CHAPTER 2

REVIEW OF RELATED LITERATURE

2.1 Introduction.

The aim of this study is to investigate students' perceptions of their mathematics classroom learning environment and its relationship to their mathematics achievement. Study of learning environments has a history of almost three decades in other countries, its appearance in the local scene is considered at infancy stage, especially in mathematics education. This chapter reviews literature related to learning environment under the following aspect: historical perspectives, research approaches, development of instruments, associations with students' outcomes, past research profiling classroom and past research using the WIHIC questionnaire.

2.2 Historical perspectives on the field of learning environment

The word 'environment' has many facets of meanings. In the context of classroom, it could be defined as the 'shared perceptions of the students and sometimes the teachers in that environment' (Fraser, 1986 p.3). In general, there are two aspects of the classroom environment, namely the physical environment and the human environment. The physical environment is the material setting of the classroom. The human environment includes the students and teacher in that classroom and their interaction. Therefore, the human environment refers to the psychosocial climate of the classroom. Educational environments can be considered as the social-psychological contexts or determinants of learning (Fraser, 1994). A growing amount of interest within

the field of educational research has been focused on what is described as the classroom-learning environment (Fraser, 1998a; Fraser & Walberg, 1991; Moos, 1979; Walberg, 1979).

The notion that a distinct classroom environment begun as early as the 1930s, when Kurt Lewin (1936) recognized that the environment and its interactions with personal characteristics of individual are determinants of human behaviour. The formula, $B = f(P, E)$ was part of the pioneering work of Lewin (1936) reflecting that human behaviour (B) is a function of the person (P) and the environment (E).

Following after Lewin's work, in 1938 Murray proposed a Needs-Press Model in which situational variables in the environment account for a degree of behavioural variance. He introduced the terms alpha press to differentiate between an environment as assessed by an external observer and beta press for an environment perceived by milieu in habitants. In 1960, Getzels and Thelen put forward a framework for the analysis of the classroom group as a unique social system suggesting that the interaction of personality needs, expectations and environment predicts behaviours, including students' outcomes. Later, Stern (1970) proposed the Person-Environment Congruence Theory on Murray's Need Press Model which states that more congruence between personal needs and environmental press leads to enhanced outcomes. Doyle (1986) pointed that the classroom be viewed from an ecological viewpoint, hence placing strong emphasis on the inter-relationships and communications among all members in the classroom community. Learning activities always are accompanied by interpersonal interaction and interpersonal sentiments.

In 1981, Walberg proposed the Multi-Factor Psychological Theory of Educational Productivity, which holds that students' learning is a function of nine variables: three of students aptitude variables (age, ability, and motivation), two of instructional variables (quantity and quality of instruction) and four of psychological environments (The home, classroom, peer group and mass media environments).

The work of Lewin and Murray has provided a strong theoretical base that has influenced contemporary research into classroom environments. In the late 1960s, two instruments pioneering the use of perceptions to measure the classroom environment were developed. The Learning Environment Inventory (LEI), developed by Herberg Walberg (Anderson & Walberg, 1968), and the Classroom Environment Scale (CES), developed by Rudolf Moos (Moos & Houts, 1968) initiated the development of subsequent instrument measuring learning environments.

2.3 Research approaches used to assess the learning environment

In the past, most common methods for studying learning environments have involved using students' and teachers' perceptions (perceptual approach), or direct observations by external observers (1994, 1998a). The measures used in the perceptual approach are called 'subjective' measures and the other is called 'objective measures'. Fraser (1994) contrasted the use of students' and teachers' perceptions with the method of direct observation for studying classroom environments. While perceptual measures require students and teachers to make a judgement in interpreting classroom events (perceptions of the learning environment), direct observations rely on the external

observer to code systematically classroom communication and events according to some category scheme (frequency counts of certain observed behaviours).

These different approaches have also been categorised as, respectively, and 'high' and 'low' inference measures. Rosenshine (1970) referred to perceptual measures as 'high inference' measures and to direct observation as 'low inference' measures.

