Critical Thinking and Employability of Computer-related Graduates: The Malaysian Context

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Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of the Degree of Doctor of Philosophy is entirely my own work and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

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This thesis is especially dedicated to my children.

Abstract

Critical Thinking and Employability of Malaysian Graduates

Norshima Zainal Shah

This quantitative study examines the relationship between critical thinking and employability in the Malaysian higher education context. This research seeks future ICT graduates' perceptions of their perceived ability and importance to employment of critical thinking strategies in relation to employer needs. The setting of this research was 10 public universities located in Malaysia and the Multimedia Super Corridor (MSC) where the employers of ICT companies were located. The research methodology consisted of surveys aimed at both future graduates and employers of ICT related companies following a mixed model approach. Three surveys were developed for this study, firstly, to capture the concerns of soon-to-be graduates in the IT sector and secondly, employers in relation to the employability of graduates. Thirdly, the research examines the critical thinking capabilities of students in relation to their future employment.

Results indicate that student respondents rated their own critical thinking ability lower than what they perceived is needed in future work. Employers also express reservations about graduates' readiness for employment. Findings suggest that the most basic employability skill apart from literacy and numeracy were communication skills, closely associated with soft skills. Additionally, findings stress the role of English language competency and a proactive, problem-solving approach as being welcome by employers. Both future graduates and employers stress the importance of non-job specific skills and this is supported overall by findings. This research suggests that faculties of higher level institutions should aim to design courses which include the skills that graduates need and employers expect. Employers need to communicate and collaborate with academia in relation to the competency levels of graduates to ensure undergraduates are provided with employability skills suited to Malaysia's role in the 21st century global economy.

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"Recently, the Holst Group has been teaching my work to unemployed youngsters as part of the Government's New Deal programme, and found that teaching just six hours of thinking increased employability by 500 percent. If six hours of thinking can do more for these youngsters than 10 years of education, then there's something lacking in education" (Edward de Bono in Milnes,2000,p.45).

Chapter outline

This research looks at critical thinking as contributing to a solution to the problem of unemployment among graduates in Malaysia. It makes a connection between critical thinking and employability, two terms which are connected to one another yet rarely associated together. This research is timely as the lack of critical thinking has been considered to contribute to the reasons for the inability of graduates to obtain employment in the Malaysian context (Ambigapathy and Aniswal, 2005; Sangaran, 2006; and Tarmizi et al., 2008).

1.0 Challenges of the Malaysian Workforce

The national unemployment rate in Malaysia in September 2009 was 3.60 percent and in March 2010 was 3.70 percent. There are some contributing factors that clarify the increase of this phenomenon such as, the changing structure of Malaysia's economy, the reputed declining quality of education, graduates' attitude in being too choosy in finding jobs, graduates not getting enough guidance, and that employers too are choosy when hiring fresh graduates. These factors are linked directly to the objectives of education, especially in higher institutions of learning, as they are seen as being responsible for producing marketable graduates. This research focuses on

this question by examining the role critical thinking can play in higher education in relation to employability.

1.1 The Need to Teach Critical Thinking

The need to teach higher order thinking skills is not new and there is an urgent call to teach it at all levels of education so that educators can create an atmosphere where students are encouraged to read deeply, question, engage in divergent thinking, look for relationships among ideas, and grapple with real life issues. McMillen (1986) wonders whether teachers are working to create an environment that stimulates critical inquiry. Cosgrove (2009) in his research finds that although critical thinking is included in teacher training courses, without an explicit and systematic framework, a teachers' comprehension of critical thinking is vague. In addition, Abdul Kadir (2009) reveals that there are gaps and uncertainties in the teachers' knowledge base of critical thinking and that the incorporation of critical thinking as part of their pedagogy and classroom practice is marginal. Raths, Jonas, Rothstein and Wassermann (1967) are concerned about the lack of emphasis on thinking in schools where they note that there is an emphasis on memorization, the three Rs and a quiet classroom in contrast to a reflective classroom where possibilities are discussed as opposed to only the right answers. If preparing students for the workplace is viewed as an objective of tertiary level education, then critical thinking can point to a solution.

1.2 Research Questions and significance of the problem

The purpose of this research is to find a connection between critical thinking and employability. It does so by finding what employers want and what soon to be graduates perceive as their strengths and weaknesses in their quest for future employment. Future graduates rate their critical thinking abilities and importance of critical thinking strategies in relation to employment.

The research questions can be separated into three parts:

- What are the desired employability skills in new graduates as perceived by employers?
- What are the reasons for the unemployment of graduates as perceived by employers?
- How do soon-to-be graduates perceive themselves as having the ability to think critically and
- How do soon-to-be graduates perceive the importance of their thinking skills to their future employment?

The findings from this research will add to the literature on the basic employability skills acquired in higher learning institutions in Malaysia where graduates of computer-related degrees are concerned in relation to entry into employment. It also offers both undergraduates and employer perspectives on the unemployment issue. This research quantitatively examines the perceptions of future university graduates, and employers who will hire them in the Information and Communication Technology (ICT) sector.

This research employs a two phase sequential mixed model design where data from three surveys are triangulated for a comprehensive finding. Although there are mono method studies which quantitatively examined the perceptions of employers (Richens, 1999; Porterfield, 1999) and qualitatively examine basic employability skills (*A Nation at Risk,* 1983; *Secretary's Commission on Achieving Necessary Skills* report, 1991), Senge (1993) considers a triangular design is better as it provides the ability to study the problem from multiple points of view, potentially providing a richer and ultimately more useful way of understanding the phenomenon.

The findings of this study can provide educators with a better understanding of the skills employers need and expect from graduates. This greater understanding will provide the ability to revise or design courses that more accurately address the skills that graduates will need when they enter the workforce. Such preparation should improve their school/university-to-work transition and increase their employment opportunities. Furthermore, employers will be able to hire graduates with confidence in the skills they need and expect, reduce hiring and training costs, and increase retention, and improve organizational performance. The broader impact of this study will be the ability to more effectively align the outcomes of the educational system with the needs of the community it serves.

1.3 Summary of Chapters

Thesis chapters are summarized as follows:

- Chapter 2 is an introduction to Malaysia and its educational system in its social and historical contact.
- Chapter 3 is on learning theories and critical thinking related to this research.
- Chapter 4 defines employability and what constitutes an employable graduate and the roles of higher learning institutions to promote employability.
- Chapter 5 explains why mixed research design is chosen as the research methodology for this research.
- Chapter 6 is the data analysis to both quantitative and qualitative questions in survey to employers.
- Chapter 7 is the data analysis to qualitative questions to final year under graduates doing computer related courses in public universities in Malaysia.
- Chapter 8 is data analysis to quantitative questions to final year under graduates doing computer-related courses in public universities in Malaysia.
- Chapter 9 is data analysis on the differences in critical thinking according to courses and gender.
- Chapter 10 gives models arising from this research which create relationships between critical thinking and employability.
- Chapter 11 summarises findings, discusses the relationship between education and employment and presents recommendations.

Chapter 2 - The Malaysian Education System

ꕤ I believe that to be effective, an education and training system must focus on equipping people with the skills and knowledge that make them productive in the workforce. For this purpose, "functional training" must be provided to ensure that the workforce has the specific skills required by industries and other employers. While knowledge and information may be easily accessible now, most people require training to be able to transform that knowledge into something that is valuable and meaningful. In that sense, people need to be educated on how to use knowledge to their advantage, to create value in their personal lives and in their work (HE Datuk Seri Abdullah Ahmad Badawi, former Prime Minister of Malaysia, 2006).ꕤ

Chapter outline

As this study focuses on graduates of computer-related degrees in Malaysia, it is essential to have an understanding of Malaysia's educational system in its social and historical context. This is followed by a discussion of Malaysia's aspiration to be a fully developed country as outlined in the Government programmes which include the introduction of critical and creative thinking skills through "Critical and Creative Thinking Skills" (Education, 1992) by the Curriculum Development Centre and the usage of English language in the teaching of mathematics and science subjects (ETeMS) (Education, 2002). Finally, this chapter gives a short overview of the present unemployment phenomena and includes some key steps taken to improve this problem at national level.

2.0 Malaysia: Introduction

The British gave independence to Malaysia, formerly known as Malaya in 1957, (Refer to Appendix B) which is now a democratic country with a constitutional monarchy in which a king is elected every 5 years from among the nine sultans who rule the Malaysian states. Malaysia is multiracial where the major races are the

Malay, Chinese and Indian (Refer to Appendix E) who live harmoniously alongside each other (Ibrahim, 2007). The total population of culturally heterogeneous nationals (Bax and Hassan, 2003) of Malaysia in 2008 is reported as 27.73 million people. According to the 2000 census, the population is 23.27 million where 65.1 percent comprise the "Bumiputera" (Malay and indigenous), 26 percent are the Chinese and 7.7 percent the Indians. Islam is the national religion and there are 60.4 percent Muslims. There are 19.2 percent Buddhists, 9.1 percent Christians, 6.3 percent Hindus, and other traditional Chinese beliefs make up another 2.6 percent (Department of Statistics Malaysia, 2000).

Education is given strong emphasis and this is evident from the huge allocation of the country's budget for education and training. For example the 8th Malaysia Plan which covers the period of 2001 to 2005 sees RM43, 729 million which is 25.7% of the Federal Government Development Allocation and Expenditure and the 9th Malaysia Plan, which covers the period 2006 to 2010, sees RM 41,114 million which is 20.6% of the Federal Government Development Allocation and Expenditure allocated to education. Allocation for education has highest percentage for both periods. (Please refer to Appendix F)

2.1 Malaysia Education System: historical overview

Malaysia's education system has always been criticised as being exam-oriented where students are taught to memorise, not to think (Lee, 1999). Memorisation of factual knowledge in order to score for exams is the norm (The Malaysian Smart School Blueprint: Executive Summary, 1997). Conservative teaching techniques,

rooted in a behaviourist view of education or pedagogy, such as drilling are still being practised in Malaysian schools despite the introduction and implementation of many new educational policies. Educational policies such as the Razak Report (1956) and the Rahman Talib Report (1960) were introduced and incorporated in The Education Act 1961 and served as the foundation for the Cabinet Report in 1979.

The 1979 Cabinet Report stressed:

- the 3Rs of basic education, reading, writing and arithmetic
- a strong spiritual education and the desired elements of discipline
- a Malaysian curriculum
- upper secondary education dividing into two streams, academic and vocational
- the opportunity to continue education from 9 years to 11 years
- the facilitation of education management procedures to improve the overall quality of education

These educational policies, constructed after independence, were aimed at restructuring the multicultural society with a focus on providing equal educational opportunities to the economically disadvantaged groups, that is, the "Bumiputras" (Malay and indigenous). Educational policies were under strong Western influence and since they did not produce desired results, the Malaysian school curriculum was totally revamped in 1982 from Year 1 in primary school to Form 5 in secondary school (Lee, 1999).

In 1982, the New Integrated Primary School Curriculum which is referred as the KBSR (acronyms in the first language for Kurikulum Bersepadu Sekolah Rendah) provided new emphases in objectives and contents, new teaching styles and instructional materials stressed a more "child-centred" education. Later, in 1988,

when the first KBSR students entered secondary school, the New Integrated Secondary School Curriculum or the KBSM (acronyms in the first language for Kurikulum Bersepadu Sekolah Menengah) was introduced. KBSM emphasizes "integration" and supports the teaching of language and values across the curriculum.

2.2 National Education Philosophy of Malaysia

In 1995, the National Education Philosophy (NEP: in Appendix G) became the base for all educational policies and is designed to produce quality world-class education to achieve the nation's aspirations. Using the NEP, a new Education Act, the Education Act 1996, was passed by government. It states that education should play a vital role in achieving the country's vision in attaining the status of a fully developed nation. The Act suggests:

> ... an educational programme that includes curriculum and co-curricular activities which encompasses all the knowledge, skills, norms, values, cultural elements and beliefs to help develop a pupil fully with respect to the physical, spiritual, mental and emotional aspects as well as to inculcate and develop desirable moral values and to transmit knowledge.

This perspective views education from a broad perspective as it stresses nurturing the "whole" person.

Additionally, there is a clear emphasis on creating moral individuals who can contribute to the social good in the country's educational goals:

> Education in Malaysia is an on-going effort towards further developing the potential of individuals in a holistic and integrated manner so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious, based on a firm belief in and devotion to God. Such an effort is designed to produce Malaysian citizens who are knowledgeable and competent, who possess high moral standards, and who are responsible and capable of achieving a high level of personal well-being,

> as well as being able to contribute to the betterment of the family, the society and the nation at large. (NEP Education Act 1995: 11)

The NEP propagates critical thinking through knowledge transfer which aims at creating inner meanings in the minds and emotions of students. This means education should go well beyond mere deliverance of facts and information (Ismail and Hassan, 2009). The holistic concept of Malaysia education stresses God or Creator, universe, knowledge, values, skills and human existence and their inter-connectedness in producing well-balanced future generations. Ideally, one who goes through this education will have knowledge, skills, and values, be able to communicate, think critically and be ready to serve the nation's workforce.

2.3 Malaysian Education System: contemporary outline/from primary to third level

It is compulsory to go to school at the age of 7 though many urban children attend nursery or pre-school before this age. There are 6 years of official primary schooling, known as Standard 1-6 and most children will enter a government-funded primary school. Private primary schools are popular among social elites. There are many different types of primary school available, as it is still a very diverse education system. At the end of Standard 6, all students are required to sit for the "Ujian Penilaian Sekolah Rendah (UPSR acronym in the first language). This is a standard countrywide examination conducted by the Education Ministry and its results determine the secondary school a student will be placed in. Additionally, there are two basic types of primary schools: fully-government funded schools and government assisted schools. In fully government-funded schools, the medium of instruction is the Malay language and the curriculum is fully controlled by the state

Education Department. In Government-Assisted schools, a board of directors is in charge of the school. The medium of instruction could be Mandarin or Tamil, depending on the type of school.

For the secondary schools, the types are still similar to the Primary Schools, which are the government-funded, government-assisted, and private secondary schools. There are technically 7 years of secondary education beginning at the age of 13 and the medium of instruction is completely in the Malay language though language subjects such as Chinese and Tamil can be taken. School curricula are completely standardised throughout the country and there is an examination at the end of Form 3 when students are 14 years old which is the Penilaian Menengah Rendah (PMR acronym in the first language). This exam has no large significance as even without passing it a student can still continue into form 4 where streaming occurs and students choose subjects and areas of specialty. Students entering Form 4 are allowed a very large choice of subjects to be taken in the final Form 5 Sijil Pelajaran Malaysia exam (SPM acronym in the first language) similar to the 'O-level/GCSE examination of the British system. However, the standard material is considered to be much higher, and the examination system is much tougher and more rigid than most comparable examinations. Thus the SPM is a very popular examination and has gained worldwide acceptance in Australia, New Zealand, America, the United Kingdom and Ireland.

