CHAPTER 1
INTRODUCTION

Background of the Study

Science is an intellectual and active process. Science is not only facts or products but is also the process of identifying problems, constructing hypotheses, carrying out experiments and making interpretations. Science enables students to develop their abilities to recall, imagine, classify, generalize, compare, evaluate, analyze, synthesize, deduce as well as infer (Renner, 1967).

The teaching of science processes was stressed in schools as early as the mid 1800s. However, science processes were only formalized in the 1960s. During the period of 1860s to the 1900s, science was taught for the purpose of developing intellectual power. In the early 1900, science education was recognized as an important factor for the advancement of a nation; thus the need for students to understand the methods and processes by which scientific knowledge was attained.

Many developing countries including Malaysia stress the importance of promoting science education in schools and institutions of higher learning as the key to creating a scientifically literate society and to produce skilled labour force to meet the scientific and manpower needs of the society (Lee, 1992). To achieve these objectives as well as to keep abreast with the development in science education, school science education was incorporated into the national objectives of the Malaysia development plan.
Both the First and Second Malaysia Plan (1965-1975) emphasized the development of a progressive society oriented towards science and technology (Tan, 1991). Science education has been introduced into the Malaysian education system after the Second World War. It became a compulsory subject in schools in 1965. In 1969, the Malaysian Integrated Science Curriculum was introduced at the lower secondary level. This was an adaptation of the Scottish Integrated Science.

After a review in the implementation of the National Education Policy, it was decided that the entire school curricula should be restructured to reflect a 'Malaysian identity as well as to meet the needs and aspirations of a united, disciplined and trained society'. It also proposed a science curriculum that would 'develop an understanding of the usefulness of scientific knowledge and processes in its application to daily life and society' (Malaysia, 1979).

Based on the recommendations of the Cabinet Report, a Malaysian-oriented curriculum was developed for the primary school in 1979. The new primary curriculum is called 'Kurikulum Baru Sekolah Rendah (KBSR) or the Integrated Primary School Curriculum (IPSC). The IPSC emphasizes on the overall development of the child, in particular, the mastering of the three basic skills, namely, reading, writing and arithmetic in the early years of primary education. This curriculum emphasized the adoption of an integrated approach towards the acquisition of knowledge and skills besides the inculcation of moral values.

In the first twelve years of IPSC (1983-1994), science in the primary school was integrated with other subjects such as history, geography and civics into one subject called 'Alam dan Manusia' or Man and Environment. The various
components were taught as an entity. However, in 1995, ‘Science’ and ‘Local Studies’ were introduced as separate subjects to replace ‘Man and Environment’ (Malaysia, 1995).

This change was initiated with the hope that primary students will master the basic concepts and skills in science to prepare them for the science subjects in secondary education. The change occurred on realizing that there was a drop in the percentage of form 4 students opting for the science classes in comparison to the students opting for the arts classes (Table 1). It was also hoped that students would become interested in science at an early age and would subsequently help to create a scientific and technological society as envisioned in the country’s Vision 2020 goals.

The objectives of the primary science curriculum is to develop individuals who are knowledgeable and skilled in order to form a society that is literate in science and technology, dynamic and progressive so that they are more responsible about the environment and appreciate nature (Huraian Sukatan Pelajaran Sekolah Rendah).

The objectives of the primary science are to be achieved by the students through:

1. The development of thinking skills to improve intellectual ability.
2. The development of scientific skills through the inquiry method.
3. The development of an interest in the environment.
4. The acquisition of knowledge and understanding of scientific facts and concepts to enable them to understand themselves and the environment.
5. Solving problems and make decisions responsibly.
6. Contributing towards science and technology
7. Applying moral values and scientific attitudes in daily life.

8. Appreciating the contribution of science and technology for a harmonious life.

9. Appreciating the order of the environment.

As a continuation of the IPSC, the new secondary school curriculum was implemented in 1989, called the Integrated Secondary School Curriculum or 'Kurikulum Bersepadu Sekolah Menengah'. This curriculum emphasizes the integration of content, skills, moral values and intellectual growth.