Classroom psychological or social environment refers to the climate or atmosphere of the class as a social group that potentially influences what students learn (Walberg, 1991). Because the study of classroom environment is more concerned with the socio-psychological context, or the determinants of learning, using perceptual measures has been the common approach to studying learning environments. Since the classroom environment refers to the less tangible aspects of the context of teaching and learning, it is often inferred by asking students to perceive and rate the psychosocial characteristics of their classroom through sets of questions. These questions typically concern the affective and social relations among the class members, the efficient completion of learning tasks, as well as the implicit and explicit system of rules and organization of the class. These subjective ratings of the perceived classroom characteristics are referred to as "high inference" measures. An example of a high inference measure is asking students to agree or disagree with the statement, "Your teacher is friendly toward you," or "Your teacher likes you."

Fraser (1986) suggested that perceptual measures of classroom environments have the advantages that they are more economical than classroom observation techniques which involve the expense of trained outside observers and that they are based on students' experiences over many lessons, while observational data usually are

restricted to a very small number of lessons. He contrasted further that perceptual measures involve the pooled judgments of all students in a class, whereas observation techniques typically involve only a single observer, students' perceptions, because they are determinants of student behaviour more so than the real situation can be more important than observed behaviours (p.3).

Despite the advantages of perceptual measures, many educators (Fraser and Tobin, 1991; Waxman, Huang and Wang, 1996) argue that classrooms need to be examined with greater sensitivity than that generated from just perceptual approach. It has been accepted that a combination of quantitative perceptual measures with qualitative observation techniques is more desirable for capturing data and providing a more meaningful understanding of the teaching and learning process in a classrooms than if quantitative or qualitative methods were used independently (Fraser and Tobin, 1991).

2.4 Development of instrument used to assess learning environment.

Bloom (1964) considered external stimuli, which can be physical or social, which has impact on an individual, to be the environment of the individual. He proposed " such a view of the environment reduces it for analytical purposes to those aspects of the environment which are related to a particular characteristic or set of characteristics" (Bloom, 1964). For Bloom, analyzing the environment meant analyzing a set or sets of characteristics, which form part of the environment. Since then, a number of instruments have been developed, reflecting a belief in specific determinants of the nature of classroom. The importance of social-psychological

constructs began to gain recognition when trends in psychology of studies merge with trends in observational studies in classrooms. The paradigm shifts in behaviourist psychology to cognitive psychology saw a shift in the view of the nature of student and the role of environment in aiding to their development. However, by the late 1960s and early 1970s, psychology studies recognised that people perceive stimuli in different ways and these perceptions intervene in the learning process. Walberg termed the teaching model based on these as 'Perceptual Model". Walberg (1976) proposed that learning was a function of seven variables. These were the person's age, ability and motivation, the quantity and quality of instruction, and the social psychological environments of the class and the home. He also later included the peer environment and exposure to media. Moos' (1973) early works of examination environment contend that it is desirable that any instrument designed for assessing human environment ensures the coverage of three dimensions: relationships, personal development and system maintenance. The Relationship Dimension involves the nature and intensity of personal relationships within an environment. With this, one can assess the extent in which individuals participate in the environment, and are supportive of, and helpful to, each other. The Personal Development Dimension enables us to assess the basic directions of personal growth and self-actualization. System Maintenance and Change Dimension yields information on the quality of order, expectations, control and responsiveness to change.

Moos and Walberg independently focused their research on the identification and measurement of classroom measurement of classroom environment characteristics. In 1968, based on his previous work in psychiatric hospitals and correctional institutions

Moos developed and refined what has become known as the Classroom Environment Scale (CES), at the same time Walberg developed the Learning Environment Inventory (LEI) in connection and research related to the Harvard Project Physics (Anderson & Walberg, 1968).

The Classroom Environment Scale was used on assessing human environments in a number of social settings including hospitals, prisons, university residences and work milieus. Initially, the CES contained 242 items representing 13 scales. After several trials, the final version of CES was reduced to nine scales with 10 items of True-False format in each scale.

The Learning Environment Inventory (LEI) developed by Walberg in its final version contains 15 scales, with 7 items per scale. The LEI employs a four point Likert-like scale, namely, Strongly Agree, Agree, Disagree and Strongly Disagree.

These two instruments remain in use and have been the basis for development of many trialed extensively, statistically analysed and refined instruments. Inspired by Walberg's and Moos's pioneering work, Fraser and his colleagues developed a number of new learning environment instruments (Fraser, Giddings and McRobbie, 1993; Fraser, Fisher and McRobbie, 1996; Teh and Fraser, 1993, 1995). A summary of 10 instruments, designed to assess the learning environment, is provide in table 2.1.

