CHAPTER TWO

LITERATURE REVIEW

This chapter reviews the relevant research work done thus far by other authors in the area of investigation. As mention by Sekaran (2006), the purpose of the literature survey is to identify and highlight important variables and document the significant findings from earlier research that will serve as the foundation on which the conceptual model for the current investigation can be built and developed. During the literature review process, a number of books, articles and Government documents (Non-Secret) had been studied by the author in order to provide facts to support the thesis of the paper.

2.1   Concept and Variables

Based on the research issues and objectives discovered in Chapter 1, several concepts were identified with the explanation of G*ender Perspective Attitudes and Beliefs of Malaysian Army on IT*. The common factors cited in previous research are, gender, age, other demographic perspective, value of IT, impact of IT and user comfort level on IT. The following discussion will explore all the literature related to that concept which determines the variables to be used in this research.

2.2   Status of Characteristics

Status characteristic is the individual's characteristic such as gender, age, skills, and experience. The possession or expected possession of status characteristics is relevant to performance output, and outcome states. For example, if males are expected to do better in mathematics, then the status characteristic, gender, is relevant to expectations of mathematical ability. In general, "if a set of states possessed by the actors is relevant to the outcome states in the situation or is a basis of discrimination in the situation, these states and those that are strictly relevant to the immediate situation will become salient" (Berger, Ridgeway, and Zelditch, 2002:164).

2.3   Theory Perspective

A theoretical perspective potentially useful in explaining students' gender as it relates to their perceptions of technology use in teaching is Expectation States Theory. This theory lays the groundwork for discussing how performances, social interaction, and definitions of situations can impact perceptions. Applying Expectation States Theory enables us to relate findings on individuals to a broader sociological phenomenon. The theory suggests that individuals develop expectations on the basis of their own status characteristics. The individual status characteristics, which were also used as the dependent variable in this research, include students' gender and their perception of technology.

2.4   Issues of Gender Gap

The issue of the gender gap in IT has caught the attention of many researchers almost two decade ago and as a result, numerous studies have been conducted to study the extent of this gap (Margolis & Fisher, 2002). The earliest research that examined attitudes toward computers was conducted by Lee (1970). He identified two dimensions of attitude:

(1)   Beliefs in the computer as a beneficial tool and;

(2)   Beliefs that the computers are autonomous.

Lee conclusion has been supported by Men's and Women's Attitudes toward Computer Technology: A comparison by Cancro & Slotnik (1970) and Gardner, Young, & Ruth (1989) was supportive of this Lee (1970) hypothesized that lower autonomous entity attitude scores would result in an increase in computer use which would in turn result in higher beneficial tool attitudes. He concluded that the driving factor in determining computer use was beneficial tool attitude. This finding can be extended to an explanation of the attitudinal processes involved in the introduction to all forms of technology. Individuals are likely to be apprehensive when they meet any new technology. As they familiarize themselves with it and adopt it, they realize its inherent utilitarian value.

As early as the 1980s, studies had reported that females exhibited more negative views and perceptions towards the use of computers than males (Dambrot, Watkins-Malek, Silling, Marshall & Garver, 1985; Koohang, 1987). Studies reported in the literature over two decade ago suggested that gender has had a mediating effect on attitudes and perceptions towards IT but it is important to note that IT was an adequate term then when computers were mostly used for mathematical and word processing tasks but today, computers are being used in various facets of life (Mitra, Lenzmeier, Steffenmeirer, Avon, Qu & Hazen, 2000).

The integration of computers and IT into the education system has greatly influenced the mindset towards IT. Hence, although the literature shows that extensive research related to gender and attitudes towards IT has been carried out over the years; such findings may be irrelevant today because of the ever expanding nature of IT. Mitra et al. (2000) stressed that the aspect of gender has remained relatively constant as an independent variable in determining the levels of learning, attitudes and the use of computers. In fact, a review of existing literature reveals that gender disparity in attitudes still exists among undergraduate students in higher institutions of learning.

In the different perspective, several scholars have argued that males and females come from two distinct sets of experiences, and therefore, gender may make differences in their expectations and perceptions. Although change has occurred, it is still the case that males and females grow up and are socialized

differently (Bandura, 1965; Basow, 1995; 2000). The differences in socialization of the genders influence many aspects of their lives, from their interactions with each other to their choice of majors when they enter college. For example, the study by Houtz and Gupta (2001) found significant gender differences in the way females and males rated themselves in their ability to master technology skills. Even though both genders were positive about their technological ability, males rated themselves higher than females.

