health Education, Integrated Living Skills
Additional Subjects	Chinese, Tamil
Integrated Living Skills (Core)	Manipulative Skills, Commerce and Entrepreneurship and Family Life Education
Integrated Living Skills (Elective)	Additional Manipulative Skills Home Economics Agriculture

The Integrated Upper Secondary School

Type	Core Subjects	Areas	Electives
Academic	Malay, English, Islamic Religious or Moral Education, Mathematics, Science, History, Physical & Health Education	Humanities`	Malay Literature, English Literature, Geography, Art
		Vocational Technology	Principles of Account, Basic Economics, Commerce, Agricultural Science, Home Economics, Additional Mathematics, Civil Engineering Studies, Electrical & Electronic Engineering Studies, Engineering Drawing, Engineering Technology
		Science	Additional Science, Physics, Chemistry, Biology
		Islamic Studies	Tasawwur, Al-Quran & As-Sunnah, Syariah Islamiah
		Additional Elective Subjects	Chinese, Tamil, Communication Arabic

Technical	Malay, English, Science, Mathematics, Islamic/moral Education	Technical	Physics, Chemistry, Engineering Drawing, Geography, Additional Mathematics
		Agriculture	Physics, Chemistry, Biology, Agricultural Science, Additional Mathematics, Geography
		Commerce	Principal Accounts, Commerce, Additional Mathematics, Geography, Physics, Chemistry
Vocational		Engineering Trades	Electrical Electronics, Machine Shop Practice, Welding & Metal Fabrication, Automobile Mechanics, Building Construction, Refrigeration & Air Conditioning
		Home Economics	Catering, Fashion Design Dress Making, Beauty Culture, Child Care, Bakery & Confectionery
		Commerce	Office Management Business Management
		Agriculture	Ornamental Horticulture and Landscaping, Farm Machinery & Farm Management

The time allocation for the science component is 22% of the total classroom time at the lower secondary level. At the upper secondary level, the time alocation for is 10.5 % for pupils doing arts, 2.5% for those in vocational, 9% for addtional science and 34 % in pure science. Time allocation for technical subjects for those who are in the technical and the vocational schools are respectively 22.5% and 70%. (Sufean, 1993).

School and The |Community

Parents in And Out of School

While interest in science is there and realisation that science is important for daily life, the development of the country and the conservation of the environment, school children opt for non science careers. Parents do have an influence particularly when the image of science and the model of successful scientist are not as visible as those in other professional fields and the humanities. Furthermore Malaysia is undergoing rapid economic growth and development. Non science careers appear more attractive and the career structure more exciting. Unless careers in science appear more promising, students will not choose to study science.

Parents would like to see their children do well in science. However time and again, school level performance in science particularly the hard science like physics and mathematics have not been too encouraging. Students felt that they have worked hard. To them it must be that the subjects are difficult. They would not consider taking up such difficult subject if their future is going to be jeopardised.

No study has been carried to determine the extent parents help their school children learn science. One thing that is certain we have particularly in the urban areas parents concerned over their children's education. If parents are not in the position to help the children with their homework then the parents will send their children for tuition. It cannot be denied however that there are parents with background in science who are able to provide their children with informal education in science very much early in the children's life. This is done through proper interaction and communications, giving children opportunities to interact with educational natural or man made resource materials. Such children pick up a lot of vocabularies, and ideas at an early age. They also acquire basic thinking skills that help them understand simple cause and effect processes. So children learn how to rationalise and air their views. Such children too are found to be active and they indulge in healthy creative activities. These children are found to develop positive attitude and they can appreciate science. However it is not necessary that these children will opt for scientific careers later in their life.

Local Community

All schools in Malaysia are linked to the community through the parent teacher association. An annual general meeting is usually held. Through such meetings, parents from the

community can voice their ideas and concern to the schools. Besides that the working committee will try to organise activities that have been suggested by the parents. Some of the activities include raising funds to enable the schools to organise visits to places of historical or scientific interest.

In some cases schools are able to have links with local industries or scientific institutions. Suck links are possible particularly if teachers or parents have already had personal contacts with the industries or institutions. Through such links, industries or organisations will sometimes organise educational programmes like visits, talks or workshops. Or they can even provide the schools with materials that the schools request for (e.g. computers, books, etc.)