Table 2.1

Overview of scales contained in 10 Classroom Environment Instruments (LEI, CES, ICEQ, MCI, CUCEI, SLEI, CLES, GCEI, CCEI and WIHIC)

			Moo's Classification		
Instrument	Level	Items /Scale	Relationship Dimension	Personal Dimension	System Maintenance & Change Dimension
Learning Environment Inventory (LEI)	Secondary	7	Cohesiveness Friction Favouritism Cliqueness Satisfaction Apathy	Speed Difficulty Competitiveness	Diversity Formality Material Environment Goal Direction Disorganisation Democracy
Classroom Environment Scale (CES)	Secondary	10	Involvement Affiliation Teacher Support	Task Orientation Competition	Order / Organisation Rule Clarity Teacher Control Innovation
Individualised Classroom Environment Questionnaire (ICEQ)	Secondary	10	Personalisation Participation	Independence Investigation	Differentiation
My Class Inventory (MCI)	Elementary	6-9	Cohesiveness Friction Satisfaction	Difficulty Competitiveness	
College & University Classroom Environment Inventory (CUCEI)	Higher Education	7	Personalisation Involvement Cohesiveness Satisfaction	Task Orientation	Innovation Individualism
Science Laboratory Environment Inventory (SLEI)	Upper Secondary	7	Cohesiveness	Open-endedness Integration	Rule Clarity Material Environment
Constructivist Learning Environment Survey (CLES)	Secondary	6	Critical Voice	Mathematical Uncertainty Negotiation Personal Relevance	Shared Control
Geography Classroom Environment Inventory (GCEI)	Secondary	4	Gender Equity	Investigation Resource Adequacy	Innovation

Table 2.1(Continued)

			Moo's Classification		
Instrument	Level	Items /Scale	Relationship Dimension	Personal Dimension	System Maintenance & Change Dimension
Computer Classroom Environment Inventory (CCEI)	Secondary	5	Satisfaction	Investigation Open-Endedness	Material Environment Organisation
Questionnaire on Teacher Interaction (QTI)	Secondary	8-10	Helping/Friendly Understanding Dissatisfied Admonishing		Leadership student Responsibility and Freedom Uncertain Strict Student Negotiation
What is Happening in this Classroom? (WIHIC)	Secondary	7	Student Cohesiveness Teacher Support Involvement	Investigation Task Orientation Cooperation	Equity

Adapted from Science Learning environments, Assessment, effects and determinants by Fraser B. J. (1998a).

2.5 The associations between students' outcomes and learning environment.

There has been a large number and variety of classroom environment studies completed in various part of the world over the past 30 years (Fraser, 1998a). The strongest tradition in past classroom environment research has involved investigation of associations between students' cognitive and affective learning outcomes and their perceptions of psychosocial characteristics of their classrooms (Fraser and Fisher 1982; Haertel, Walberg and Haertel 1981; McRobbie and Fraser 1993). Numerous research programs have shown that student perceptions account for appreciable amounts of variance in learning outcomes, often beyond that attributable to background student characteristics.

Using the SLEI, associations with students' cognitive and affective outcomes have been established for a sample of approximately 80 senior high school chemistry classes in Australia (Fraser and McRobbie 1995; McRobbie and Fraser 1993), 489 senior high school biology students in Australia (Fisher, Henderson and Fraser 1997) and 1,592 grade 10 chemistry students in Singapore (Wong and Fraser 1996). In Malaysia, Lau (1997) study with 255 science students found positive significant relation between Science achievement and students' perception of Science Laboratory Environment.

Studies such as these provide information to educators and classroom teachers a basis for systematic attempts to improve classroom environment to enhance students' cognitive and affective outcomes. In 1995, Teh and Fraser established associations between classroom environment, achievement and attitudes among a sample of 671 high school geography students in 24 classes in Singapore using an instrument suited for computer-assisted instruction classrooms (CCEI).

Using the QTI, associations between student outcomes and perceived patterns of teacher-student interaction were reported for samples 3,994 high school science and mathematics students in Australia (Fisher, Fraser and Rickards 1997). In Goh, Young and Fraser's (1995) study with 1,512 grade 5 mathematics students in 39 classes in Singapore, scores on a modified version of the MCI were related to student achievement and attitude. In this study, multiple regression analysis involving the modified version of the MCI scales showed that Friction was a significant independent predictor for mathematics achievement. The study suggested that a lesser amount of friction in the class was related to higher achievement mathematics.