After the SPM examination, most students will pursue post secondary courses such as A-levels, diplomas or degrees. Education beyond Forms 1-5 is very diverse and

cannot be standardised as many students will have the choice of continuing tertiary education under any other country's system. Some students will opt for Form 6. There is the Sijil Tinggi Pelajaran Malaysia known as STPM (acronyms in the first language) examination to be taken at the end of a two-year course. The Webster Online Dictionary in its definition on education in Malaysia states that the STPM is known to be more difficult than the GCE A levels, covering a broader and deeper scope in syllabus. It is perceived by Malaysian students as 'the toughest examination in the world and is a requirement for entry into most local universities. However, it does not allow tertiary education in other countries so Malaysian students will opt for external qualifications with Australian, American and British universities being the most popular choices. Table 1 shows the number of students who study abroad at university.

Table 1: The number of Malaysian students abroad Year 2002-2007

No.	*Countries*	*2002*	*2003*	*2004*	*2005*	*2006*	2007
1	USA	7,395	7,611	5,519	6,411	6,142	5,281
2	SAUDI ARABIA	127	125	125	132	138	125
3	AUSTRALIA	15,700	15,448	15,434	15,909	14,918	13,010
4	CANADA	231	231	196	230	238	312
5	INDONESIA	1,337	1,225	1,607	2,444	3,630	4,565
6	JORDAN	361	361	310	444	490	655
7	EGYPT	4,664	4,330	5,768	6,256	5,780	6,896
8	NEW ZEALAND	995	918	1,011	1,338	1,297	1,574
9	UK AND IRELAND	11,970	11,860	11,041	15,189	12,569	11,490
10	OTHER COUNTRIES			2,268	8,256	8,722	11,007
	Total	42,780	42,109	43,279	56,609	53,924	54,915

The country spends billions of Ringgit in sending students to get an education abroad. These students are high achievers and they are sent abroad to pursue studies at prestigious universities which are seen as vital for the country. With the foreign qualifications, it is hoped that the students are more motivated, able to exchange ideas and views at international level, see things from different perspectives, gain exposure from different cultures, build self-confidence and enhance their employability prospects and indirectly improve the country's human capital standing (Lim, 2009)

According to Lee Beng Kim, ASEAN client development leader as stated by Lim (2009) in The Star Online:

> some multinational companies may prefer candidates from foreign universities because of the perception that they are typically more exposed to different nationalities and cultures and have better communication and interpersonal skills, enabling them to cope better in a matrix organisation.

This implies that some employers prefer overseas graduates over local ones and this notion is of direct relevance to this study and relates to research findings.

2.4 Privatising and corporatising of universities in Malaysia

At present there are twenty public universities in Malaysia and nineteen private ones (Refer to Appendix C). Public universities in Malaysia are government-funded institutions and self-managed. They normally take in students using the merit system where students are listed according to their academic performance regardless of their race. On the other hand, private universities normally attract students who have

difficulty getting into government Form 6 classes or into public universities due to lack of vacancies (Yaakub and Ayob, 1997). There are already an estimated 500 post secondary educational institutions now which includes foreign universities (Lee, 1999). Additionally there are also polytechnics and community colleges which offer certificates and diplomas for more technical-based courses.

In the early 1970s there was a shift in the roles and functions of the private education system when private education entrepreneurs began focusing on pre-university courses. Mok (2007) considers that a number of significant factors converged to liberalise the education market in Malaysia. Some of these factors are the insufficient funding in meeting the pressing demands for higher education and the inadequate places for high school graduates with strong higher education needs. Ismail (1997) says the focus on pre-university courses is simply because there was a pressing educational need with insufficient places for high school graduates in the country. Tan (2002) states that three-quarters of qualified applicants were unable to enter local public universities in 1993 and one third of qualified candidates still failed to get into public universities in 1998. Consequently, the Malaysian government began to allow private universities and even foreign or overseas universities to set up branches to offer higher education learning opportunities. Secondly, it is also because of the shift of Malaysia's economic goal from being a manufacturing economy to a knowledge-based economy (Wee, 2001).

It has to be noted that education has always been seen as a tool in nation building and transformation. For example, during the 1980s, higher education was seen as a

means of restructuring Malaysian society by eliminating the association between race and social class. Hence, the government made strong efforts to provide more educational opportunities to the "Bumiputeras" (Malay and indigenous) by having racial quotas for admission into the universities and providing additional resources through scholarships and loans. In the 1990s, with the government aspiration to turn Malaysia into a technology and educational hub in the region, there was a need for more professionals and highly qualified personnel. Reacting to this demand, the Malaysian government launched the corporatisation of public universities project in 1998.

In January 1998, ten public universities were corporatized in Malaysia. The Malaysian government believed that corporatisation would give public universities more autonomy and flexibility in administration and finance. This means the universities are free from cumbersome bureaucratic processes (Kodwani, 2002) and are not rigid anymore in the sense of generating revenue internally. Although the Malaysian government would continue to own most universities and provide development funds for new programmes and expansive capital projects, universities now have the freedom to diversify their financial resources and are seen as more entrepreneurial (Lee, 1999). In their mission to promote social and economic development and at the same time promoting and teaching research (Etzkowitz, 2000), universities now vary ways of obtaining financial resources by: increasing the number of students, charging students tuition fees, working closely with businesses and industries, offering professional courses, and being available for consultancy and community projects.

According to the Ninth Malaysia Plan (2006), enrolment at tertiary level increased from 574,421 in 2000 to 731,698 in 2005. At the end of the 2006-2010 plan period, it is estimated that 1,326,340 students will enrol in both public and private institutions which sees an average annual growth rate at 23.6 percent. The enrolment in science and technical courses at the first degree and diploma levels increased from 229,014 in 2000 to 291,546 in 2005, in line with the need to improve the supply of science and technology graduates. The 9th Malaysia Plan under its Prospects 2006-2010 also underlies the Human Capital Development Policy Thrusts which says that investment in human capital will be given greater emphasis to sustain economic resilience and growth, drive a knowledge-based economy as well as foster a community with an exemplary value system. There will be greater collaboration between the Government, the private sector and the community.

With the notion of achieving a developed nation status by 2020, the thrusts are as follows:

- undertaking comprehensive improvement of the education and training delivery systems;
- strengthening national schools to become the school of choice for all Malaysians to enhance national unity;
- implementing measures to bridge the performance gap between rural and urban schools;
- creating universities of international standing and ensuring that tertiary institutions meet the needs of employers;

- providing more opportunities and access to quality education, training and lifelong learning at all levels;
- nurturing an innovative society with strong science and technology capabilities and the ability to acquire and apply knowledge;
- strengthening national unity and developing a society with a progressive outlook, exemplary value system and high performance culture as well as an appreciation for tradition and heritage;
- and enhancing the forum of engagement and consultation between the Government, private sector, parents and community in human capital development.

The above are of critical concern to this thesis which focuses on the development of critical thinking skills in the Malaysian educational context in relation to the problem of graduate unemployment in a developing economy.

2.5 A vision for Malaysia: education for prosperity

In 1999 the Malaysian Prime Minister, Datuk Seri Dr Mahathir Muhammad, announced the Malaysian development plans popularly known as Vision 2020. This proposal lays nine targets for the country's development which need to be achieved by the year 2020. These targets or strategic challenges need to be overcome to reach this vision. They are:

Challenge 1: To form a nation that stands as one

Challenge 2: To produce a Malaysian community that has freedom, strength, and full of self confidence.

Challenge 3: To develop a mature democratic community.

Challenge 4: To form a community that has high moral, ethics and religious strength.

Challenge 5: To cultivate a community that is mature and tolerant.

Challenge 6: To form a progressive science community.

Challenge 7: To cultivate a community rich in values and a loving culture.

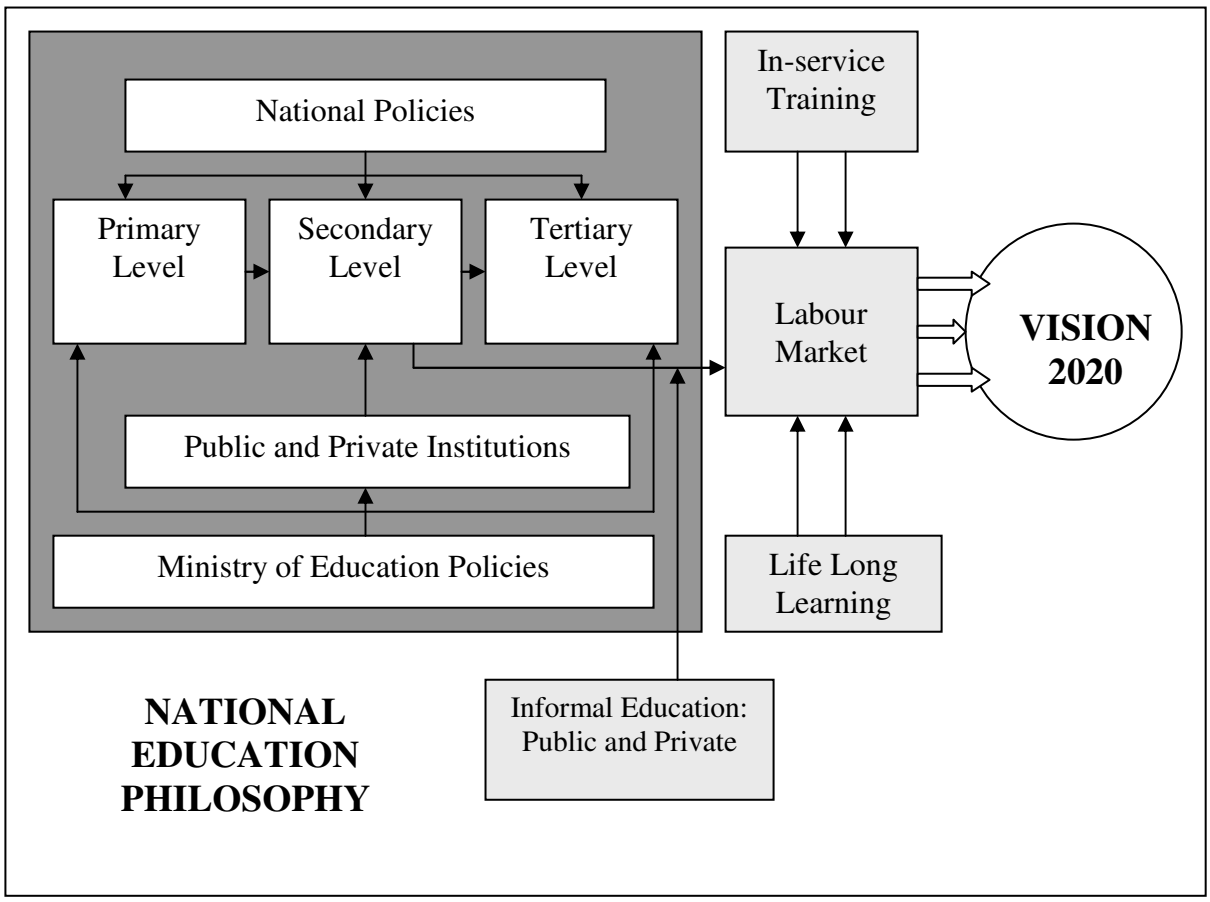
Challenge 8: To ensure the formation of a community with a fair economy.

Challenge 9: To cultivate a prosperous community.

In its sixth element of Vision 2020, it envisages a Malaysian society that is scientific and progressive in nature, as well as one that is innovative and looks far ahead into the future, a society that is not only the user of current state-of-the art technologies but is also a contributor if not creator, of new and advanced technological inventions. Consequently, Malaysians must strive to achieve critical thinking together with the highest ethical standards so that they are not only a technology-aware nation but also a caring society.

Education is seen as the direct link to human resources in meeting these visions. Figure A shows these connections.

Figure A: Interlink between Education and National Development (Ministry of Education 2004)



The task here is to educate a future workforce to think critically, to prepare them when they begin employment, as critical thinking is highly valued in the workplace (Gardner, 1999). There is a coming together here of education, employment and critical thinking which is the focus of this dissertation.

2.6 Critical thinking in Malaysia's Education System

Lee (1999) says that the education system has an important role in supplying human resources for economic growth where it is seen as an instrumental agent in helping the country achieve national goals and objectives (Nalliah and Thiyagarajah, 1999). Due to this, there has been a shift in emphasis in the educational system in Malaysia, from the 3Rs (reading, writing and arithmetic) to critical thinking skills, scientific skills, as well as technological skills in a schools' curriculum. This introduction to critical thinking skills, scientific skills, as well as technological skills in a schools' curriculum is also because the education system is moving away from an exam-oriented system which assesses students entirely on final exams. An exam oriented system is mechanical and tends to make students exposed to facts, but not necessarily able to apply the facts learnt in other contexts and can be linked to a behaviourist perspective on education. In the classroom students are not provided with the opportunity to search and use information and eventually they become too dependent on teachers: in Malaysia this is viewed as 'the spoon-feeding phenomena'.

Critical and creative thinking skills (CCTS) known as "Kemahiran Berfikir Secara Kritikal dan Kreatif" (KBKK) in "Kurikulum Baru Sekolah Rendah" (KBSR) and "Kurikulum Baru Sekolah Menengah" (KBSM) was made the basis for mastery of knowledge and skills and was introduced into the education syllabus of Teacher's Training Colleges in late 1991 to promote the teaching of critical thinking. Critical and Creative Thinking Skills (CCTS) is integrated in English, Science and Mathematics.

2.6.1 Critical Thinking in the curriculum

Lee (1999) considers that to meet Vision 2020, Malaysia needs active learners who have acquired the skills of problem solving, independent thinking, and autonomous learning as well as the abilities to work co-operatively. Schools need to emphasise different kinds of teaching and learning strategies such as co-operative learning, group work and other learner-directed modes of operation. School performance indicators should not be based on exam results only but should be broadened to include a whole host of social outcomes such as attendance, behaviour, self image and a range of attitudes to school. For Lee (1999), all these desired behaviours can be achieved through the teaching of critical thinking in educational institutions.

Yet, teaching critical thinking, although introduced in the early 1990s in Malaysia, can be seen as still at its infancy stage. The Star Online on July 25, 2010 reveals that teachers in the country still lack the time to introduce innovation and creativity in their lessons and the educational curriculum does not allow space for students to adopt critical thinking. In addition to this, the Malaysian Examination Syndicate shows students performing poorly in questions requiring critical thinking. It states that students often answer questions without fully analysing what is required. Following this, The Education Director General said that the Ministry of Education would introduce new examination formats in stages covering all subjects and where questions requiring critical thinking would comprise 60 percent of the content in public examinations. As critical thinking was already being taught in both primary and secondary schools, the focus was on adjustments in teaching methods which

support critical thinking and self-access learning, including students sourcing information critically.