Cultural Relevance

Presently formal science education in schools primarily meant to meet the industrial manpower needs of the country. Pupils become knowledgeable and skilful through education and training. There is an attempt through curriculum development to foster critical thinking, creativity and innovativeness and to infuse cultural values into the education system (Seventh Malaysia Plan, 1997). The process of going through such education will definitely develop individuals that will bring about changes in worldview, values, lifestyle and hence culture. The state of culture in a given society is not something permanent when a country undergoes rapid development. However to ensure that society continues to exist in stability and with certain identity of her own then certain cultural traits like being socially responsible, caring, respect for others including the environment need to be maintained.

In Malaysia science education of the fifties through eighties have neglected the human socio - cultural dimensions of life. The scenario is different presently. The secondary level education makes it compulsory for pupils to take humanities subjects like living skills, Islamic religious/moral education and history. However the teaching of science that incorporates in an integrated manner both the cultural and technical aspect, is something that has not been developed. Science teachers have by virtue of their training gone through science education that is more content based.

Political Anxieties and Movements for Change

Science education is perceived to be difficult and do not promise good career prospects. There is truth in such perceptions as experienced by most of the science graduates. Parents concerned over their children's well-being, the rising cost of living and quality of life will encourage their children to choose professional careers. Thus professional courses like medicine, law, accountancy and other applied courses like computer technology become popular. So the marketability of science students in the workforce is one of the major issues (Robiah, 1994) that has an influence on parent's and also their children's interest in scientific and technological careers.

As early as in 1969, it is stated in the fifth statement of the ideology of Malaysia to build a progressive society whuich shall be oriented to modern science and technology (Information Ministry, 1969). This is further reenforced when the Malaysian government adopted Vision 2020 as a guide to development planning, implementation and monitoring activities in the country. Vision 2020 spells features that Malaysia should have if she is to become industrialised by 2020. Of the nine statements in Vision 2020, the sixth states that Malaysians should not just be consumers of the products of science and technology but should contribute towards the development of a scientifically and technologically progressive society (Mahathir, 1991). Thus science and technology is seen as a tool for growth and development. As such the government has placed priority and greater emphasis in the development of science and technology in the country. Further, Malaysians are encouraged to translate statements of Vision 2020 into workable programs through various government and private educational and mass communication channels that are available in the country.

Popularisation of Science

The science and technology culture is a key area in the National Plan of Action for Industrial Technology development that was approved and adopted by the Malaysian government in 1990. It is the Ministry of Science Technology and Environment (MOSTE) who is responsible for the formulation and implementation of the S & T awareness programmes. The major projects/programmes that have been undertaken by the ministry include the establishment of the National Planetarium, The National Science Centre, The Malaysian Science and Technology Information Centre, The S & T Promotional Programme and financial assistance to S & T NGOs. Activities to promote S & T include giving awards to e.g. young scientists & science journalists, holding science exhibitions and fairs for the public, radio and television forums, seminars/workshops, quiz, contest and competitions for schoolchildren and tertiary level students, visits, career talks and publicity. These activities are organised at various national, state, district and school levels. Various ministries including the Ministry of Education, The ministry of Information, research institutions, non governmental organisations and the private sectors are invited to contribute towards realising these activities.

Presently the major issue is not the gender issue. A report on one study (MASTIC, 1994) shows that there is no significant difference between the women's and the men's general knowledge of S & T and knowledge of various topics in S & T. It is the question of getting both the male and female members of society to be interested in science and technology. Malaysian schools are not experiencing tha shortage of girls doing science. It is only at the institution of higher learning that there are more males than females taking up technical programmes like engineering.

Non formal education for the promotion of science and technology are being carried with the help of the mass media and the various NGOs through activities that have been stated.

Conclusion

Malaysia recognises the importance of science and technology as a tool for development. The government tries to meet the scientific and technological manpower needs of the country through the education system. However, Malaysian society in particular the school children have reservations choosing careers in science and technology. To this effect the government had taken steps to popularise science and technology to the public. It is not solely for the intention of pulling people into science and technology. It is also to enhance the level of scientific literacy of the people in order to prepare them to lead a more meaningful life as Malaysia works its way to become industrially developed by 2020. It is also to ensure that Malaysia can participate and contributes towards various socio-cultural, economic, political and environmental activities that are conducted at the international level in the coming 21st century.

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