In another study, Shashaani and Khalili (2001) reported that female undergraduate students had significantly lower confidence than males when it came to their ability to use computers. Females also reported feeling helpless, nervous and uncomfortable around computers. Both genders, however, viewed computers as a useful tool and equally believed that computers had positive effects on individuals and society. Consistent with earlier studies (Houtz & Gupta, 2001; Shashaani & Khalili, 2001; Margolis & Fisher, 2002), Liaw's study (2002) had also indicated that males had more positive perceptions towards computers and Web technologies than females. Dorup (2004), in a study of undergraduate medical students in Denmark, found that most students had access to computers at home as well as used email and the Internet regularly. In addition, Dorup (2004) found that males had more access to computers at home, and held more favorable attitudes towards the use of computers in their medical studies compared to females. A small proportion of students reported that they would

prefer not to use computers in their studies. Males were also significantly more inclined to replace traditional teaching activities with better ICT resources.

A recent study by Broos (2005) also found significant gender differences – favoring males in terms of attitudes toward new communications technology, the extent of computer use and self-perceived computer experience. Even when females perceived themselves as being more competent in using computers, they expressed higher computer anxiety levels compared to males. Enoch and Soker (2006) examined students' use of web-based instruction at an open university. They found that there had been a continuous increase in use of the Internet for both female and male students. However, the differences between the two gender categories were still significant and quite large. Male students were more likely to use web-based materials as an addition to the printed materials. Although they may not provide conclusive evidence of specific gender disparity, all the abovementioned studies, which were carried out among high school or undergraduate students except for Broos (2005), indicated that gender disparity in the use of IT for educational purposes existed to a certain extent. This is definitely a cause for concern as IT is considered a crucial tool for effective teaching and learning in most curricula.

In the study on gender attitudes in adoption of education technology, George Zhou & Judy Xu (2007) found that gender differences were significant for three barriers: unstable hardware or software, not enough training opportunities, and

limited research evidence. In regard to the motivations, females were more likely to consider "I don't want to fall behind my colleagues who use computers in teaching" as a significant motivator. In other words, females were more likely than males to take pressure from colleagues as a significant motivator for their use of technology.

However, contrary with many other research mentioned about, Charles, Sormunen & Thomas (1999) in their study of gender differences in following issues: *(1) the value of technology in making users more productive, (2) the impact of computer technology on people and their work environments, and (3) the relative comfort of men and women when using computers.* They found that females are more positive about computers than males. The differences are significant for all three research area. Not only do women regard the value of computer technology as a way to simplify tasks and to increase productivity, but it also presents evidence to support the belief that women have become more comfortable with technology, removing a stumbling block to opportunities related to technology.

Consistent with the above study, Kirkpatrick and Cuban (2000) in the study of gender differences argued that the effect of gender in access, use, attitudes, and achievement with computers is changing. They stated that both female and male students will have similar experiences if they have the same amount and type of opportunities and achievements. Tsai, Lin and Tsai (2001) reported similar

results in their study which showed no significant gender differences in the perceived usefulness of the Internet. Anduwa-Ogiegbaen and Isah (2005) in his studies on extent of faculty members' use of internet in the University of Benin, Nigeria; did not find any significant difference between male and female faculty in their internet usage.

2.5   Experience

The debate on gender disparity in IT has also been documented by several researchers who recognized the importance of other variables, such as students' computer experiences, socioeconomic status and age, in explaining gender differences. In the case of students' computer experience, Chen (1985) in his studies on *Gender and Computers: the Beneficial Effects of Experience on Attitudes* found that females and males responded with similar levels of interest toward computers when they possessed similar amounts of *160 student's* computer *experience*.

Shashaani (1997) provided further evidence that computer attitudes and related experience were reciprocally related. Shashaani (1997) revealed that students who were more knowledgeable in computers had used computers more frequently and had greater access to home computers. They were also more interested in computers and had more confidence working with them. This suggests that the discrepancy between male and female attitudes can be

reduced to a certain extent if computer experience is controlled (Shashaani, 1994a; 1997).

Previous computer experiences and attitudes toward computers is an important individual characteristic that students bring to the classroom. This characteristic relates to students' expectations and in turn relates to student perceptions of using technology in the classroom. Generally, the skills and experiences that students bring into the classroom do make a difference. Students' technological background may impact students' expectations and perceptions of using instructional technology. According to Necessary and Parish (1996), Salameh (1993), unequal access to technological sources outside the classrooms, influence students' perceptions of use of technology. Those who have had previous experience with computers had more positive perceptions of technology. Reynolds and Rucker (2002) also found that those who had positive experiences with computer and related technological tools developed positive perceptions toward technology; those who lacked experience or had negative experiences with technology would likely develop negative attitudes.