Meta-analysis of findings from prior research involving 734 correlations from 12 studies involving 823 classes, eight subject areas, 17,805 students and four nations (Haertel, Walberg and Haertel 1981) found consistent and strong association with cognitive and affective learning outcomes. In particular, better achievement on a variety of outcome measures was found consistently in classes perceived as having greater Cohesiveness, Satisfaction and Goal Direction and less Disorganisation and Friction.

Wong (1993, 1996) used qualitative methods involving open-ended questions to explore students' perceptions of the learning environment in Grade 9 mathematics classrooms in Hong Kong. This study found that many students identified the teacher as the most crucial element in a positive classroom learning environment. These teachers were found to keep order and discipline whilst creating an atmosphere that was not boring or solemn. They also interacted with students in ways that could be considered friendly and showed concern for the students. Influenced partly by the CES, Wong (1993) developed a 54-item questionnaire to assess the actual and preferred environment of classes in Hong Kong along the dimensions of Enjoyable, Order, Involvement, Achievement Orientation, Teacher Led, Teacher Involvement, Teacher Support and Collaborativeness.

2.6 Past research profiling classroom learning environment.

The profile of a classroom-learning environment is the pattern of the mean scale scores. There have been three common ways in which class profiling has been used in research for class environment.

The first involved the use of Actual and Preferred forms of instrument. The item wording of these two forms are almost identical but it differs in perspective. Profiles of classrooms using these two forms consistently show higher ratings for the preferred environment (Fraser, 1986; Moos and Trickett, 1987). The difference between the two sets of results can be the basis of intervention treatment by the teacher.

A second way of profiling the classroom environment is to include the teacher's perspective (Wong and Fraser, 1996). However, a discrepancy often occurs when teachers and students profile the same classroom environments. Early in their research Moos and Trickett noted that teachers consistently see their classes in a more favourable light than do their students.

Using the ICEQ with a sample of 116 classes for the comparisons of student actual with student preferred scores and a sub-sample of 56 of the teachers of these classes, Fisher and Fraser (1983a) investigated the differences between students and teachers in their perceptions of the same actual classroom environment and of differences between the actual environment and that preferred by students or teachers. The study reported students preferred a more positive classroom environment than was actually present for all five ICEQ dimensions. Also, teachers perceived a more positive classroom environment than did their students in the same classrooms on four of the ICEQ's dimensions.

A third and more recent way of profiling classrooms is through the use of Personal and Class Forms of classroom environment instruments. These two forms of the instrument are identical except for the focus of each statement. The Class Form focuses

on student's perception of the environment, whereas the Personal Form focuses on a student's perceptions of his or her own interaction with the learning environment.

Fraser and Tobin (1991) initiated the use of a Personal Form of the classroom environment stressing that it would be useful as a measure of students' perception of their specific interaction with the classroom-learning environment. They also suggested that it would be more useful than the Class Form for exploring sub-population amongst students. For example, the Personal Form was anticipated to be more useful in determining the views of sub-populations such as those of female and male students because it measured students' perceptions of their specific, and individual, interaction with the learning environment rather than students' perceptions of class's interactions.

The use of the Personal Form and Class Form was implemented in the Science Laboratory Environment Inventory (SLEI) developed by Fraser, Giddings & McRobbie, 1995) to measure the distinct of the science laboratory.

Then, in 1996 Fraser, Fisher and McRobbie developed the 'What is Happening In This Class?'(WIHIC) questionnaire; more suited for a general classroom situation, which also has a separate, Class Form and Personal Form. Administration of the WIHIC questionnaire followed by interviews with 45 students showed that many students have perceptions from the perspective of the class as a whole that differ from their perceptions of their personal role within the classroom (Fraser, Fisher and McRobbie 1996). Underlying many of the responses was the idea that, because the individual student is only part of the class, interactions with an individual student (Personal form) are less frequent than the interactions with the class as a whole (Class form).

