

## CHAPTER 1

### BACKGROUND OF THE STUDY.

#### 1.1 Introduction

Research into ways of improving students' learning and the dimensions in school life which are studied have changed continually as researchers build upon what is already known. In particular, the creation of a better classroom environment has become one of the major concerns of many educators. (Majeed, Fraser and Aldridge, 2001; Margianti and Fraser, 2000; Aldridge, Fraser and Huang, 1999; McRobbie and Ellett, 1997).

Educators often consider a classroom environment important in its own right and influential in terms of student learning. Garafalo (1989) suggests that, 'The nature of the classroom environment in which mathematics is done strongly influences how students view the subject of mathematics, the way they believe mathematics should be done and what they consider appropriate responses to mathematics questions' (p.451).

Can teachers conveniently assess the climates of their own classroom and can they change the environment? What are the determinants that create the dynamics of a classroom? How do they relate to students' outcomes? These questions represent the core of research on classroom learning environments for the past quarter of a century.

According to Lorbach & Jobin (1995), a learning environment is ' a construction of individuals in a given social setting, an individual's ...beliefs about the opportunities each has to learn and the extent to which the social and physical milieu constrain learning' (p.19). Fraser (1986) puts it in a classroom context and defined classroom

learning environment as the 'shared perceptions of students and sometimes teachers in that environment' (p.1).

Classroom environment is somewhat a subtle concept, but investigation of the perception of classroom and its relationship with learning is made possible with the development of several instruments such as the Classroom Environment Scale (CES) developed by Rudolf Moos (Moos & Houts, 1968) and the Learning Environment Inventory (LEI), developed by Herberg Walberg (Anderson & Walberg, 1968), which can assess the psychosocial classroom environment. The psychosocial classroom environment is the psychological and social relationships that exist between students, and between students and their teacher. Over the past quarter of a century, considerable interest has been shown internationally in the conceptualisation, measurement and investigation involving perceptions of psychosocial characteristics of the learning environment of the classroom at the primary, secondary levels and higher level (Fraser, 1994, 1998b; McRobbie & Ellett, 1997). The initial instruments profiling a few dimensions of the classroom have been trialed, refined and expanded to more scales and pioneered the development of subsequent instruments measuring learning environments that are used internationally to study perceptions of classroom in various areas of classroom environment measures.

The strongest tradition in the past research using the classroom environment instruments is the associations between students' cognitive and affective learning outcomes and their perceptions of psychosocial classroom environment. It was found that class environment has salient effect on achievement (Fraser, 1998a; Fraser & Fisher, 1982). Cheung (1993) using multilevel analysis investigation of the learning

environment contributed significant insights that could explain why Hong Kong students were found to rank highly in achievement in physics, chemistry and biology in international comparison.

Research on the learning environments can be both descriptive of the classroom and also potentially predictive of student learning. Wong and Watkin (1996) in their study of Hong Kong mathematics classroom with 356 secondary school students suggested that by creating an atmosphere close to student preference, a high-monitor student would perform better. Majeed, Fraser and Aldridge (2001) in their study of mathematics classrooms in Brunei Darussalam supported earlier research suggesting boys and girls hold different perceptions of the same classroom learning environments. Their study had provided practical implications about how to change mathematics classroom environments in order to enhance learning.

Franke (1997), however, felt mathematics classroom environment 'may not have an impact on students' belief in themselves as much as the implementation of a particular approach to the teaching and learning of mathematics' (p.10). Her contention thus indirectly reveals that mathematics classroom environment consists of a few dimensions that interact with different degree of effects to students' learning mathematics. Her view on the strong role played by the teacher in mathematics classroom is supported by Wong (1996) in her qualitative research on mathematics classroom environment in Hong Kong involving Grade 9 students.

In the local scene, studies on classroom environments have been centred in the science domain. The use of Science Laboratory Environment Inventory (SLEI) can be found in studies done by Lau (1997) and Selva (1997). Lau (1997) found significant

relationship between students' perception of the science laboratory and their science achievement. Selva (1997) found no significant difference in Chemistry achievement between the High and Low Perceptions Groups in her study. Comparatively, very few if any investigations have been reported into the learning environment of the mathematics classroom. Furthermore, there exist a contrast between the dimensions that form the learning environment in a mathematics classroom and a science laboratory in terms of the physical environment and also the nature of mathematics or science as a subject. The findings using SLEI is not very parallel to the dimensions in a mathematics classroom environment.

Many studies have provided consistent and strong support for the predictive validity of students' perception of the classroom learning environment in accounting for appreciable amounts of learning outcome variance' (Fraser & Fisher, 1982, p.499). The practical implication of these finding and the apparent lack of research mainly in secondary mathematics classroom environments in Malaysia warrants a study that could provide some insight regarding students' perception that could be used to improve the mathematics classroom learning environment as students spent a large part of their time in school in the classroom and supposedly, most learning happens within the context of the classroom environment.