Kadijevich's (2000) study found that males exhibited more positive attitudes toward computers than females even when computer experience was controlled. This means that such experience does not necessarily have a mediating effect on computer attitudes. Most of the early studies revealed that computer experience played a role in narrowing the gender gap while other studies

indicated that such experience might be gender-based. Broos (2005), for instance, found that prior computer experience would only have a positive effect for males. More experienced male users showed greater positive attitudes toward IT while females with equal computer experience reported having computer anxiety. Todman (2000), on the other hand, found that the reduction in computer anxiety for males was more apparent over time than in the case of females.

In the study of gender, internet and computer attitudes and experiences, Schumacher and Morahan Martin (2001) argued that females have less overall experience with computers, and are more likely than males to have negative attitudes towards computers. These authors found that there were significant differences between males and females in computer experience and attitudes towards computers. It was found that males were more likely to take high school courses requiring computer use, and reported higher skills in applications such as programming, games and graphics. Males were perceived to be more experienced and reported higher skills level with the use of the Internet, except for email, than females. Davis and Davis (2007) reported that no statistically significant difference was found on overall perception of computer competence based on gender studies on the use of computers by males and females in workplace and household settings have told a similar story. Earlier studies revealed that, in general, women seem to have less experience with computers and tend to be less skilled in the use of computers (Harrison & Rainer, 1992).

In the study on gender differences in attitudes among student teachers at University Putra Malaysia (UPM), Malaysia, Wong & Hanafi (2007) during their prior research has also found that experience in using IT can influence attitudes toward the usage of IT, this study also assumed that there would be a significant difference in such attitudes of student teachers before and after their completion of a discrete IT course.

2.6   Age and Socioeconomic

In the study of gender perspective attitudes and beliefs on IT, socioeconomic status and age are also important variables to consider. Shashaani (1994b) found that socioeconomic status, as indicated by parents' occupations and incomes had a significant influence on students' attitude towards computers. Students from families with higher socioeconomic status were found to have more positive computer attitudes than those from families with lower status (Shashaani & Khalili, 2001). It can be assumed that those from the higher socioeconomic end are more likely to have a computer at home or have better opportunities of gaining access to one. Brunner and Bennett (1987) and Ratt and deVries (1985) found that young women often feel they are not suited for technological careers because they are not whole-heartedly "for" technology. Canada and Brusca (1991) discovered males expressed more interest in computers, less anxiety about mastering computers, a stronger belief that

computer skills lead to respect from parents and peers, and a stronger belief that women cannot be as skilled with computers as men

In terms of age, studies have also found gender differences in attitudes in younger individuals and the differences increase among older individuals (Kirkpatrick & Cuban, 1998; Jennings & Onwuegbuzie, 2001). Kraut et al (1998) found that Internet usage was higher among older persons, compared with younger persons. Most but not all studies have found that gender differences in attitudes and behavior are relatively small at younger ages but increase as students become older. (Hattie & Fitzgerald, (1987); Kirkpatrick & Cuban, (1998); McCormick & McCormick, (1991). Twelfth-grade girls in Canada and in China showed a decline in computer attitudes when compared to eighth-grade girls. However, Ramayah and Jantan (2003) found that age was negatively related to Internet and computer usage where younger students were more likely to use these facilities.

Overall, previous findings regarding age differences in Internet and computer usage tended to be mixed. Another study found gender differences in age which were due more to computer experience than to age (Dyck & Smither, 1994). On the whole, however, effect sizes in studies on age were larger for older students than for younger ones. Morris, Venkatesh, and Ackerman (2005) studied over a half year the reactions and use behaviors among 342 workers being introduced to a new computer application. They found that gender effects in individual

adoption and use of technology differed based on age. These studies are, however, inconsistent with the study by Lau and Ang (1998) and Roussos (2007) who found that age had no significant relationship with attitudes towards computing.

Specifically, gender difference in technology perceptions became more pronounced among older worker, but a unisex pattern of results emerged among younger workers. Ono and Zavodny (2005) conducted a comparative study between USA and Japan. They found that there were significant gender differences in computer and internet usage in both countries during the middle 1990s. By 2001, these gender differences had disappeared in the US but persisted in Japan. However, controversy exists in regard to the recently reported smaller gender differences. Some recent studies still document fairly visible gender differences. Gay G, Sonia, Dwayne, Philmore A, and Peter G. (2006) study found out and recommended that academicians and course administrators pay more attention to gender and age differences regarding the use of ICT resources as a major component in classroom teaching. This should serve to attract greater support for ICT and e-learning among all categories of students.