With the introduction of Critical and Creative Thinking Skills in the curriculum in the early 1990s, thinking skills attributes are infused in the teaching of subject matter in Malaysian classrooms though not taught formally as a subject. Some of the skills are problem solving skills, higher-order thinking skills, analyzing skills, evaluating skills and mind-mapping skills. In the newly designed curriculum for the secondary schools, thinking skills attributes such as problem solving, decision making, critical and creative thinking have been explicitly written for some academic subjects such as science, mathematics, language, history and geography. However, in other subjects, which are still yet to be reviewed, thinking skills attributes are not explicitly elaborated in the curriculum.

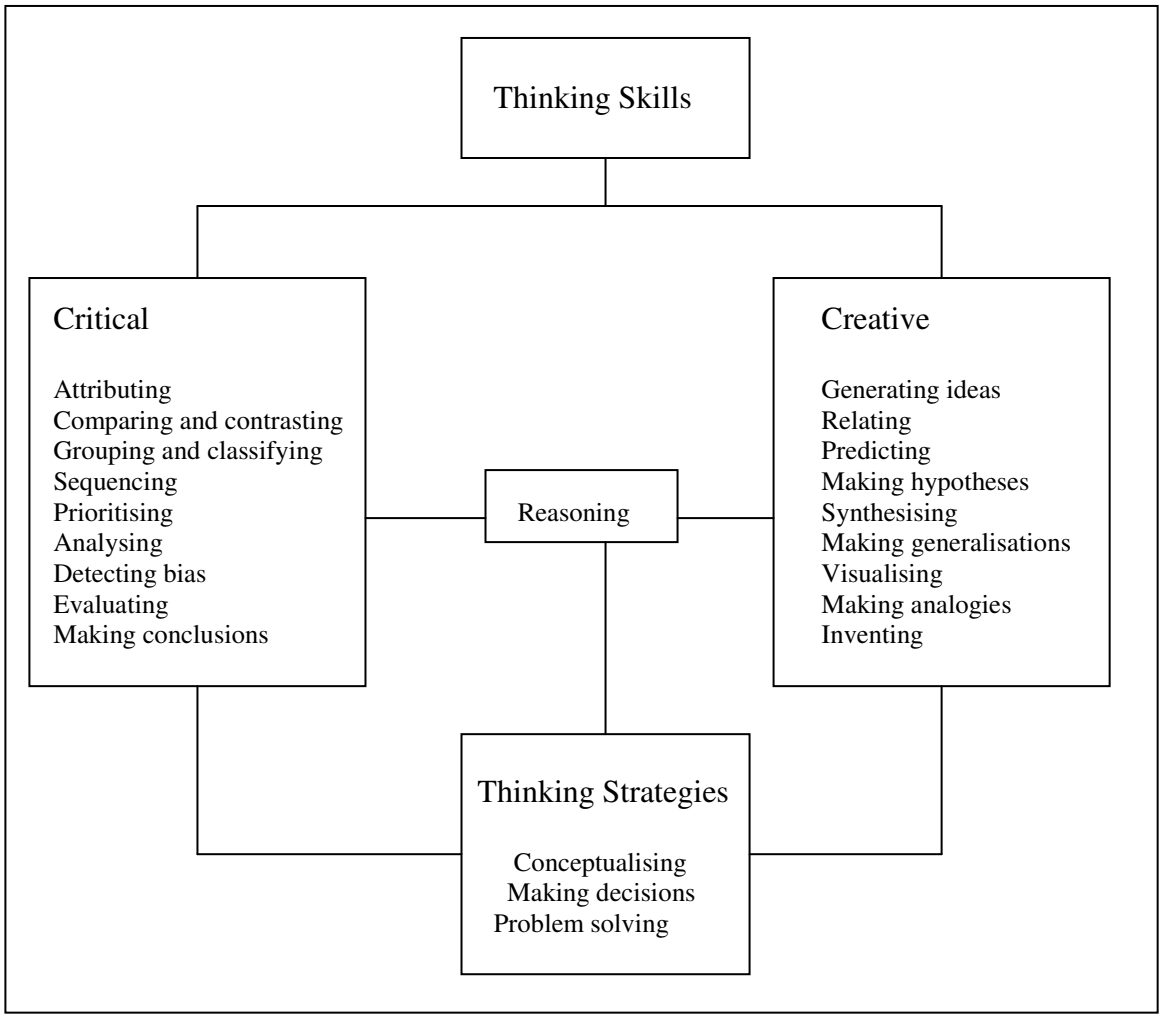
To know the exact critical thinking skills taught in the Malaysian schools, one has to refer to the Educational Curriculum. For example, the English Language Syllabus is planned in accordance with the goals of the Kurikulum Bersepadu Sekolah Menengah or the KBSM, that is, the Integrated Curriculum for Secondary School which is aimed at the intellectual, emotional, spiritual and physical development of the individual. The contents of the syllabus, its structure, scope and sequence take into consideration the position and role of the English Language in Malaysia, the need for it, at both national and international levels. The aims of the syllabus are

presented in global terms and take into consideration the roles and needs of English in the country.

The objectives draw upon the aims and are stated under four language skills, namely, listening, speaking, reading, and writing. The focus outlines the teaching of the four language skills and language content. In addition, the English language syllabus specifies the scope for the selection of topics and moral values to be taught for each year of the secondary school. The syllabus content states what the students will be able to do at the end of the secondary school in the four language skills. The content also lists the sound system, the grammar, and the vocabulary to be taught. The syllabus is to be taught using the Malaysian setting as a base. The teaching should emphasize the principles of good citizenship, moral values, and the Malaysian way of life and so relates to both the National Education Philosophy (NEP) and Vision 2020.

The syllabus is organised in terms of aims, objectives, focus and syllabus content. The Science syllabus has critical and creative thinking skills as terminal objectives. Teachers are to infuse critical thinking skills in their teaching methodology and teaching materials. Figure B illustrates the thinking skills and thinking strategies model in science. Similarly, in the integrated curriculum for secondary school for Chemistry, thinking skills and thinking strategies are integrated. Besides thinking skills and strategies, another skill emphasised is the reasoning skill. It is used in making logical, just and rational judgements. Mastering of critical and creative thinking skills and thinking strategies is simpler if one knows how to reason.

Figure B: Thinking Skills and Thinking Strategies (TSTS) Model in the Integrated Curriculum for Secondary Schools: Curriculum Specifications for Science Form 5, p.6., Ministry of Education Malaysia (2006).



It is suggested in the curriculum that Thinking Skills and Thinking Strategies (TSTS) be taught through the teaching and learning of science through development of the following phases:

1. Introducing thinking skills and thinking strategies (TSTS).
2. Practising TSTS with teacher's guidance.
3. Practising TSTS without teacher's guidance.

4. Applying TSTS in new situations with teacher's guidance.
5. Finally, applying TSTS together with other skills to accomplish thinking task.

However, having a critical thinking element in Malaysian education does not prevent unemployment and the unemployment scenario in Malaysia is discussed next.

2.7 Unemployment of graduates in Malaysia

In February 2006, the Berita Harian, a local newspaper, reported that every year Malaysia produces 60, 000 graduates. Table 2 shows the high rate of unemployment among graduates according to universities and courses in Malaysia. The breakdown in the table refers only to 20,217 unemployed graduates who registered with the Ministry of Human Resources Malaysia in June 2006, and does not include those who did not. The highest level of unemployment is from University Teknologi Mara (UiTM), which is 16.2 percent and of direct relevance to this research. This university conducts mostly engineering, and science and technology courses. The lowest level of unemployment is from University Pendidikan Sultan Idris (UPSI) which is only 0.2 percent. This is not surprising as UPSI is a teachers training university and students are sent out to teach in schools once graduated.

Table 2: Unemployment among graduates in Malaysia according to universities (Ministry of Human Resources, 2006)

University	Unemployed	%
Universiti Teknologi Mara	3,278	16.2%
Universiti Utara Malaysia	1,532	7.6%
Private Universities & Colleges	1,217	6.0%
Universiti Teknologi Malaysia	1,147	5.7%
Universiti Kebangsaan Malaysia	971	4.8%
Universiti Putra Malaysia	919	4.5%
Other public universities	840	4.2%
Universiti Malaya	531	2.6%
Universiti Sains Malaysia	505	2.5%
Universiti Malaysia Sabah	371	1.8%
Universiti Islam Antarabangsa	358	1.8%
Foreign Graduates	342	1.7%
Universiti Malaysia Sarawak	174	0.9%
Universiti Pendidikan Sultan Idris	39	0.2%
Others	7,993	39.5%
Total	20,217	100.0%

The following table shows university courses in relation to unemployment:

Table 3: Unemployment among Malaysian graduates according to courses (Ministry of Human Resources, 2006)

Course/Subjects	Unemployed	%
Computer Science	3,942	19.5%
Business Administration/Management	3,736	18.5%
Engineering	3,096	15.3%
Accountancy	1,923	9.5%
Literature & Social Sciences	1,283	6.3%
Pure Science & Applied Sciences	1,303	6.4%
Architecture & Building Management	540	2.7%
Agriculture, Fisheries & Forestry	401	2.0%
Others	3,993	19.8%
Total	20,217	100.0%

The Computer science graduates are the highest unemployed with 19.5 percent is quite surprising when the world is embracing the technology era. Logically, these graduates should be in demand especially when there is a clear shortage of skilled workers in this industry. This poses the question, central to this thesis, whether graduates produced by both public and private universities in Malaysia are well equipped with the qualities sought by the industries outside the learning institutions.

In general, there are common perceived reasons as to why graduates are unemployed in Malaysia. Most importantly, from the perspective of this thesis, graduates lacked skills (Vijan, 2007); they were not able to impress employers during interviews because they did not have the right skills such as presentation and communication skills which include proficiency in English (Phang, 2006). In addition, they cannot

contribute to the company once they start work because they are not "work-ready". Malaysian universities are not producing "work-ready" graduates because the country's education system is too exam-oriented (Fong, 2004; Henwood, 2007). They produce graduates who are competent theory-wise but do not have sufficient practical exposure. Finally, another common relevant reason is related to the mismatch between what the universities are producing and what the Malaysian job-market seeks (Asma and Lim, 2000; Vijan, 2007; Yogeeswaran, 2005).

This phenomenon has caused a commotion in Malaysia where local society is starting to accept that there is no guarantee of employment after a degree. This has made graduates automatically enroll themselves for postgraduate programmes; parents become more concerned about the courses their children are signing up for or their children's' employment at the end of the study period; educators no longer stress educational excellence only but have started to recognize that skills need to be taught. Reacting to the problem, the Malaysian Government has taken crucial steps to face this problem. Examples of three such steps taken by the Government are the training scheme for unemployed graduates, teaching more subjects in English at school level, and the introduction of the Electronic Labour Exchange System (ELX) which are detailed in the following section.

2.7.1 One Solution: more subjects at school level taught in English

In 2002, the Government announced that from 2003 onwards, the teaching of Science and Mathematics in schools would be in English, to ensure that Malaysia would not be left behind in a world that was rapidly becoming globalised.

Consequently, all public universities were urged to change the medium of instruction from Malay to English in the science and technology subjects in 2005. These two actions taken by the Government through educational institutions at post secondary or tertiary education is becoming increasingly critical to social and economic mobility across the world (Agadjanian and Liew, 2005). Indirectly, this programme aims to arrest the declining command of the language among students. This confirms the status of English in Malaysia as being of high importance as English is readily accepted as the language associated with globalization. It is also the international language of business communication and the IT sector and so forms the focus of part of this research regarding employability.

2.7.2 Training for unemployed graduates: becoming employable

The objective of the Graduate Training Scheme (GTS) 2005 is to assist and equip unemployed graduates with specialized skills to enhance employability. This also includes English so underlining its importance to employability. It is targeted at degree or diploma graduates from 2002 onwards. The Government sponsors the programme fee, which is a generous monthly allowance of RM500. Depending on the educational institutions which signed up to run the GTS for the Ministry of Human Resources Malaysia, some other examples of free courses offered are: business accounting, executive development programme, Information and Communication technology, Sales and Marketing and Microsoft Certified System Engineer (MCSE) or open source operating system based on Unix (LINUX).

2.7.3 The Electronic Labour Exchange (ELX) project

Additionally, the Electronic Labour Exchange (ELX) project was officially launched by the Minister of Human Resources, Datuk Dr. Fong Chan Onn on 30 May 2006 and acts as a one-stop centre for labour market information; it is accessible to government agencies, the private sector and the general public. The Job Clearing System offers free-of-charge job matching services for the Malaysian public and employers; the Government hopes that the objectives of improving the mobilization of the nation's human resources and optimizing the utilization of manpower through the systematic matching of job seekers to job vacancies can be achieved.

Even so, the effectiveness of these actions is debatable as the unemployment rate keeps creeping upwards (see Appendix D) especially with the country facing a global financial crisis. It is absolutely crucial to contribute to solving this problem if the state wants to generate future-proof graduates, regardless of their specializations as these are the graduates who will be able to cope with change and achieve the vision of Malaysian prosperity. Consequently, this thesis will look into the unemployment problem of graduates with computer-related degrees. This includes reasons for unemployment and the connection between critical thinking and employability.

Chapter Summary

This chapter has provided a summary of Malaysia education system, the NEP, Vision 2020, the Ninth Malaysia Plan and the graduate unemployment scenario. It is

seen that Malaysia envisages being fully developed by 2020 and gives serious attention to human capital development through education. Critical thinking is given emphasis as it is believed to be able to nurture a well balanced graduate who is ready to embrace the working world.

The following chapter examines the learning theories of relevance to this thesis and discusses the concept of critical thinking from a number of perspectives.

Chapter 3 - Critical thinking

A man is but the product of his thoughts, what he thinks, he becomes.
Mahatma Gandhi

Chapter outline

This chapter begins with a discussion of three learning theories, behaviourism, cognitivism and constructivism and connects these learning theories to critical thinking. Next, the definition of critical thinking is discussed from philosophical and cognitive psychological views. Two models of critical thinking are discussed in detail: Bloom's educational taxonomy of higher learning and Paul's critical thinking model. This chapter closes by drawing together the relationship between critical thinking and skills in relation to employability.

3.0 Learning theories and thinking

Since thinking can be taught and learned (De Bono, 1976; Milvain, 2008; Roberts and Billings, 2008) it is vital to relate three learning theories to thinking in this research. These three theories, behaviourism, cognitive, and constructivism will be discussed in relation to the research focus of this thesis on critical thinking and employability of graduates.