Formulation of the ICSS is in accordance with the objectives of the National Philosophy of Education (Malaysia 1989) which states that:

> Education is an on-going effort towards further developing the potentials of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious.

In line with the general objectives of the ICSS, ICSS science emphasizes the integration of knowledge and science process skills.
Table 1: Percentage of science students in Form 4 in comparison to Arts students.

<table>
<thead>
<tr>
<th>Year</th>
<th>Percentage (%)</th>
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<tbody>
<tr>
<td>1990</td>
<td>24.9</td>
</tr>
<tr>
<td>1991</td>
<td>18.1</td>
</tr>
<tr>
<td>1992</td>
<td>18.4</td>
</tr>
<tr>
<td>1993</td>
<td>19.0</td>
</tr>
<tr>
<td>1994</td>
<td>19.1</td>
</tr>
<tr>
<td>1995</td>
<td>18.7</td>
</tr>
<tr>
<td>1996</td>
<td>18.5</td>
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Source: 'Perangkaan Pendidikan BPPP, Kementerian Pendidikan Malaysia, 1996.

The Malaysian prime minister, YAB Dato’ Seri Dr Mahathir Mohamad, in presenting his working paper on Vision 2020 to convert Malaysia into a fully industrialized nation by the year 2020, also emphasized the development of science, mathematics and technology. It is stated that Malaysians must contribute towards the development of science and technology in the future.

Although the importance of science is emphasized in all national educational programmes and science related vocations are expected to increase in the future, there is still a drastic drop in the ratio of science students.
There are several factors, which are closely related to academic achievement in students. Those are motivation, intelligence, learning environment, teachers’ and parents’ expectations and self-confidence (Lapuran Keciciran, 1973).

At individual level, one’s own expectations and motivation is the key factor influencing diligence and achievement in life. One’s own expectations can be described as intrinsic motivation or as internal locus of control. On the other hand, factors outside of one’s own expectations can be described as extrinsic motivation or external locus of control (Crandall et al, 1965).

Problem Statement

At present, the ratio of students entering the science stream to the students entering the arts stream is only 20:80. There are several reasons why this phenomenon is taking place. Some of the reasons are that students find the science subject difficult to understand, not willing to face the difficulties of the science subject and the limited number of job opportunities (Lee, 1996). However, for Malaysia to become a developed nation, the ratio of 20:80 has to be increased to 60:40.

Studies have shown that younger children of grades three to six expressed a more positive attitude towards science, irrespective of gender (Greenfield, 1996; Harvey and Edwards, 1980). It has also been found girls start off with less motivation and interest science (Meyer, 1961). Therefore, ‘teachers should
pay attention to the fostering of interest and motivation to nurture their potential specialists as well as contribute to future enrichment of the pupils’ lives.’

Studies have also shown that high achievers in science have interest and motivation in science. Thus, achievement and motivation are closely linked (Kempa and Dube, 1974). This is clear indication that motivational factors must be identified early during formal education in order to increase students’ interest and achievement in science. Therefore, students who face difficulty in understanding primary level science may carry it forward to the secondary level; thus resulting in low achievement and reduced motivation.

Research has shown that academic achievement is closely linked to the locus of control (Jamallulail, 1990; Norbaiti, 1987). Students with internal locus of control were found to have better academic achievement compared to students with external locus of control Maznah, 1988; Bustaman, 1996).

Furthermore, girls were found to be more inclined towards internal locus of control than boys (Maznah, 1988). Does this mean that girls are better achievers of science in comparison to boys?

There are several factors affecting students’ orientation of the locus of control. According to Phrase (1976), the difference in the orientation of the locus of control between boys and girls can be influenced by the traditional roles expected of them. Good health, systematic guidance from parents, socio-economic status, location (urban or rural) and pre school education are factors internal locus of control in students.
Students from the Tamil primary schools were found to be low academic achievers in Mathematics (Marimuthu, 1985). The orientation of the locus of control towards external could be a factor contributing to this state. Are the students in this study externals and if they are, is there any correlation to their achievement in science?