2.7   Comfort Level

Some studies found that males' and females' confidence in their computer ability was equal (DeRemer, 1990; Dyck & Smither, 1994; Houle, 1996; Jennings,

Susan & Onwuegbuzie, 2001), but most found females' confidence level significantly lower than that of males even when females were more successful than the males in the class. Girls had lower confidence in their computer skills in studies conducted in Hong Kong (Lee, 2003), Australia (Lee, 1997; Ring, 1991) & New Zealand (Selby, 1997). By and large, studies found that females' comfort level with computers increases (and anxiety decreases) with experience. Several prior studies that examined the relationship of computer confidence with masculinity or femininity as measured by the Bem Sex Role Inventory, and all five studies agreed that positive computer attitudes correlated with high masculinity for both males and females, not with maleness *per se*. (Brosnan, 1998a, 1998b; Charlton, 1999; Colley, Gale, & Harris, 1994; Ogletree & Williams, 1990).

In a study by Bame, Dugger, deVries, and McBee, (1993), 60 percent of males thought they would chose a technological profession while 66 percent of females said they would not seek a technological career. Males are more interested in pursuing an IT or technology career than their female peers (Houtz & Gubta, 2001; Ratt & deVries, 1985) even though girls believe that technological fields are appropriate for both genders (Ratt & deVries, 1985). Furthermore, males also felt more confident in their ability to acquire the necessary technology skills (Houtz & Gubta, 2001).

Margolis and her colleagues have explored computer interest in several studies, finally concluding that in the "nexus of confidence and interest" (Margolis, Fisher & Miller, 2000), a female's loss of confidence in her computer abilities precedes a drop in her interest in computers (Margolis & Fisher, 2000). In many studies boys invariably saw computers and computer skills as male-associated; females differed, seeing them as male or neutral or, in a few cases, female. Thompson and Lynch, (2003) reported that, compared to women faculty, men were significantly more likely to express confidence in their ability to organize and execute courses of internet actions.

2.8   Definition

2.8.1 Information Technology (IT).

IT, as defined by the Information Technology Association of America (ITAA) is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." Encompassing the computer and information systems industries, information technology is the capability to electronically input, process, store, output, transmit, and receive data and information, including text, graphics, sound, and video, as well as the ability to control machines of all kinds electronically. IT is comprised of computers, networks, satellite communications, robotics, videotext, cable television, electronic mail ("e-mail"), electronic games,

and automated office equipment. The information industry consists of all computer, communications, and electronics-related organizations, including hardware, software, and services. The completing of tasks by using IT results in rapid processing and information mobility, as well as improved reliability and integrity of processed information.

According to Kirk, Jackson, Walter & Jacquelyn (2003), IT is a concept describing all aspects of managing and processing information. IT careers are based on computer technologies, the Internet, and networks concerned with creating, analyzing and accessing data for decision-making and problem solving. Information tools, such as personal computers and the Internet, are increasingly critical to economic success and personal advancement. The IT workforce is not just computer engineers and programmers, but individuals with a high skill level in information technologies. From an educational standpoint, IT has an effect on how people learn, what people know, and where people obtain knowledge and information (National Science Foundation, 2000).

2.8.2 Attitude

An attitude is a hypothetical construct that represents an individual's degree of like or dislike for an item. Attitudes are generally positive or negative views of a person, place, thing, or event; this is often referred to as the attitude object. People can also be conflicted or ambivalent toward an object, meaning that they

simultaneously possess both positive and negative attitudes toward the item in question. An attitude is made up of three components: cognition, affect, and behavior (S. L. Crites, Fabrigar, and Petty; 1994). The cognitive component of an attitude refers to his beliefs, opinions, knowledge, or information held by a person. The belief that "discrimination is wrong" illustrates cognition. The affective component of attitudes is the emotional or feeling part of an attitude. The behavioral component of an attitude refers to an intention to behave in certain way toward someone or something.

Fishbein and Ajzen, (1975) refer to an attitude as a learned predisposition to respond in a consistently favorable or unfavorable manner with respect to a given object. An individual should already have knowledge and exposure to the innovation's existence. From that stage, individuals must be persuaded to form either a favorable or unfavorable attitude toward the innovation. In developing this attitude, individuals may mentally apply the new idea to their present or future situation before deciding whether or not to accept the innovation (Rogers, 1995).