3.0.1 Behaviourism

Behaviourism is seen as a philosophy of psychology and is based on the notion that everything an organism does, including action, thinking and feeling, should be regarded as behaviours. As Jarvis et al. (2003) note, it also suggests that the only

human data that are scientifically useful are these empirical and measurable behaviours. In the early 19th century, the behaviourist school of thought suggested lessons be broken into smaller components and treated in isolation in order to maximize clarity and aid memory retention (Jackson, 2008; Maclellan, 2005). The lessons are also set to achieve goals which are sequential, systematic and linear. However these lessons do not have to be taught in context or real life situations.

Savage and Ramos (2009) consider that Pavlovian conditioning is a mechanism by which organisms develop predictions about rewards and such anticipatory or expectancy states enable successful behavioural adaptations to environmental demands. In many classroom instances for example, individuals do learn when they are provided the appropriate blend of stimuli, rewards and punishments and this is apparent especially with small children and simpler tasks. This is clearly inappropriate for third level education.

In a behaviourist teaching and learning setting, lessons are repetitive, small, concrete, and include progressively sequenced tasks with consistent positive and negative reinforcements. Behaviourism is thus seen as functional and mechanical in that it rejects mental entities and Maclellan (2005) says that in higher education its primary pedagogic method has traditionally been one of lecturing, note-taking and memorising information for later recognition or reproduction. Schweitzer and Stephenson (2008) see behaviourist learning theory as a traditional method associated with “chalk and talk” to describe its lectures, and “kill and drill” for its homework.

In Malaysia, Outcome Based Education (OBE) is practiced. OBE is a system in which the outcomes drive the whole course content and assessment structure (Tucker, 2004). It is seen as a type of learning where learning outcomes are specified as behavioural forms and teachers write the behavioural changes expected to be seen or achieved by their students. These written objectives are behavioural outcomes and can be measured. The practice of using six categories of cognitive domains from Bloom's taxonomy is also widely used in writing terminal objectives in Malaysian education settings. Having these terminal objectives, lessons are very precise but conditioning here takes away students' freedom, so the system and teachers' roles need to be considered carefully (Jarvis et al., 2003).

The outcomes produced are always reliant upon the authority, or teacher, who decides what form of behaviour is the "correct" behaviour. Because of this, this approach to learning might not be efficient in the long term since it does not encourage students to think for themselves, but only to learn to conform to their accepted positions (Schweitzer and Stephenson, 2008). The behaviourist approach shows limitations in explaining certain social behaviours and cognitivists reject traditional operant conditioning that says an individual must perform and receive reinforcement before being able to learn.

3.0.2 Cognitive learning theory

As opposed to behaviourism, cognitivism looks at the mental entity and basic assumptions of cognitivists are that cognitivism is pure science and is based on laboratory experiments. Behaviour is explainable in terms of how the mind operates

and is likened to a computer, where there is input of data, storing of data and retrieving of data. Cognitive theories started with Gestalt theories (Atherton, 2005; Ormond, 1999) which are originally theories of perception and interest in how the brain imposes patterns on the perceived world; they are deeply influenced by the developmental psychology of Piaget (1971) with his four periods of cognitive development (Malerstein and Ahern, 1979; Ormond, 1999) which focus on the maturational factors affecting understanding. Piaget carried out in-depth studies using small samples of children from which he proposed the five stages of cognitive development so that learning thus becomes a complex phenomenon.

Kohlberg (1981) sees Piaget's stage theory as too simple and considers that individuals mix their modes of thoughts in moral development. He proposes six stages of moral development and claims that moral development is not entirely age related. Being influenced by Piaget and Kohlberg, Fowler (1995) constructs a similar stage theory for religious and faith development. From his six stage theory, it is possible to argue that human development is not age based but experiential (Jarvis et al., 2003). Both these models by Kohlberg and Fowler are of particular interest because the Malaysian education system incorporates religious foundation and faith development in the education system and supports the idea that experience is essential for human advancement.

Additionally, Jones (2009) discusses, Vygotsky's cultural-historical psychology concept which is predicated on the existence of three forms of speech- external

speech, egocentric speech and inner speech and suggests the developmental process of internalization in which the first is transformed into the second and third. Vygotsky views language as an important tool in the emergence of distinctively human forms of thinking and action in the child. Speech is transformed from a directly interpersonal, communicative means of regulating and directing the child's behaviour into inner speech that is personal consciousness and will and a child's capacity for purposeful and independent actions. This adds the notion that cognitivism stresses the importance of language in thinking and actions and is of importance to this thesis in relation to employability.

Mezirow (1991) says for learners to change their beliefs, attitudes and emotional reactions, they must engage in critical reflection on their experiences, which in turn leads to a transformation. Mezirow (1997) states that, transformative learning occurs when learners change their frame of reference by critically reflecting on their assumptions and beliefs and consciously making and implementing plans that bring about new ways of defining their worlds. In other words, this learning theory emphasizes reflecting on experience where the reflection process is a critical thinking process.

Phye (1997) sees cognitivism as a practical pedagogical tool for teaching undoing thinkers (undoing thinkers are people who are not doing things because of themselves, not because they do not get external motivation). Merriam and Caffarella (1991) say that the purpose of cognitivism in education is to develop the capacity and skills to learn better and an educator's role is to structure the content of

learning activities. The cognitivist also views experience as important, having language as important for both thinking and actions and stresses reflecting on experience as essential. This is a significant point in this thesis in relation to teaching in the Malaysian educational system as well as in the teaching of critical thinking.

Finally, cognitivist theory is also the basis of constructivism, which emphasises the role of the learner in constructing his or her own world view. A learner does not just receive information but does a great deal with the information acquired, by actively organising it and trying to make sense of it. Learning is seen as a construction of knowledge rather than a reception or absorption of knowledge from the surrounding world. Constructivist learning theory is discussed next.

3.0.3 Constructivism

Constructivism is not a particular pedagogy but a theory describing how learning happens, regardless of whether learners are using their experiences to understand a lecture or simply following instructions to build something. It is often associated with pedagogic approaches to promote active learning or learning by doing. Davis-Seaver et al. (2000) say that constructivism is a philosophical view on how we come to understand or know. They then characterize this view in terms of three primary dispositions: understanding is in our interactions with the environment, cognitive conflict or puzzlement is the stimulus for learning and determines the organisation and nature of what is learned; lastly, knowledge evolves through social negotiation and through the evaluation of the viability of individual understandings. These propositions suggest a set of instructional principles and problem based learning

(PBL) as a constructivist teaching method. Constructivists see constructivism as more than a cognitive process. Raskin (2008) says that constructivism is neither wholly cognitive (thinking) nor affective (feeling) but is a kind of thinking rather than a feeling or a process. It emphasizes bodily experience which incorporates humanistic, existential and phenomenological philosophical ideas.

There are many versions of constructivism and Gordon (2009) agrees with Phillips (1995) who says these different versions of constructivism have important overlaps and major differences among them. In Gordon's (2009) quest to define constructivism, he found at least twenty theorists of different historical periods and diverse philosophical traditions. Constructivism is thus open to interpretation (Cook-Sather, 2008; Davis and Sumara, 2002; Kroll and Galguera, 2005; Shapiro, 2002, 2003) but it has a common belief that learners actively and distinctively construe and construct their own understandings in relationships and in contexts (Davis and Sumara, 2002; Dewey, 1964; Duckworth, 1987) and adapt their understanding and future choices for action based on the sense they make through those processes of construal and construction (Kroll and Galguera, 2005; von Glaserfeld, 1996).

Hosei, Schibeci and Backhaus (2005) outline pedagogy in an e-learning constructivist environment where constructivist pedagogy:

1. Sees the learner as the centre of learning experience rather than the lecturer.
2. View learning as a process of knowledge construction where a learner develops knowledge according to his/her individual experience.
3. With the learner at the centre of the learning experience, learners have to take responsibility for their own learning.

4. Constructivist pedagogy sees the learner as an active participant in their learning experience rather than being a passive vessel to be filled with information.
5. Constructivism sees learning as a process occurring in a social context.

A constructivist learning environment supports collaborative/cooperative learning where these are successful learning strategies in which small teams, each with students of different levels of ability, use a variety of learning activities to improve their understanding of a subject. Learners with different skills and backgrounds should collaborate in tasks and discussions to arrive at a shared understanding of the truth in a specific field (Duffy and Jonassen 1992). Each member of a team cooperates not only for learning what is taught but also for helping teammates learn, thus creating an atmosphere of achievement.

The constructivist pedagogy is of significance for this study which focuses on graduates with computer related degrees in a Malaysian educational context.

In Malaysian education settings, as described in chapter 2, the behaviourist and cognitive learning theories influence practice widely and lead to situations where students become too dependent on a teacher; classrooms are teacher-centred rather than student- centred. Consequently, Davis and Sumara (2002) claim that, unlike the behaviourists and cognitivists, theories which are intended as sources of practical advice in education, constructivist discourses function as critiques of current

educational practices. Gordon (2009) provides reasons why constructivist theories have not played a more significant role in shaping educational practice:

1. At present there is a wide range of constructivist discourse which is fragmented and loosely defined. This not only makes the meaning of constructivism vague in an educational setting, but also uncertainty in its implication for teaching and learning.
2. The teachers' experience and knowledge are not generally considered legitimate resources that can be used to evaluate and revise educational theory as teachers are viewed as mere practitioners not researchers. Additionally, teachers view educational theories as abstract and separate from the reality of school and classroom. Teachers may be skilled at facilitating active learning and authentic assessment, but lack understanding as to why such experiences are so important and how they are different from traditional methods.
3. Teachers are not fully comfortable with the concept of constructivist theory where constructivist teaching is more complex and unpredictable than traditional teacher-directed instruction. Windschitl (2002) says even experienced teachers have difficulty putting constructivism into practice as there are multiple challenges such as managing classroom interactions, understanding content and assessing students' knowledge.
4. Lastly, the cultures of schools too contribute to the fact why constructivist theories do not play a significant role in shaping educational practices. School culture refers to frameworks of norms, expectations and values. A

> school culture can expect students to be quiet and orderly whereas constructivists seek them to be active, gesturing, building things and moving about. Consequently, this aspect of constructivism is of direct relevance to this study of critical thinking in a Malaysian educational setting.

In contrast, a constructivist teaching practice according to Brooks (1990) requires a teacher to adopt practices which develop a student's thinking and learning as well as their abilities to question and also reflect on learning. According to Olsen (1999), although such practice does not use the term higher-order thinking, it is apparent that constructivist-based practices result in greater critical and creative thinking in students. As such it concerns this thesis directly.

In brief, constructivism adds motivation, social context, and self-direction to cognitivism (Phye, 1997). As it sees learning as a process not an isolated event, the knowledge constructed is based on perception through personal frameworks coupled with experiences (Duffy and Jonassen, 1992). Additionally, this learning comes from reflections and the use of abstract thinking which is impacted from the learner's environment (Duffy and Jonassen, 1992). Constructivists believe in the incorporation of activities that call on or generate new experiences for learning to occur (Brown, et al., 1989; Duffy and Jonassen, 1992). For constructivism to work, learners need situations to share text and explore ideas. This is the root of constructivism where reflection and the incorporation of abstract thought drive learning that ultimately becomes self-directed (Julyan and Duckworth, 1996; Fosnot, 1996; Perkins, 1992).

In relation to this research and the three learning theories above, critical thinking is discussed next. The discussion starts with an attempt to define critical thinking.

3.1 Defining Critical Thinking: a work in progress

In defining critical thinking, Nugent (1990) outlines five prerequisites for teaching critical thinking and of those five; there are two which stress an educator's involvement in defining critical thinking. The two prerequisites are: educators must have a sufficiently liberal definition of critical thinking and educators must know how they came to understand critical thinking. It is clear that the definition and an educator's involvement are crucial in defining this term as well as the importance of having a more systematic, precise definition of critical thinking (Kuhn, 1999) for teaching to be a meaningful educational goal. Even though literature suggests the importance of understanding the meaning and purpose of critical thinking, evidence suggests that there is lack of understanding of this concept and educators appear to lack knowledge of how to teach and assess critical thinking skills (Onosko, 1991; Shermis, 1992; Paul et al., 1997).

A review of literature in this field will reveal a general lack of consensus on how critical thinking is best defined. In other words, there is no universally accepted definition on critical thinking. Until today, no one has yet come up with a definition or theory that is accepted as definitive (Beyer, 1985; Booher, 2003; Dike et al.,2006; Ennis, 1987; Facione, 1990; Lee, 2004; Petress, 2004; Shelly et al., 2006; Tsui, 1998). Given the complexity of the concept, no single definition can suffice.

However, Dewey (1916) says high quality thinking is thinking accurately and it involves deliberate connections between what has been done and the consequences which come with the action. This means critical thinking is intentional, based on accepted standards for assessment and questions the results of one's conclusion. For Dewey, critical thinking is a concrete process which requires intellectual work in practical situations, not an abstraction which cannot be applied in one's everyday life.

Glaser (1941) defined critical thinking as having three important components: Firstly, it involves an attitude of being disposed to consider in a thoughtful way the problems and subjects that come within the range of one's experiences. Secondly, it involves knowledge of methods of logical inquiry and reasoning. Thirdly, critical thinking has the skills to apply the methods mentioned earlier. Similar to Dewey, Glaser emphasizes the need to think with well founded reasons rather than thinking that is directed. Ennis (1996: xvii) writes that '*Critical thinking is a process, the goal of which is to make reasonable decisions about what to believe and what to do*'. Ennis (1996) points out that critical thinking is not a thing or a goal in itself but is a process of making informed decisions that affect the way one lives life, the ultimate goal of which is to live reasonably in the strong or ethical sense of the term. This is a point that relates to the Malaysian educational system.

Although the definitions above have some similarities, Booher (2003) says that there are no standard operational definitions of critical thinking. Halpern (2001) and Moseley et al. (2005) also agree to that there is lack of agreement regarding a clear

definition to critical thinking. Although unclear of its operational definition, critical thinking is seen as an important element in higher education (Halpern, 1993, 1999). Halpern (1996) also links critical thinking to both education and social engagement, which for this research in the case of graduates, is employment.

3.1.1 Critical thinking: the influence of philosophy and cognitive psychology

One of the reasons why critical thinking has diverse definition is the serious shortage of communication between the two principal research disciplines (Morgan, 1995; Reed, 1998; Ten Dam and Volman, 2004) of philosophy and cognitive psychology. Ten Dam and Volman (2004) state that from a philosophical point of view, critical thinking is primarily approached as the norm of good thinking, the rational aspect of human thought, and as the intellectual virtues needed to approach the world in a reasonable, fair minded way. On the other hand, psychologists conceptualise critical thinking first and foremost as higher-order thinking skills and focus attention on the appropriate learning and instruction processes. Reed (1998) explains these two differences in depth. She says that there is no consensus regarding defining critical thinking because of these two distinctive disciplines: philosophy and psychology.