The original version of WIHIC consists of 9 scales, each with 10 items. It was fine-tuned to form the second version, which contains 80 items in eight scales. Rawnsley (1997) in his study adapted it to suit secondary mathematics students involving 490 Grade 9 students in 23 classroom in 14 schools in Adelaide, Australia and, trialed the instrument and found the Autonomy scale difficult for the grade 9 mathematics students. This according to Rawnsley (1997, p. 67) is because the nature of mathematics classes is such that work is more sequential than in may other subjects and generally are not autonomous in their learning. Further discussion also showed that the students found a greater teacher dependency in mathematics and that some Autonomy items did not seem relevant to them. On the basis of the discussion with the students and the need to shorten the instrument, the Autonomy scale was removed and this improve the internal consistency of the instrument. A sample item in the autonomy scale, which was removed, is given in Table 2.2.

Table 2.2

Sample item in Autonomy scale

Scales	Item
Autonomy	Students have a say in how class time is used

Also, two items in each scale, which had the lowest correlation with the other items, were deleted to meet the practical requirement of shortening the length of the

questionnaire. The final instrument in both the Personal and Class Form consisted of eight scales, each with eight items (Table 2.3).

This study will use the Personal Form of 'What is Happening in this class?' WIHIC questionnaire modified by Rawnsley (1997). It is noteworthy to mention that at the time of this study, the original WIHIC questionnaire has also been refined by Aldridge & Fraser (2000) using students from science classes to consist of seven scales, 54 items. The scale Emphasis on understanding has been removed. However, the decision to use Rawnsley's mathematics class version of WIHIC Personal Form with eight scales was maintain for the reason that, this study has parallel characteristics to his study in terms of subject matter and the student's age. Furthermore, the researcher, based on her 18 years of teaching experience in mathematics is highly certain that this scale is very relevant and significant to mathematics students in a Malaysian classroom.

Table 2.3

The scales and sample items from the Personal Form and Class Form of WIHIC Questionnaire

Scale	Scale Descriptor	Personal Form Sample Item	Class Form Sample Item
Student cohesiveness	Students show friendship and help each other with their work	I do favours for members of this class	Members of this class do favours for one another
Teacher support	The teacher is friendly, helpful, supportive and interested in his / her students	The teacher takes a personal interest in me	The teacher takes a personal interest in students.
Involvement / negotiation	Students are involved in questioning, answering and discussing their work	My ideas and suggestions are used during class discussion	Students' ideas and suggestions are used during class discussions.
Investigation	Students investigate mathematical problems in a variety of ways to find solutions.	I carry out investigations to test my ideas.	Student carry out investigations to test their ideas.
Cooperation	Students work cooperatively rather than competitively.	I cooperate well with other class members.	Students cooperate well with other class members.
Task orientation	Students are focused on their mathematics work in class.	I am ready to start this class on time.	Students are ready to start this class on time.
Equity	All students are treated equally in their work and their class contributions	The teacher is as friendly to me as to other students.	The teacher is equally friendly to all students.
Emphasis on Understanding	The teacher questions, explains, and emphasizes student understanding of the work.	The teacher's questions help me to understand.	The teacher's questions help students to understand.

Adapted from 'Associations between classroom learning environments, teacher interpersonal behaviour and student outcomes in secondary mathematics classrooms' by Rawnsley, D. G. (1997). p. 70

2.7 Past research using the WIHIC questionnaire

Fraser (1998b) described research on learning environments as being both descriptive of the classroom and potentially predictive of student learning. Past research

using WIHIC have seen it as a good tool to evaluate programs outcomes (Teh & Fraser, 1994). The instruments have also been used as independent variables to address associations between the classroom environment and dependent variables such as student' attitudinal and cognitive outcomes. Because the "What is Happening in this class?'(WIHIC) questionnaire was used in the present study (see chapter 3); past studies using WIHIC are of particular relevance.

Fraser, Fisher and Mc Robbie (1996) developed the 'What Is Happening in This Class? (WIHIC) questionnaire, a new general-purpose classroom environment instrument, to address contemporary issues in education such as equity and meaningful learning. It has been shown that the instrument is reliable and valid. Originally, the instrument had nine scales with each scale containing 10 items. As with many previous instruments, it employs a five-point response format Almost Never, seldom, Sometimes, Often, and almost always). In Taiwan, the WIHIC has been translated into Mandarin and validated for use using a sample of 1,879 students in 50 junior high school science classes (Aldridge, Fraser and Huang, 1999). Aldridge & Fraser (2000) cross-validated WIHIC with an Australian sample of 1,081 students in 50 junior high school science classrooms who responded to the equivalent English version, this led to final form of WIHIC containing the seven eight-item scales, namely, Student Cohesiveness, Teacher Support, Involvement, Investigation, Task Orientation, Cooperation and Equity.