## 1.2 Rationale of the study

Falling student achievement in mathematics, as well as students' lack of motivation for learning mathematics (*Bahagian Perancangan & Penyelidikan Dasar Pendidikan*, 1996) is the current prevailing problems in mathematics education in

Malaysia. In addition, the curriculum is examination driven which is encouraging teacher-centred classroom practices (Saw, 1996; Fatimah, 1996; Amir, 1996). Rote learning is the main teaching approach (Agness Voo, 1996). Students, especially the low achieving ones, felt tired of mathematics during mathematics class and bore a negative attitude towards mathematics (Tengku Zawawi, 1997; Raja Sulaiman, 1996). As a foundation for future research and future attempts for reform mathematics education in Malaysia, it is important to have high quality benchline information about the nature and effects of mathematics classroom learning environments. In the provision of evidence that demonstrates the effects on student outcomes, it will provide practical implication for teaching and for school that can be implemented to improve positive student outcomes in mathematics.

Since the late 1960s, educational researchers and evaluators have issued and published more than 200 reports concern students, perceptions of the psychosocial dimensions of their classroom in developed countries. In contrast, in developing countries like Malaysia, analogous classroom environment evaluation has hardly begun. There is an apparent lack of research literature in mathematics classroom environment and this study will attempt to redress the situation. Given this context of mathematics education in Malaysia, it is felt timely to undertake a closer look of mathematics classroom environment.

### 1.3 Purpose of the study

This study focusses on mathematics students, their classroom environments and their cognitive outcomes. Since much of the formal education takes place within the

classroom, research into the scales of classroom environment will hopefully, provide insight to variables affecting students' achievement in mathematics.

The purpose of this study is to describe the strength and the direction of the relationship between the perceptions of students' mathematics classroom learning environment as measured by the 'Personal Form of What is Happening In This Class?' (WIHIC) questionnaire and their mathematics achievement as measured by the Mathematic Achievement Test (MAT).

### 1.3.1 Research questions

In essence, this study is to relate the background characteristics and practices in the mathematics classroom to its educational outcomes. This study was thus conducted, guided by the following research questions

1. What are the students' perceptions of their mathematics classroom environment?
2. What associations exist between students' achievement and their perceptions of their mathematics classroom environments?

### 1.4 Definitions of terms

Definitions of the variables used in this study are either adapted from the previous studies or formulated by the researcher. They are as follows:

#### 1.4.1 The scales of mathematics classroom learning environment

The terms presented in Table 1.1 are the scales of the Personal Form of WIHIC questionnaire as defined by Rawnsley (1997).

Table 1.1

Scales of mathematics classroom learning environment

<b>Scales</b>	<b>Descriptor</b>
Student Cohesiveness	Students show friendship and help each other with their work
Teacher Support	The teacher is friendly, helpful, and supportive and interested in his/her students.
Involvement	Students are involved in questioning, answering and discussing their work
Investigation	Students investigate mathematical problems in a variety of ways to find solutions
Cooperation	Students work cooperatively rather than competitively.
Task Orientation	Students are focused on their mathematics work in class
Equity	All student are treated equally in their work and their class contributions
Emphasis on Understanding	The teacher questions, explain and emphasizes student understanding of work

#### 1.4.2 Mathematics Achievement

Mathematics achievement is defined as the mathematics test scores attained by students in their Mathematics Achievement Test (MAT). The instrument MAT as shown in Appendix B measures this test scores. The MAT consists of forty multiple-choice questions constructed by the researcher based on the current Form Two *Kurikulum Bersepadu Sekolah Menengah* (KBSM) Mathematics syllabus. For each item with the

correct option, a score of one point was awarded. No point was awarded for any questions with the wrong options or omitted by the students.

### 1.5 Significance of the study

This study is to explore if there are any, association between students' perception of their mathematics classroom learning environment and their mathematics achievement. The significance of this study is in the provision of evidence that demonstrates the effects on student outcomes, it might provide practical implication useful and helpful for educational diagnosis, intervention and planning that can be implemented to promote positive learning environment in classroom to enhance students' learning outcomes.

Secondly, this study is significant because it explores the use of the Malay Version of the Personal Form of WIHIC questionnaire that can be used in the study of secondary mathematics classroom environments by other researcher. This is important because by its existence and reported use, it will encourage further research into secondary mathematics classroom environments as currently very limited investigations have been reported into the learning environment of the mathematics classroom in Malaysia. Consequently, this study adds significantly to the body of knowledge regarding the perceptions of the secondary mathematics classroom environment.

### 1.6 Limitations of the Study.

The subjects used are convenient samples taken from only two schools in the same district. The schools are coeducational and located in a sub-urban environment. Groups used were taken from intact classes. It was limited to Form Two students. Thus



the subjects drawn are not representative of the whole population of Form Two students from coeducational schools in Malaysia. Furthermore, the study dealt with only one subject, namely mathematics and excludes all other subjects. Thus, the findings of this study cannot be generalized to the whole population of mathematics students in the country.

The study is also limited by its research method. Survey method using variation types of items such as in the Personal Form of WIHIC questionnaire is subjected to random error for example clerical errors in responding or coding which could affect the reliability of its instrument. Consistent error, for example momentary mood or item wording effect could affect the validity. This study results and discussion is thus based on the assumptions that the responses given by the subject were genuine and that the possible errors were negligible.