**Purpose of the study**

This study is intended to determine the orientation of the locus of control of the year six pupils of a Tamil primary school. Subjects of year six were chosen because they have been exposed to the science subject for two years. Furthermore, they will be exposed to science in the secondary school the following year and the determination of the orientation of the locus of control will help the teachers of the primary and secondary schools to understand their students better.

It is also intended to determine if there is any correlation between the orientation of the locus of control and the achievement in science. This study is done using the IAR (Intellectual Achievement Responsibility) scale. The study is based on the following aspects.

1. To determine the orientation of the locus of control among year six students of a primary school.

2. To determine the correlation between the orientation of the locus of control and the achievement in science among year six students.
Rational of the study

The development and advancement of science and technology is an important factor in moving towards a developed country. A society that is literate in science has to be developed. To achieve this purpose, the Ministry of Education is attempting to increase the quantity and quality of science students.

The sharp fall in the ratio of science students is alarming. If this situation is allowed to continue, there will be a serious shortage of scientists and science related vocations would be seriously short of workers. Research and development in various sectors such as agriculture and industry will be hampered.

Therefore, this problem has to be tackled at the root when students are first exposed to science at the primary level. KBSR science has been implemented after a ten-year lapse. In replacing Man and his Environment or 'Alam dan Manusia', this study is intended to determine the motivational level in science at the primary level.

Although subjective, locus of control is an attitude that exists within an individual. Locus of control is the belief of an individual of his or her ability to control a situation, including achievement in science.

Research questions

This study attempts to determine the correlation between the orientation of the locus of control and the achievement in science among year six pupils. It attempts to answer the following questions:
1. What is the orientation of the locus of control among year six pupils. Are they of internal or external locus of control?

2. Is there any difference in the orientation of the locus of control between the boys and girls?

3. Is there any significant correlation between the orientation of the locus of control and the achievement in science?

4. Is there any difference in the achievement in science between the boys and girls?

With the research questions above as a guide, the following hypotheses are formulated:

Hypotheses 1: There is no significant correlation between the locus of control and the achievement in science of year six pupils.

Hypotheses 2: There is no significant correlation between the orientation of the locus of control and the gender of year six pupils.

Hypotheses 3: There is no significant difference in the orientation of the locus of control between the boys and girls of year six.

Hypotheses 4: There is no significant difference in the achievement in science between the boys and girls of year six.
Importance of the study

The drastic drop in the number of students opting for the science subjects indicates that there is something seriously amiss. Scientific knowledge and skills is one of the factors contributing towards the development of the country and becoming a developed country as foreseen in Vision 2020. According to Fishwick (1988), the economic and social development of a country depends on the quality of science education in the country.

The interest in science education cannot be forced on a student. However, studies have shown that belief in oneself can influence and is closely linked to attitudes in various fields including that of science (Lefcourt, 1983; Bar-Tal and Bar-Zohar, 1977).

Students whose orientation is internal locus of control have been found to be more observant, inquisitive and more skilled at processing information (Lefcourt, 1982). Further studies have also shown that students who are internals are more motivated, have more initiative and are more hardworking in carrying out a task (Bar-Zohar, 1977). In the classroom, students consider themselves to be responsible for their high or low academic achievement.

The locus of control is an important indicator of students' diligence and attitude (Crandall et al, 1965). In the context of the study, attitude determines the level of academic achievement in science. This study enables more information to be obtained especially that of achievement in science in a primary Tamil school and its correlation to the locus of control.
especially that of achievement in science in a primary Tamil school and its correlation to the locus of control.

It is also important that all parties involved in the education system namely teachers, the school administration and the curriculum developers are aware of the influence of the locus of control on students' achievement and motivation. This helps to encourage students to develop a lasting interest in science and hence develop a society that is literate in science.

Limitations

This study, which focuses on the correlation between the orientation of the locus of control and the achievement in science among year six pupils, has certain limitations. Firstly, this study is limited to only students from one class of a rural school. No comparison to urban schools is done.

Secondly the sample size is limited to only 28 students. Furthermore, inter-racial comparison is not done. The subjects are limited to one ethnic group only.