Adapted and translated versions of WIHIC has also been cross-validated with 2,310 high school geography and mathematics students in Singapore (Chionh and Fraser, 1998) and 644 high school students from 35 chemistry classes in Brunei (Riah and Fraser, 1997). Riah and Fraser established the factorial validity of the WIHIC and SLEI in Brunei. The

study also supported the notion that classroom environment instruments developed originally in Western countries can be reliable and valid for use in different cultural settings. Reported associations between the learning environment and student's outcomes for most scales were found in these studies have replicated those of past research. These studies provide insights and practical suggestions to educators and school administrator regarding classroom environment dimensions that could be changed in order to improve student's learning outcomes.

The past research reveals that WIHIC has been extensively trialed with science students. Other than Rawnsley (1997) study with mathematics students in Australia, and Margianti study in Indonesia, research in mathematics classroom using WIHIC questionnaire and other learning environment instrument is still unsaturated. In Singapore, Chionh and Fraser (1998) investigated the relationships between classroom environment and the learning outcomes of achievement, attitudes and self-esteem among geography and mathematics students using the WIHIC. When compared, both groups of students revealed had almost similar general perceptions of their learning environments. However, better examination scores were found in classrooms perceived as more student cohesiveness, whilst attitudes and self-esteem were more favourable in classrooms perceived to have more teacher support, task orientation and equity.

Rawnsley (1997), in his study with Grade 9 mathematics students found students
ated significantly higher perceptions of Student cohesiveness, Task orientation,
and equity but significantly lower perceptions of Teacher support,
ation and Emphasis on understanding. By sub-profiling the population
accor
significant differences on four scales (Cohesion, Teacher

Support, Cooperation and Equity). In each instance where male and female students had significant differing perceptions, female students viewed the environment more favourably. Male and female students perceived Task orientation and Investigation similarly. Higher cognitive achievement occurred in classes where students perceived a strong emphasis on understanding of mathematics. His study also found students displayed the most positive attitudes in classes, which students perceived a highly supportive mathematics teacher who is equitable, placed high emphasis on understanding the work and involved the class in high levels of investigative activity. Students in such classes also saw themselves as being very involved and cohesive in class. Cooperation scale was found to correlate negatively with attitudes suggesting more positive attitudes are found in classes with a small amount of competition.

Margianti (2001) used modified version of WIHIC in her study involving 2,498 University computing students in Indonesia. For her study, she used the refined 7 scales WIHIC but replaced the Investigation scale with the Order and Organisation scale. The results of the simple correlation analysis suggest a statistically significant association between mathematics achievement and four of the seven learning environment scales, namely, Student Cohesiveness, Order and Organisation, Task Orientation and Equity.

2.8 Summary

The major aim of this chapter was to review literature on the study of classroom learning environments. An overview of the field from the historical perspective and paradigm shift of psychology perspectives leading to a constantly improved measures and instruments to detect the nuances that prevails in the classroom environment. The review

indicated that learning environment research provides a new lens through which teaching and learning can be viewed and observed to provide insight and deeper understanding of the nature of the learning environment in classroom settings from both students' and teachers' perspective.

The literature reveals consistent associations between outcomes and dimensions of learning environment and suggests that learning assessments should be used to provide subtle but important information regarding the dynamics of a classroom and feedback should be used to improve the quality of learning environment. In their study of mathematics learning environment, Rawnsley (1997) and Margianti (2001) had found associations between mathematics learning environment and student's outcomes in their respective countries.

The review also, brought up a concern as what have been disclosed shows an apparent lack of studies in mathematics learning environment as compare to science learning environment. This concern is that despite the compulsory nature of mathematics in most countries including Malaysia, and its importance in society, little research has been carried out in the mathematics classroom to address the nature of classroom environment or its association with student outcomes.

This concern is addressed in the present study, which will use the Personal Form of WIHIC based on Rawnsley's study (1997) in exploring associations between student outcomes and the mathematics classroom environment. The present study involves first, the translation of WIHIC into *Bahasa Melayu* that is the Malay Language. The translation and validation of the WIHIC the use in this study in Malaysia at the secondary level are described in details in chapter 3 and 4.