Firstly, philosophers have tended to focus on the nature and quality of the product of critical thinking while psychologists have concentrated on the processes of cognition, on the components and operations used to address academic and practical problems. Secondly, cognitive and developmental psychology has been based on empirical research while philosophy has relied on logical reasoning to reach conclusions. Chua (2004) adds an educational perspective to these two influential disciplines on critical thinking, and also places Bloom's taxonomy of higher thinking

(discussed later in this chapter) as part of this education perspective. Critical thinking theories are thus based on these three interlinking theoretical philosophical, psychological and education perspectives. They are discussed in turn.

3.1.2 The Philosophical Theories of Critical Thinking

Philosophical theories are theories which use reasons and ideas in understanding subjects, in other words what a person needs to think critically. It can be seen as a system of beliefs, values and principles. Ennis (1996) has said that critical thinking is reasonable, reflective thinking that is focused on decision making and beliefs. According to Ennis (1996), for anyone to think critically, one needs the motivation or desire to think logically and critically. Ennis (1996) has classified critical thinking into five main processes which are: elementary classification, basic support, inference, advanced classification, strategy and tactics. In addition, Henri (1991) identified five dimensions in analysing problems: participative, social, interactive, cognition and meta-cognition. Garrison (1992) says critical thinkers move through five stages: identifying a problem, defining it clearly, exploring the problem and possible solutions, evaluating their applicability, and then integrating their understanding with existing knowledge. These philosophical perspectives (Ennis, 1986; Garrison, 1992; Henri, 1991) have focused attention upon the formal requirements of the formal logical systems of critical thinking.

Also, from a philosophical perspective, Facione (1998) developed the Model of Critical Thinking Skills. It was based on the work of a panel of experts from the United States and Canada, who had worked together to find out how college level

critical thinking should be defined. There are six core thinking skills in this model of critical thinking: interpretation, analysis, evaluation, inference, explanation, and self-regulation.

Psychological theories of critical thinking, in contrast to philosophical ones, link to the mind and affect or feelings and can be related to the scientific study of how the human mind works and how it influences behaviour. This perspective is discussed next.

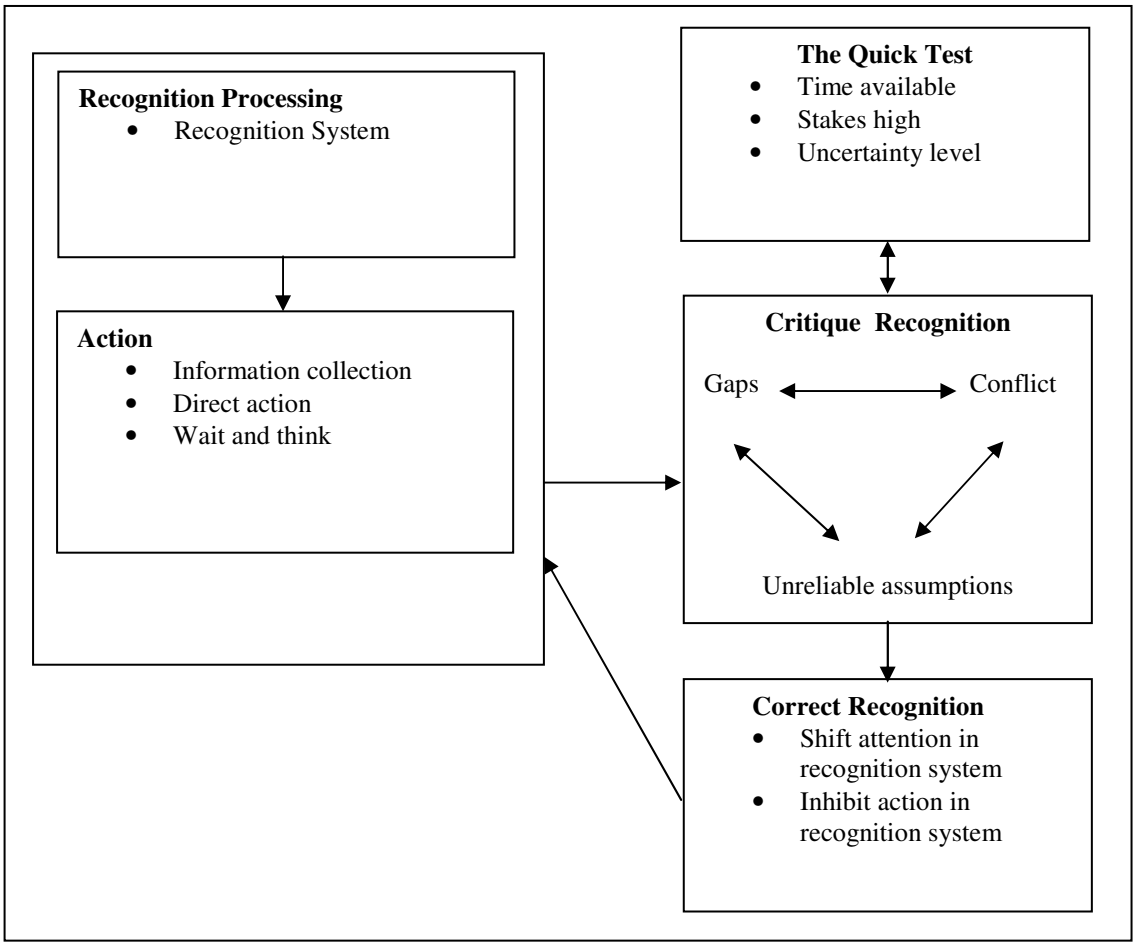
3.1.3 Cognitive psychology in relation to Critical Thinking

While the philosophers have focused on the nature and quality of the products of critical thinking, psychologists have concentrated on the process of cognition, the components and operations used to address academic and practical problems (Reed, 1998). From a psychology perspective, critical thinking involves three kinds of thought which are: metacomponents, performance components and knowledge-acquisition. Metacomponents are the executive components of intelligence, used to plan, monitor, and evaluate problem-solving strategies. Performance components help to execute the instructions of the metacomponents; they are the implementation segment of intelligence. Knowledge-acquisition components refer primarily to the ability to acquire and use language, thus, enabling one to seize on contextual cues in solving problems or obtaining new information. These three components suggest that in critical thinking one will have to identify the nature of a problem, select the steps necessary to solve it, devise a plan, and evaluate the outcomes and feedback.

Cohen, Freeman and Wolf (1996) developed a computational model of critical thinking processes which emphasised two prerequisite skills of critical thinking: recognition and metacognitive skills. This model, outlined in figure C, recognises that the critical thinkers are metacognitively skilled with metacognition being understood as being about one's own thinking.

More specifically, Jones and Ratcliff (1993) defined metacognition as being aware as one performs one specific task and then using the awareness to control what one is

Figure C: The model of recognition and metacognition –Psychological Perspective: Cohen, Freeman and Wolf (1996)



doing. This model shows that thinking should be self-directed. In thinking one should self reflect, correct oneself, which involves critiques, and then carry out remedial actions.

3.2 Teaching Critical thinking: the Malaysian context

In higher education students have to be taught to be responsible for their own thinking. They should not be 'spoon fed' as discussed in chapter two, but have initiative in getting something done. Thinking takes place in context which is synonymous with the teaching of critical thinking using suggested activities from constructivist learning theory. This raises the question of the ideal way of teaching critical thinking, as in Malaysia it is generally interpreted through the use of Bloom's Taxonomy in writing terminal objectives in lessons.

Benjamin Bloom's (1956) influential Taxonomy of Higher Learning is related to a formal system of teaching critical thinking. Bloom (1956) related critical thinking to high level thinking and listed a set of six thinking levels from the simplest (knowledge) to the most complex in critical thinking (evaluation). The highest level, evaluation, acts as the goal of learning and thinking processes. Bloom's (1956) taxonomy is widely used in the writing of terminal objectives in lesson plans at schools and also by choice at university level in Malaysia. Bloom et al. (1956: 2) considers a specific use for the taxonomy and he summarises the point as:

> In short, teachers and curricula makers should find this a relatively concise model for the analysis of educational outcomes in the cognitive areas of remembering, thinking and problem solving.

The taxonomy can be seen as a framework which, under the cognitive domain, consists of different levels of scale in building up educational outcomes.

Andrich (2002) provides a description of Bloom's model, Figure D, which outlines its five levels and their components with regard to education objectives. Since the classification is hierarchical, it is intended that each level incorporates the level before it. The model is as follows:

- Level 1 comprises the cognitive domain, which refers to the intellectual component, the affective domain, referring to the emotional and attitudinal components, and the psychomotor domain to physical component of educational objectives.

- Level 2 indicates the beginning of the hierarchy of levels stemming from the cognitive domain. This level is subdivided into six levels taken from Bloom (1956), namely, Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation.

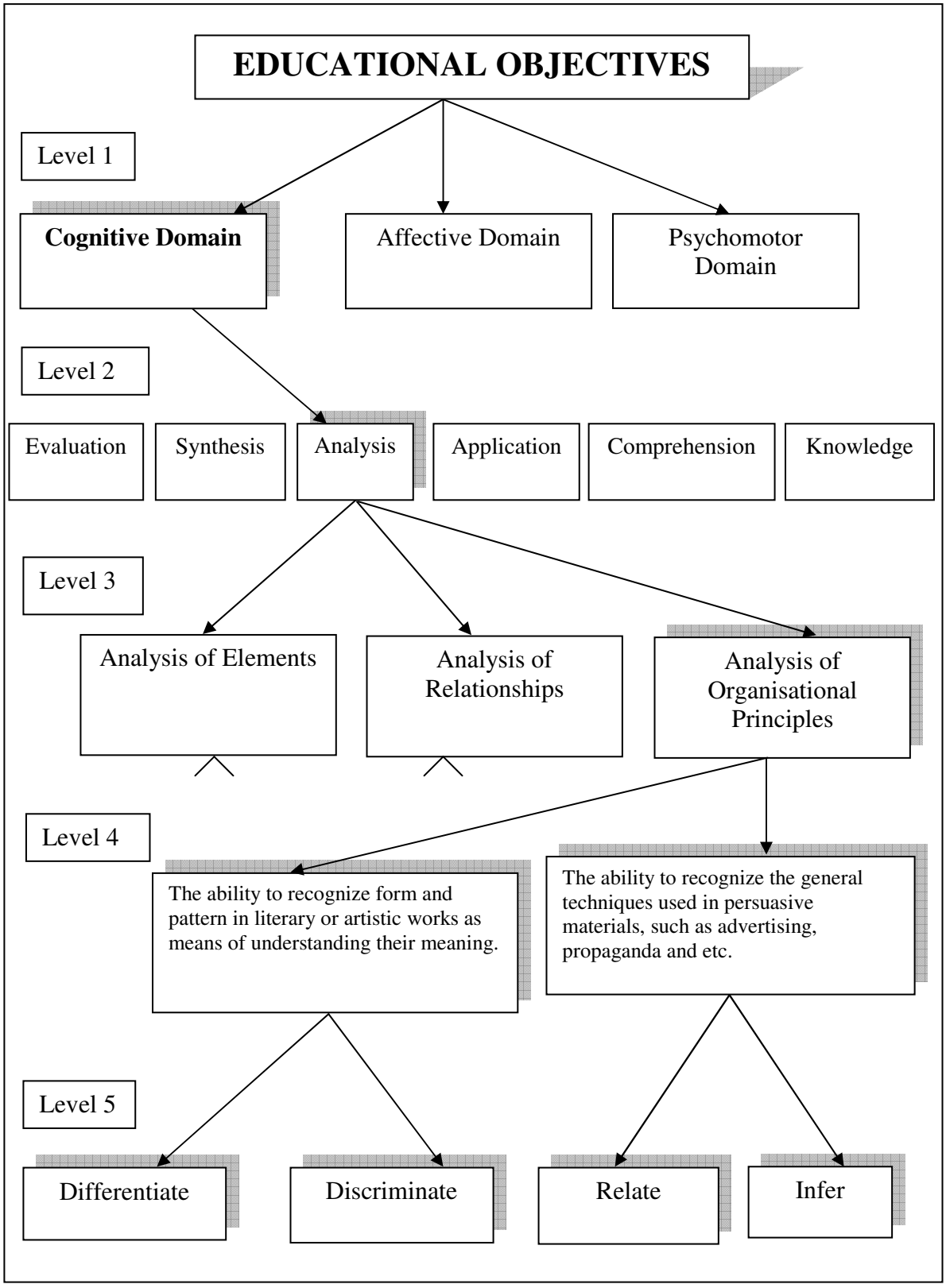
- Level 3. The level of analysis is further divided into its components which can be seen in level 3, namely the Analysis of elements, Analysis of relationships, and Analysis of organisational principles

- Level 4 consists of the subcomponents of the analysis of organisational principles stemming from level 3. It is important to note that at level 4, when compared to Level 1, the content has reached a relatively concrete and observable stage.

- Level 5 produces specific verbs of behaviours which show that the objective has been achieved. These terms are in the form of sets of verbs, or action words, which operationalise its different levels in terms of behaviour.

This model is important to this thesis because it shows that critical thinking is not only comprised of the cognitive domain solely but also includes the affective and psychomotor domains. Yet, it also shows that expansion of Bloom's Taxonomy emphasizes the cognitive domain more than the other two domains which are not broken down further and clarified in relation to their components as shown in figure D.

Figure D: Component analysis of Bloom's Taxonomy of Educational Objectives (Andrich, 2002)



Anderson and Sosniak (1994) reviewed Bloom's taxonomy and a revision was discussed and agreed upon. The published revision (Anderson et al., 2001) moves away from the original taxonomy where the six major categories of knowledge, comprehension, application, analysis, synthesis and evaluation are situated on a single dimension. These categories were also arranged from simple to complex and from concrete to abstract. The revised version, on the other hand, has two dimensions: the horizontal, known as the Cognitive Process Dimension and the vertical dimension, known as the Knowledge Dimension Application. The Cognitive Process Dimension is still hierarchical where the higher categories are more complex and more abstract than the lower ones. However, for the taxonomy table, the constraint of cumulative hierarchy is removed which means 'Understand' is no longer a necessary prerequisite for 'Apply' (Anderson and Sosniak, 1994) which is a possible drawback to the model.

Table 4: Taxonomy Table-Revision of Bloom's taxonomy (Anderson and Sosniak, 1994)

Knowledge dimension	The Cognitive Process Dimension					
	Remember	Understand	Apply	Analyze	Evaluate	Create
Factual						
Conceptual						
Procedural						
Metacognitive						

What Bloom's taxonomy lacks will be discussed in a later part of this chapter in comparison with Paul's critical thinking model.

3.3 An alternative vision: Richard Paul's Model for Critical Thinking

According to Ten Dam and Volman (2004), the most comprehensive attempt to define how critical thinking instruction should look like has been made by Paul (1992: 303-304) where Paul says critical thinking is not an aim of education but the aim.