According to Ajzen, (1998), affect is related to the evaluation of and the feelings toward the attitude object while cognition reflects the perception of and information about the attitude object and lastly behavioral or behavioral intention are commitments, and actions toward the attitude object. The search of the literature did not reveal any study that defined clearly the meaning of attitudes

toward IT. There were, however, several definitions related to attitudes toward computers in the literature. Because computer is a part of IT, the author thought that it would be worth while to look at these studies.

Attitudes may also not be converted into action because communication channels used to help adopters make their decision are not utilized effectively. Numerous studies report attitudes towards computers and technology careers, which are a vital component of the IT picture. Having an understanding of students' knowledge and attitudes are necessary and a prerequisite to effective teaching about technology (Bame, Dugger, deVries, & McBee, 1993). However, it may be difficult for students to express their attitude towards technology because they may have neither an accurate nor a complete knowledge of such technology.

Kay (1993) and Selwyn (1997) proposed four subscales of computer attitudes. The subscales measured affection (how an individual feels towards computers), perceived usefulness (the extent to which an individual believes using computers will enhance job performance), perceived control (perceived ease or difficulty of using computers) and behavior (behavioral intentions and actions with respect to computers). Volman and Eck (2001) have pointed out that gender differences in computer attitudes are both a cause and a consequence of gender differences in ICT participation and performance.

Schumacher and Morahan- Martin (2001) found that in general, men tend to have more favorable attitudes toward computers. Ong and Lai (2006) surveyed 156 employees from six international companies in Taiwan and found that men's rating of computer self-efficacy, perceived usefulness, perceived ease of use, and behavioral intention to use e-learning are all higher than that of women. In the study of human behavior, Reynolds and Rucker (2002) found that those who had positive experiences with computer and related technological tools developed positive perceptions toward technology; those who lacked experience or had negative experiences with technology would likely develop negative attitudes. Thus, positive past experience with technology, generally orients users to a higher expectation. Nelson (2005) findings show that Malaysian women entrepreneurs' adoption of computer technology is driven directly by their perception of the system's usefulness and indirectly (via perceived usefulness) by perceived ease of use. Women entrepreneurs in this study deem easy to use systems as useful systems and in turn adopt.

2.8.2.1 Attitude and Consistency

Research has generally concluded that people seek consistency among their attitudes and between their attitudes and behavior (A. J. Elliott and Devine, 1994). This means that individuals try to reconcile differing attitudes and align their attitudes and behavior so they appear rational and consistent. When there is an inconsistency, individuals will take steps to make it consistent either by

altering the attitudes or the behavior or by developing a rationalization for the inconsistency. For example, a friend of has repeatedly argued that she think joining a sorority is an important part of college life. But then she goes through rush and doesn't accepted. All of a sudden, she's saying that sorority life isn't all that great.

2.8.2.1   Attitude Survey

Many organizations regularly survey their employee about their attitudes (B. Fishel, 1994). Typically, attitude surveys consist of a set of statements or questions that ask employees how they feel about their job, work conditions, supervisors, or the organization. Manager can get valuable feedback on how employees perceive their working conditions by using attitude surveys on a regular basis. The regular use of attitude surveys, therefore, can alert the top management to potential problems and employees' intention early enough to do something about them (A. Kover, 2005). Manager should be interested in employees' attitudes because they influenced behavior. Cognitive dissonance theory sought to explain the relationship between attitudes and behavior. Cognitive dissonance is an incompatibility or inconsistency between attitudes or between behavior and attitudes (L. Festinger, 1957). The theory argued that any form of inconsistency is uncomfortable and that individual will try to reduce the dissonance and thus, the discomfort. In other words, individuals seek stability with a minimum of dissonance.

2.8.3 Belief

According to Wikipedia, a **belief** is a mental acceptance of a claim as truth. Beliefs form the building blocks in the framework. Based on observations, reflection, experiences, etc., an individual develops a belief system. This belief system at any given time determines the individual's attitudes, subjective norms, intentions, and behaviors. This approach assumes a rational individual whose beliefs, attitudes, subjective norms, and intentions are internally consistent with one another and externally consistent with reality. Using the set of beliefs toward the outcomes of performing a specific behavior, an individual then forms a favorable or unfavorable attitude about performing that behavior (for example, attending a meeting). Based on this attitude and the subjective norm for performing the behavior that the individual perceives, a person forms an intention to perform the behavior. This intention corresponds directly to a related specific behavior. However, individuals may not perform according to their intentions due to a lack of volitional control to carry out an intended behavior, adding even more complexity to understanding the behavior patterns.