Richard Paul (1993) uses both philosophical and cognitive approaches to critical thinking to develop the critical thinking model which provides the theoretical perspective for this thesis and its methodological framework for data collection. Paul (1993) defines critical thinking as "thinking about your own thinking while you are thinking to make thinking better (Paul, 1993: 91). Additionally, Paul (1993: 21) provides a more in-depth definition of critical thinking as:

> a unique kind of purposeful thinking in which a thinker systematically and habitually imposes criteria and intellectual standards upon thinking, taking charge of the construction of thinking, guiding the construction of thinking according to the standards, assessing the effectiveness of the thinking according to the purpose, the criteria, and the standards.

These definitions place a strong emphasize on the metacognitive aspect of critical thinking, on independent thinking, and the importance of learning to assess thinking according to the ideal way of how thinking should be done (Reed, 1998).

Paul (1992) considers that thinking can be characterized in terms like: *clear, precise, accurate, relevant, consistent, profound, and fair*. In contrast, thinking can also be characterized as: *imprecise, vague, inaccurate, irrelevant, superficial, trivial and biased*. Because of this, he suggests that human beings should not unquestioningly believe what spontaneously occurs to them but there is the need to form

intellectually sound standards for belief, truth and validity. This can be achieved by cultivating the capacity of human minds to think critically. Critical thinking thus become more complex and Paul et al. (1990) defines critical thinking as:

> disciplined, self-directed thinking which exemplifies the perfections of thinking appropriate to a particular mode or domain of thought. It comes in two forms. If disciplined to serve the interest of a particular individual or group, to the exclusion of other irrelevant persons or groups, it is sophistic or weak sense critical thinking. If disciplined to take into account the interest of diverse persons or groups, it is fair-minded or strong sense critical thinking.

When one starts to think critically in the strong sense, a person develops special traits of mind and according to Paul et al. (1990), if one wants students to become critical thinkers in the strong sense, there are seven traits of mind that should be cultivated. The seven traits are: intellectual humility, intellectual courage, intellectual empathy, intellectual good faith (integrity), intellectual perseverance, faith in reason, and intellectual sense of justice.

He supports a Socratic philosophical tradition which influences the Critical Thinking Movement and stresses that this approach emphasizes cultivating a certain sort of person, the "rational person", conceived of as whole and integrated and as involving affective as well as cognitive dimensions of thinking. With the strong influence form Socratic questioning, Paul et al. (1990) created a model consisting of thirty-five dimensions of critical thinking. Basically this dimension consists of 9 affective strategies, and 26 cognitive strategies which are further divided into macro and micro-abilities as shown in Figure E.

3.4 Comparison of Paul's model and Bloom's taxonomy

Neither Bloom nor Paul's models are used in relation to employability although

Figure E: Paul et al. (1990) thirty-five critical thinking strategies

<table>
<tr><td colspan="2">The 9 affective strategies are:

1. Thinking independently 2. Developing insights into egocentricity or sociocentricity

3. Exercising fair mindedness 4.Exploring thoughts underlying feelings and feelings underlying thoughts
5. Developing intellectual humility and suspending judgement 6.Developing intellectual courage

7. Developing intellectual good faith or integrity 8.Developing intellectual perseverance
9. Developing confidence in reason</td></tr>
<tr><td>The 17 cognitive strategies divided into macro-abilities are:

10. Refining generalizations and avoiding oversimplifications
11. Comparing analogous situations
12. Developing One's perspective
13. Clarifying issues, conclusions, or beliefs
14. Clarifying and analyzing the meanings of words and phrases
15. Developing criteria for evaluation
16. Evaluating the credibility of sources of information</td><td>17. Questioning deeply
18. Analyzing or evaluating arguments, interpretations, beliefs or theories
19. Generating or assessing solutions
20. Analyzing or evaluating actions or policies
21. Reading critically
22. Listening critically
23. Making interdisciplinary connections
24. Practicing Socratic discussion
25. Reasoning dialogically
26. Reasoning dialectically</td></tr>
<tr><td colspan="2">The 9 cognitive strategies divided into micro-abilities are:

27. Comparing and contrasting ideals with actual practice 28. Thinking precisely about thinking
29. Noting significant similarities and differences 30. Examining or evaluating assumptions
31. Distinguishing relevant from irrelevant facts 32. Making plausible inferences, predictions or interpretations
33. Evaluating evidence and alleged facts 34. Recognizing contradictions
35. Exploring implications and consequences</td></tr>
</table>

mentioned and used in a great deal of research (Hale, 2008; Manaris et al., 2009; Vrchota, 2004). Bloom's taxonomy was originally built with the hope that it would reduce the labour of preparing annual comprehensive examinations (Krathwohl, 2002) as it is a scheme for classifying educational goals, objectives, and standards. It

is explained in detailed as the Malaysian education system uses this taxonomy in primary, secondary and tertiary levels. It also gives good explanation of two levels of thinking: lower and higher. Its objectives which describe intended learning outcomes as the result of instruction outcome based education (OBE) (Andrich, 2002) are practised widely in Malaysian educational settings. However, the emphasis on the three domains cognitive, affective and psychomotor is unequal with the one most developed generally being the cognitive domain (Andrich, 2002).

In comparison to Bloom's educational objectives taxonomy, which is entirely about cognitive processes (Andrich, 2002) with an emphasis on verbs for each separate levels in writing of terminal objectives for lessons, Paul's model is more comprehensive. It emphasises critical thinking strategies, where strategies can be taken by undergraduates to practice thinking critically rather than waiting to achieve end objectives as proposed by Bloom's taxonomy. Paul's model is also more comprehensive as it covers the affective, macro and micro cognitive critical thinking strategies and so is more suitable for this research on critical thinking in relation to employability.

3.5 Critical thinking and employability

Technical skills alone are not sufficient for success in the IT profession and soft skills like communication, problem solving, and teamwork are increasingly important (Brungardt, 2009; Gallivan et al., 2004; Harvey, 1999; Scott and Yates, 2002). According to Harvey (1999) it is the graduate's attributes that determine a graduate's success in the workplace rather than a specific degree. In addition,

researchers like Clark (2005) and MacLeod (2000) speak of soft skills shortage among employees in the workplace. Research aims to identify these attributes (Bailey and Stefaniak, 2000; Lewis et al., 2008; Nagarajan and Edwards, 2008) although, the list of attributes sought by employers is becoming longer and more complicated especially due to the nature of this field which is fast changing and complex.

Lewis et al. (2008) investigate the effects of technical and soft skills on Computer Science (CS) programme retention. Using structural equation modelling, they found that satisfaction with the major or course was the most important factor in determining the intention to leave or retention for the student majoring in CS. The least important reason to leave was obtaining technical skills (compared to soft skills); this implies that future graduates are aware of the importance of soft skills in relation to technical skills. Bailey and Stefaniak (2000), identify soft skills needed for employees in the IT sector using a threefold process. Firstly, they identify the knowledge; skills and abilities (KSAs) needed for successful IT professionals, and then rank the KSAs in order of importance. Lastly they incorporate the highly rated desired skills into a training curriculum. Their research produces twenty soft skills with the five most important ones being: problem solving, listening, teamwork, adaptability to new technology and new language and transferring knowledge to application.

If soft skills are crucial for graduates' employability, then this raises the question of how to include them in the training of the future workforce, including the possibility

of doing this during time spent in higher education. Nagarajan and Edwards (2008) researched graduates' perceptions of the practical relevance of university courses to the development of knowledge and non-technical skills applicable to their work experience. From audio recorded interviews with IT graduates, they revealed that apart from getting soft skills from extracurricular activities, students declared that they picked up these non- technical skills from previous work experience and other formal courses or subjects at university like psychology, sociology and international business. This suggests that critical thinking can be subject specific, in other words, taught as integrated in courses. From their study they also discovered that the soft skills the students say they need are communication skills, teamwork skills, conflict resolution and negotiation skills, managing expectations, abstraction versus generalization, eye for detail and time management.

Cleveland-Innes and Ally (2006) posit that soft skills are developed in the affective domain and are important to productivity, employer satisfaction, health and ultimately, economic success for society. The soft skills Cleveland-Innes and Ally (2006) list as important are self-awareness, analytical thinking, leadership skills, team-building skills, flexibility, the ability to communicate effectively, creativity, problem solving skills, listening skills, diplomacy and change-readiness.

All these soft skills can potentially be taught by teaching students how to think critically. This is because thinking precedes other types of behaviour; for example, having "self-awareness" means awareness of strengths and weaknesses in order to

improve. According to Paul et al. (1990) there are nine affective critical thinking strategies that can enhance self-awareness as listed below:

1. Thinking independently
2. Developing insights into egocentricity or sociocentricity
3. Exercising fair mindedness
4. Exploring thoughts underlying feelings and feelings underlying thoughts
5. Developing intellectual humility and suspending judgement
6. Developing intellectual courage
7. Developing intellectual good faith or integrity
8. Developing intellectual perseverance
9. Developing confidence in reason

For example, a person needs the ability to think independently as in strategy 1, to be aware of the truth or falseness of a situation by revealing or rejecting irrational beliefs. Independent thinkers are self aware of the consequences of any actions taken and not influenced or passively accept the beliefs of others. Apart from this strategy, one can easily relate the other 8 affective strategies to other soft skills. Consequently, examining critical thinking in relation to soft skills draws this thesis towards considering employability as a related theoretical perspective.

3.6 Critical thinking defined

Thinking is the most fundamental of an individual's abilities because thinking precedes any behaviour. Thinking not only helps human beings fulfil their responsibility, but it is also the essence of humanity. This means the act of thinking is central to all human behaviour. Moon (2008: 126)) discusses the fact that "there is no one definition of something like critical thinking and that it is also linked to cultural interpretations. Firstly, she states that:

> It is clear that critical thinking is something to do with the processes of learning … Critical thinking would seem to be a gathering of various processes such as understanding, analysis, synthesis, evaluation and so on (such as those described by Bloom 1956) and termed 'tools of manipulation of knowledge' … (Moon 2008: 25)

However, Moon (2008: 126) continues that:

> The fully developed capacity to think critically relies on an understanding of knowledge as constructed and related to its context (relativistic) and this is not possible if knowledge is viewed only in a dualistic or absolute manner.

Thus, a critical thinking model has to reflect this process of the construction of knowledge and for this reason Paul's concept of critical thinking and his model is selected as the most appropriate for this study.

Chapter Summary

This chapter suggests that constructivist learning theory is the most relevant learning theory to support the teaching of critical thinking. This is because it suggests activities which are student centred and give freedom to students to become better critical thinkers. In the Malaysian education system, Bloom's, taxonomy, more representative of a behaviourist approach, is still widely and at times solely used.

This chapter stresses that Paul's critical thinking model is a better option as it is more comprehensive and gives equal attention to both affective and cognitive domains which are important not only for the enhancement of critical thinking but also to the holistic development of graduates. The next chapter will discuss employability in relation to this research.

Chapter 4 - Employability

How on earth have we got ourselves in such a position where expectations of new graduates are so absurdly inflated and so unrealistic? Hinchcliffe, G. (2006)

Chapter outline

Employability plays a crucial role in labour market policies (McQuaid et al., 2005) in enhancing social and economic growth at national, regional and local level. There is an apparent pressing association between the concepts of employability with higher education (Prokou, 2008). Universities all around the world are called upon in making their graduates more employable for today's knowledge economy. With reference to the above, this chapter presents definitions of employability, draws a holistic employability framework, answers what constitutes an employable graduate and associates higher institutions' roles in promoting graduates' employment.

4.0 Defining employability

The concept of employability differs according to contexts and meanings (Andrews and Higson, 2008; Hillage and Pollard, 1998; McQuaid and Lindsay, 2005) and Philpott (1999) says it is more often used than properly understood. It is defined as "a fuzzy notion, often ill defined and sometimes not defined at all" (Gazier, 1998: 298). The concept of employability is widely discussed in labour market policies but it is also pertinent to the changing roles of institutions of higher learning globally. In general, there are two ways to view employability. Firstly, in a narrowly defined

context, employability relates mainly to an individual's readiness for work. Secondly, in a broader perspective, it sees individual's employability in terms of his or her capabilities to move into new employment taking into consideration of all other factors influencing whether an individual can get relevant work.

A narrowly defined supply-side view on employability focuses on individual's skills only. As employability is centrally synonymous with skills, it is not surprising to find abundant research on the "skills and attributes approach" (Andrews and Higson; 2008, McLaughlin, 1995; McQuaid and Lindsay, 2005). These skills, whether they are transferable skills, personal competencies, core skills, soft skills or key skills are the desirable prime outcomes of higher education in making students employable. In other words, looking at employability this way defines employability as primarily a characteristic of the individual. There are many definitions of employability which hint at this view (Forrier and Sels, 2003; Fugate et al., 2004; McQuaid and Lindsay, 2005).

McLaughlin (1995) defines employability as a mix of skills that employers expect to find in new recruits. Skill is then defined as a set of characteristics that make a person employable, including knowledge, know-how, attitudes and behaviours. The Dearing Report (1997) presents a comprehensive list of skills and argues that higher education should realise its aspiration to be world class in both teaching and research through agreement with staff, students, government, employers and society in general. The report supports the further development of a range of what it calls 'key' skills during higher education – communication, both oral and written, numeracy,

the use of communications and information technology and learning how to learn, which potentially links it to thinking critically, a point of relevance to this thesis in relation to Vision 2020 for example.

The report argues that these key skills are necessary outcomes of all higher education programmes, namely:

i) Communication: speaking, listening, reading and writing skills.
ii) Application of Number: interpreting information involving numbers, carrying out calculations, interpreting results and presenting findings
iii) Information Communication Technology: finding, exploring, developing and presenting information including text, images and numbers
iv) Working with others: includes process and interpersonal skills to support working cooperatively with others to achieve shared objectives, work cooperatively and have regard for others
v) Improving own learning and performance: developing independent learners who are clearly focused on what they want to achieve and able to work towards targets that will improve the quality of their learning and performance.
vi) Problem solving: encouraging learners to develop and demonstrate their ability to tackle problems systematically, for the purpose of working towards their solution and learning from this process.

It can be seen that Malaysia's education objectives, discussed in chapter 2, are similar to the Dearing Report (1997) objectives particularly with the emphasis of basic literacy skills such as speaking, listening, writing and mathematics skills. Information and Communication Technology (ICT) too is given emphasis and the stress on critical thinking ensures the ability to work independently and in teams and solve problems.

In Canada the Employability Skills Profile (McLaughlin 1992) lists what twenty-five (25) major employers wanted:

- People, who can communicate, think and continue to learn throughout their lives.
- People who can demonstrate positive attitudes and behaviors, responsibility and adaptability.
- People who can work with others.

In Canada, this emphasis on employability also tends to dwell on the improvement of individual characteristics, such as educational achievement, employment skills, work habits, the ability to write resumes, interviewing skills and attitudes in order to find paid work.

Even when defining employability the narrow way, clear differences can be seen, especially when one defines the set of skills needed for a particular job. By interviewing twenty employers and thirty graduates of business-related courses, Andrews and Higson (2008) found three themes that their research respondents spoke of as necessary to enhance graduates' employability. Firstly, business-related knowledge and skills such as a higher qualification will make a graduate more employable. Secondly, interpersonal competencies are necessary as both employers and graduates spoke of the importance of having a high level of written communication and thirdly, work experience and work-based learning. The research analyses perception and experiences of both graduates and employers in five different areas, namely perception of current employment situations; reflections on higher education; experiences of work-based learning and other work; possessions of

business focused skills and competencies, and the usefulness of interpersonal and communication skills and competencies.

Andrews and Higson (2008) concluded that graduates benefit from work placements, internship and part-time employment. Employers in the four European Union (EU) countries who took part in the research expect their graduates to have discipline focussed knowledge and know-how abilities. They also voiced the need to have problem-solving abilities which they perceived as the ability to think critically and analytically, a point of direct relevance to this thesis.

4.1 Skills for employment: employer and employee perspectives

With relevance to this research on the role of critical thinking and employability, there is a range of opinion among employers of computer related companies in term of what they seek from their new employees. Bailey and Stefaniak (2001), for instance, identify the knowledge, skills and abilities needed by computer programmer and, find that the shortage of computer personnel comes from a lack of adequate skills not a lack of applicants. The study identified a total of 85 skills that were important to computer programmers; these subdivide into technical skills (53), soft skills (20) and business concepts (12). The three highest rated soft skills are listening skills, problem-solving processes and team work skills. Aken and Michalisin (2007), among others, state that there has been a significant level of research carried out to determine the skills that are lacking in recent Information Systems graduates (Cheney, 1988; Gallivan et al., 2004; Litecky et al, 2006;

Prabakar et al., 2005; Watson et al, 1990). Their research investigates the deficiencies of Management in an Information Systems (MIS) programme from employers' perspective. Aken and Michalisin (2007) note that MIS graduates are generally lacking in the quality of the skills that are of the most interest to employers. Lastly, Haywood and Madden (2000) use a semantic differential format (a Likert-type scale) with employed graduates ranking 9 generic skills. Time management was rated as the most important skill to be learned and applied in the workplace.

Where skills are concerned, there is a similar scenario in Malaysia. The Malaysian National Computer Association has reported that many unemployed ICT graduates lacked learning skills particularly "how to learn from more experienced people", and were deficient in communication, teamwork and problem-solving skills (New Straits Times, 2004). This issue has also been aired in the national press so that it is of interest to the general Malaysian public and government as chapter 2 indicated.

Based on the discussion above, it can be seen that the key skills of employability that emerge so far are:

- Job specific skills
- Soft skills (which can be nurtured through critical thinking skills)
- Critical thinking skills

4.2 Approaches to employability: a holistic view

On the other hand, when defined more holistically, employability emphasises both individual skills and labour market conditions which include both supply and

labour demand factors. This means apart from individual characteristics, for example, barriers to work faced by individuals, household circumstances and working cultures also concern employability. There are attempts to define employability in this more holistic approach, for example, by Hillage and Pollard (1998), the Kirby Report (2000), the 'Taskforce on Employability and Long-Term Unemployment' by the Department of Employment and Learning Northern Ireland (DELNI) (2002) and the ‘Statement on Education and Training’ by the Irish National Competitiveness Council (2009).

Firstly, Hillage and Pollard (1998: 12) offer this definition:

> Employability is the capability to move self-sufficiently within the labour market to realize potential through sustainable employment. For the individual, employability depends on the knowledge, skills and attitudes they possess, the way they use these assets and present them to employers and the context (e.g. personal circumstances and labour market environment) within which they seek work.

This definition emphasises both individual characteristics and readiness for work and also the factors influencing the labour market.

Secondly, the Kirby Report (2000: 37), based on work by the International Labour Organization, discussed employability as being a construct which:

> Involve(s) self-belief and an ability to secure and retain employment. It also means being able to improve… (the workers) productivity and income-earning prospects. This often requires competing effectively in the job market and being able to move between occupations as necessary. It requires ‘learning to learn’ for new job opportunities.

The above clarifies that a graduate who seeks employment should possess a certain level of self-esteem and it is difficult to know whether it is a university’s

responsibility to make sure a graduate has self-integrity before he/she joins the working world. There is also the implication that learning is life-long, particularly as a graduate can expect to move between occupations. A lifelong approach is needed not only with regard to skills as a graduate should also display flexibility and adaptability in the workplace which itself is constantly changing.

Next, the Department of Employment and Learning Northern Ireland's (DELNI 1992) taskforce's analysis suggests a working definition of employability as follows:

> Employability is the capability to move into and within labour markets and to realize potential through sustainable and accessible employment. For the individual, employability depends on:
> • the knowledge and skills they possess, and their attitudes;
> • the way personal attributes are presented in the labour market;
> • the environmental and social context within which work is sought; and
> • the economic context within which work is sought.

There are similarities in these definitions. There is also the suggestion that new employees need skills such as presentation skills and interview skills. Again it has to be asked if this fits into the role of a university providing a particular type of education or if a university has to change as well.

Undoubtedly, there are many factors related to securing employment, such as graduates attributes and labour market policies but the National Competitiveness Council of Ireland relates education to employment in terms of the skills and knowledge a graduate possesses. This brings us to the question of the terminal objective of education, to be precise the outcomes of higher educational institutions. If part of their role is to supply employable candidates as part of a future work force, then there is the question of how these institutions should promote graduates'

employment. It appears that in this debate surrounding education and employment, the promotion of skills or the skills agenda in tertiary level institutions cannot be ignored. Because of that, the National Competitiveness Council Ireland (NCC) in the Statement on Education and Training 2009 sees the education system in the Republic of Ireland as the critical foundation for the country's economic and social progress where education has the responsibilities of equipping the Irish workforce with skills and qualities which will support growth in economic activity and employment.

This is similar to Malaysia's concern with Vision 2020 and the role of education in achieving Vision 2020's goals. With the prospects of unemployment in Ireland, the NCC states the importance in striking a balance between supplying necessary resources to the newly unemployed and up-skilling the entire workforce with key skills for the future, as employment can no longer be viewed from a 'job for life' perspective

The National Skills Strategy (NSS) provides details of an ambitious vision for the skills profile in Ireland in 2020. The key skills for the future as listed by the National Skill Strategy are as below:

- Generic and soft skills (critical thinking, self-management, self-directed learning, communication, influencing skills and team working)
- Language skills (communication skills, foreign language skills)
- ICT literacy (ICT skills)
- Maths, Science, Technology and Engineering

However, listing what is needed is not a guarantee that a national strategy will work out. There are other internal factors that need to be considered such as providing the

infrastructure for a plan. For example, introducing ICT in schools also requires ICT infrastructures and professional development or training for teachers.

4.3 Creating a holistic framework

In the Department of Education, Science and Training Australia (DEST) Report (March 2002) "Employability Skills for the Future", employers were seeking highly skilled and generically skilled graduates. The report defines employability as 'skills required not only to gain employment but also to progress within an enterprise so as to achieve one's potential and contribute successfully to enterprise strategic directions (2002: 3). The report offers an employability skill framework that has three key terms which are: *personal attributes*, *skills* and *elements*. These key skills are explicitly defined with more sub-skills and examples are provided to illustrate and refine the nature of the skill.

Firstly, *personal attributes* encompasses loyalty, commitment, honesty and integrity, enthusiasm, reliability, personal presentation, commonsense, positive self-esteem, sense of humour, balance to work and home life, ability to deal with pressure, motivation and adaptability. Secondly, *skills* encompass communication, team work, problem solving, initiative and enterprise, planning and organizing, self-management, learning and technology. Thirdly, *elements* are facets of the skills that employers identified as important and the mix and priority vary from job to job. For example, elements for the skill 'communication' are listening and understanding, speaking clearly and directly, writing for the needs of the audience, negotiating responsively, reading independently, empathising, using numeracy effectively,

understanding the needs of internal and external customers, persuading effectively, establishing and using networks, being assertive, sharing information, and speaking and writing in languages other than English.

Another example is for the skill 'learning', where the facets are for this skill : managing own learning, contributing to the learning community at the workplace, using a range of mediums to learn – mentoring, peer support, networking, information technology courses, applying learning to 'technical' issues (such as learning about products) and 'people' issues (for example interpersonal and cultural aspects of work), having enthusiasm for ongoing learning, being willing to learn in any setting – on and off the job, being open to new ideas and techniques, being prepared to invest time and effort in learning new skills, and acknowledging the need to learn in order to accommodate change. These in-depth lists require some integrated framework in which they can be understood.

McQuaid and Lindsay (2005) offer a holistic framework of employability, illustrated in Table 5, which has three main inter-related components: individual factors; personal circumstances, and external factors. The improvement of employability skills, therefore, includes personal interaction skills, formal qualifications, attitudes and timekeeping, which can help the job search process. Also, there are external factors influencing personal circumstances such as the availability of childcare or dealing with aspects of labour demand (McQuaid et al., 2005).

Finally, as graduates themselves are also outcomes of higher learning institutions; higher education can help most evidently in nurturing the individual factors under the first column in this framework. Institutions of higher learning can also directly equip graduates with the necessary skills to combat factors under the second and third columns too where it will be helping graduates either to maintain or move within a workforce and progress within the enterprise.

Table 5: Holistic Framework of Employability (adapted from McQuaid and Lindsay, 2005)

Individual Factors	Personal circumstances	External factors
Employability skills and attributes Essential attributes Personal competencies Basic transferable skills Key transferable skills High level transferable skills Qualifications Labour market attachment Demographic characteristics Health and well-being Health Disability Job seeking Adaptability and mobility	Household circumstances Direct caring responsibilities Other family and caring responsibilities Other household circumstances Work culture Access to resources Access to transport Access to financial capital Access to social capital	Demand factors Labour market factors Macroeconomic factors Vacancy characteristics Recruitment factors Enabling support factors Employment policy factors Other enabling policy factors

It is therefore, essential to see the connection between institutions of higher learning and the employability of graduates as the results for this research reveals and this is examined in the following section.

4.4 Higher education and employability

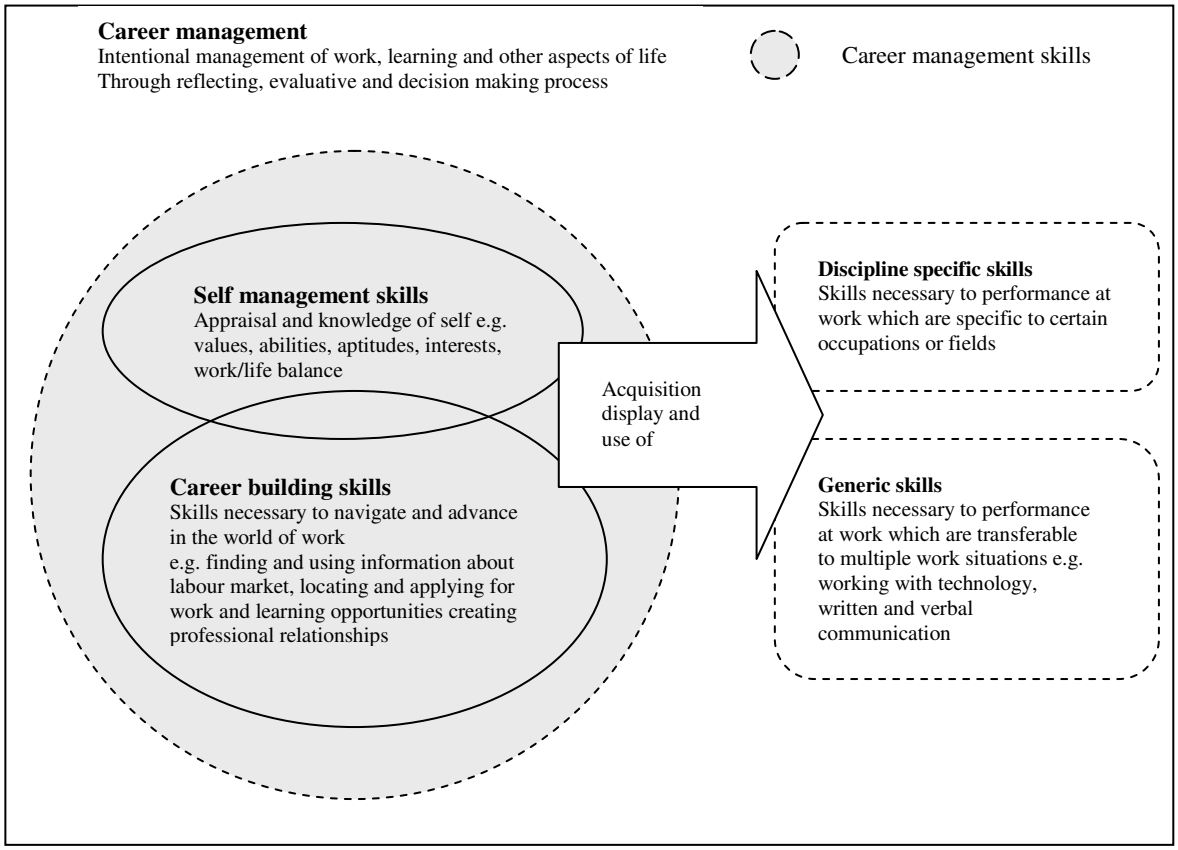
In recent times, there has been major economic, political and social change globally. Also, in relation to higher education gone are the days where people went to universities purely for the sake of pursuing knowledge for its own sake. The function of universities as public institutions is extensively debated and part of this debate includes the pressure to produce employable graduates (Andrew and Higson, 2008; Bridgstock, 2007; Green et. al, 2009; Knight and Yorke, 2003; Mason et al., 2009; Prokou, 2008). According to Bridgstock (2007), recent shifts in education and labour market policy have resulted in universities being placed under increasing pressure to produce employable graduates. In the context of a rapidly changing information and knowledge intensive economy, she suggests that employability should not be seen as only having skills desired by employers but graduates should be able to proactively navigate the world of work and self manage the career building process. If universities are to embrace a graduate employability agenda, then there is a question around what the tertiary educational sector should foster in its students.

Bridgstock (2007) created a model of desirable graduate attributes in which she acknowledges the importance of self management and career building skills to lifelong career management and enhanced employability (see Figure F). Her

conceptual model suggests that universities must begin to comprehensively and actively engage with the employability agenda, where students actively manage career building and self-management skills, through intentionally managing all aspects of their lives including learning. As the model suggests, this is achieved through reflection, evaluation and decision-making.

Bridgstock, (2007) says desirable graduate attributes are not only generic skills but that universities should also promote broader career management competence. This is because

Figure F: Conceptual model of graduate attributes for employability including career management skills (Bridgstock , 2007)



employer-driven lists of employability do not address the full picture of what is required by graduates facing the prospect of entering the labour market. Graduates will therefore require higher-order, meta work skills which are the abilities to continuously recognize and capitalize on employment and training-related opportunities and integrate these with other aspects of an individual's life. Thus, graduates have to think critically and strategically throughout their lives with regard to employment. This is a key point where there appears to be an inter-linking of critical thinking with employability and so this model is of major relevance to this thesis.

Chapter summary

This chapter concludes the theoretical perspectives on this research project which views the employability of Malaysian graduates in relation their critical thinking skills. It has examined views on employability and concludes with a holistic framework in which to view the individual graduate.

The next chapter, chapter 5, sets out the methodology for this investigation.

Chapter 5 - Research Methodology

"While we have made tremendous progress in science and technology, we've made virtually no progress in human affairs because our method of thinking is simply not design-based...mankind is operating well below full thinking capacity." Edward de Bono in Japan Times (2003)

Chapter outline

Mixed research is chosen as the research design as it is seen as the most appropriate way to discuss both employability and critical thinking issues depicted in the research questions. The constructed research questions which attempt to address graduates' unemployment problem through critical thinking strategies can best be answered through triangulation of data from both qualitative and quantitative methods of a mixed research design.

The reason for choosing the research topic is described together with the difficulties encountered while conducting the research. This is followed by the limitations of this research. Next is the introduction to mixed research paradigm where all the three involved paradigms; the quantitative, qualitative, and mixed research paradigms are discussed. The reason why this type of paradigm is chosen for this research is also explained. Thirdly, the method, research questions synergy and projection of the research are presented in two separate explanatory diagrammes. Finally, there is a summary of this chapter.

5.1 Natural History of the research

The interest to pursue this research started with an interest in building English materials which support critical thinking. This is due to the lack of aesthetic and culturally relevant English materials for tertiary level in Malaysia. Even though critical thinking has been implemented into Malaysia's educational curriculum and taught in almost all subjects in primary and secondary schools in Malaysia, it is not compulsory to do so at university levels. In 2006, when the PhD was started, the unemployment problem among Malaysian graduates surfaced as a critical issue. Lack of critical thinking was frequently quoted by politicians as well as academics as one of the major reasons why graduates are unemployed. It is due to the relevancy, appropriateness and needs at this particular time that the research topic shifted from English teaching materials and critical thinking to graduates' employability and critical thinking.

There are three major reasons why this study is focussed on the relationship between graduates' employability and critical thinking. Initially, in 1994, when I first started teaching at primary school level, I was teaching Science and English. It was then that CCTS (critical and creative thinking skills) was first implemented. I was sent for courses and training for teaching these skills through the two subjects. In 2004, 10 years after that, I continue to integrate CCTS in English for my tertiary level students. I strongly believe that teaching CCTS is beneficial for overall development in students. One simple way is by selecting workbooks which support critical thinking for my students, the link to my original research intention. Secondly, in 2006, when the problem of unemployed graduates arose, lack of critical thinking

skills was numerously quoted as one of the major reasons for unemployment.

Although clearly it cannot be the main reason to why these graduates are unemployed, this is quite frustrating for me. After more than 10 years of including critical thinking skills into teaching and learning activities, it is sad to find that students cannot think critically and secure themselves employment after graduation. Thirdly, since there is little to date on the relationship between critical thinking and employability, it is definitely a challenge to discover a connection between them.

5.2 Research Design: Mixed Research Perspective

The reason for using a mixed research perspective is initially based on the research objectives of my research questions. Writers like Creswell et al. (2003) and Newman et al. (2003) agree that research objectives have an important relationship to research questions in opting for a research design. Along with Morse (2003), they conclude that it is the intent of how the chosen methods are used when answering the research questions that differentiates a mixed research design to one which merely uses two different research techniques.

A mixed research design, in general is a combination of quantitative and qualitative methods. The act of linking quantitative and qualitative methods or data derived from these methods in the same research can be pursued with different aims. Basically it is to obtain broader knowledge on a study than what a single method would provide by validating the findings from both methods. Creswell et al. (2003)

say that this kind of research is more than simply collecting both quantitative and qualitative data; it indicates that data will be integrated, related, or mixed at some stage of the research process. Erzberger and Kelle (2002) say that this combination results in three types of outcomes:

1. Quantitative and qualitative results coverage, mutually confirm and support the same conclusion.
2. Both focus on different aspects of an issue, such as the subjective meaning of subject matter in the study, but are complementary to each other and lead to a fuller picture.
3. Quantitative and qualitative results are divergent and contradictory. Bazeley (2003) urges that researchers employing mixing methods be able to cope when unexpected divergences and contradictions arise. In solving this, a high understanding of principles is required because methods are frequently modified and methodological assumptions may be challenged.

A mixed research design or paradigm involves both quantitative and qualitative methods. This chapter breaks the design into three parts and discuss them one by one according to the sequence: quantitative, qualitative and mixed research paradigms to help comprehension.

A paradigm is a perspective based on a set of assumptions, concepts and values that are held by a community or researchers. Likewise, a paradigm can be defined as the "basic belief system or world view that guides the investigation" (Guba and Lincoln,

1994: 105). Mertens (2003) says that a paradigm is a conceptual model of a person's worldview, complete with the assumptions that are associated with that view. A theoretical paradigm or philosophical assumptions about the nature of reality is crucial to understanding the overall perspective from which the study is designed and carried out. A theoretical paradigm is thus the identification of the underlying basis that is used to construct a scientific investigation; or, "a loose collection of logically held together assumptions, concepts, and propositions that orientates thinking and research" (Bogdan and Biklan, 1982:30).

The definitions for quantitative, qualitative and mixed research paradigms given below are adapted from the Handbook of Mixed Methods in Social and Behavioural Research by Tashakorri and Teddlie (2003).

5.2.1 Quantitative Research Paradigm

It is a research that lies primarily on the collection of quantitative data (Tashakorri and Teddlie, 2003). Its characteristics include involvement of deductive or "top-down" processes where researchers construct hypotheses then test them against theory using data. This paradigm views human behaviour as regular and predictable under controlled conditions. Data is collected based on precise measurement using structured and validated data collection instruments like close-ended items, rating scales and behavioural responses. Normally data is in the form of variables and analysed using statistical instruments. The results from data analysis have generalized findings and are presented through a statistical report such as correlations, comparing scores and reports of statistical significance of findings.

5.2.2 Qualitative Research Paradigm

Qualitative research methods are inductive or "bottom-up" (Tashakorri and Teddlie, 2003). Data collected through fieldwork during the research will generate new hypotheses and grounded theory. It studies human behaviour in natural environments and the context in which behaviour occurs. The researcher is the primary data collection instrument. Data is collected through, for example, in-depth interviews, participant observation, field notes and open-ended questions. Data can be in the form of word, images, categories and even expressions and data collected is analysed by searching for patterns, themes and holistic features. Data is reported for instance by using a narrative report with contextual description and direct quotations from research participants. For example, Strauss and Corbin (1988) used content analysis to aggregate data from open ended-questions to capture students' thoughts about their future career and embarking on a working life while Ryan and Rusell (1995) created categories by reading responses and observing the themes that emerged by coding data. Lairio and Penttinen (2006) used χ^2 (chi²) analysis to seek students' thoughts about their future career.

5.2.3 Mixed Research Paradigm

The mixed research paradigm involves both deductive (quantitative/positivist) and inductive (qualitative/interpretive) methods and view human behaviours as predictable. Human behaviours are studied in more than one condition and looked at through a multilens focus as in the theoretical perspectives discussed in relation to this research. Research of this kind normally has multi-objectives and its

corroborated results may be generalized. It is an eclectic and a pragmatic type of research and as a pragmatic research it supports the usage of more than one method in a single research. These complex combinations of approaches provide greater opportunities for mapping, analysis and interpretation to provide *holistic* understandings of the research area than would be gained if relying on a single approach (Sammons et al., 2005; Tashakorri & Teddlie, 2003).

There are two types of mixed research: mixed method research and mixed model research. Mixed method research is where a researcher uses a type of research paradigm for a phase of the research study and another type of research paradigm for another phase of the research study. It can be quantitative, followed by a qualitative paradigm or the other way round. For example, a researcher might distribute questionnaire surveys (quantitative) and after that conduct an interview with the respondents to see how they agree with the analysis of the survey. Mixed model research, however, is where the researcher mixes both qualitative and quantitative research approaches within a single stage of the study or across two of the stages of the research process. For example, a researcher might conduct a survey and use a questionnaire that is composed of multiple close-ended questions or quantitative type items as well as several other open-ended or qualitative type items. Another example is that a researcher might collect qualitative data but try to quantify the data.

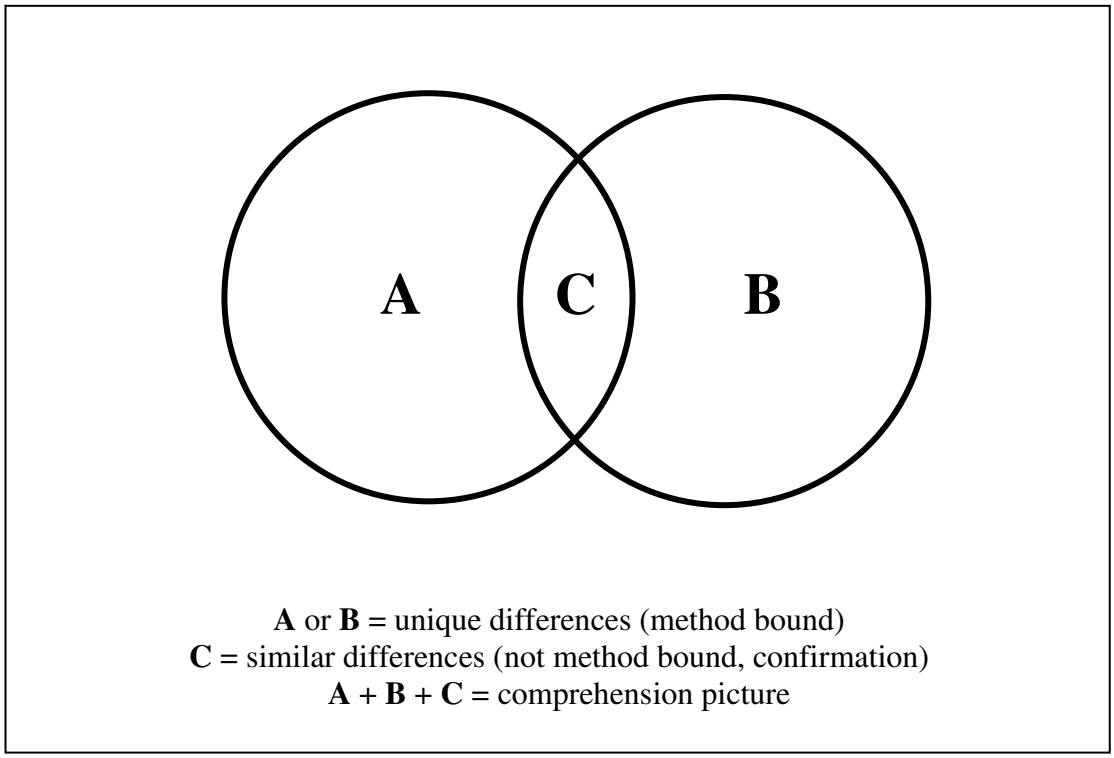
The mixed research paradigm is supported by the pragmatists; one of three schools of thinking on the debate of whether paradigms should be linked to methods. Maxcy (2003: 52) states that "pragmatism" is as much a philosophy of science as it is a

method that embraces a plurality of method and method philosophies. In embracing holism and continuity, research using mixed methods suggests that that the question within each stage of research cycle is more important than either the method used or the paradigm that underlies the method (Teddlie and Tashakkori, 2003: 21).

The mixed research approach is said to originally stem from the "triangulation of methods" movement. The main goal of triangulation is to confirm a study's results by using quantitative and qualitative methods. Yet mixed research approach's goal goes beyond the initial goal of triangulation. According to Shih (1998) and Thurmond (2001), there are two broad goals of using mixed research approaches: confirmation and comprehension of results. Confirmation is defined as the convergence of findings from two different data sets and has been operationalised by two general approaches in the literature. The second goal which is comprehension, brings together qualitative and quantitative approaches to provide a more comprehensive and detailed understanding of a phenomenon under study.

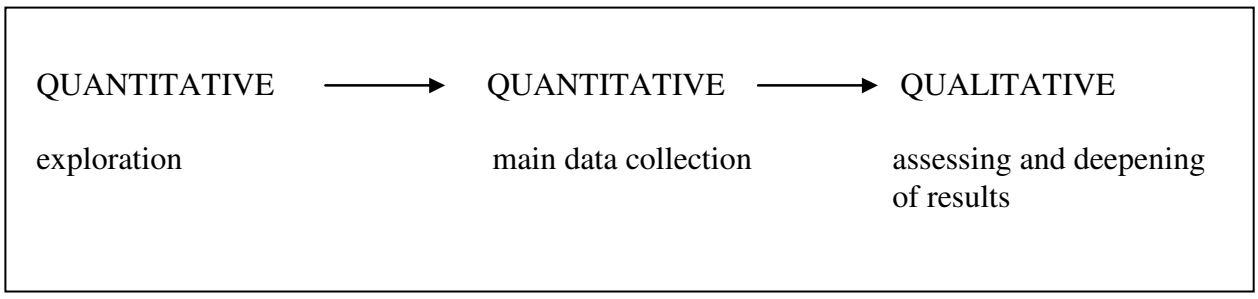
From figure G, assuming that method A precedes method B, linkage of methods is in a sequential manner. This manner is seen in a sequential approach where it makes a study logical and easily conducted as it flows phase by phase. Miles and Huberman (1994) and Patton (1990) consider that the data from the initial phase helps explore a research topic while data from the last phase helps assess and deepen the results of earlier phases.

Figure G: Confirmation and comprehension: Related concepts [Adapted from Mitchell (1986: 22)]



Another sequential approach design is given by Miles and Huberman (1994). This is Figure H.

Figure H: Sequential approach design for the integration of quantitative and qualitative research [Adapted from Miles and Huberman (1994: 41)]



This design also suggests the integrations of both quantitative and qualitative methods.

5.2.4 How was the research carried out?

This research uses the mixed model approach paradigm through a 2-phase sequential design. Phase One, according to Miles and Huberman (1994) is the exploration phase. In this research, this phase consists of two surveys: a web survey to recent graduates of Computer Science degree and a postal survey to employers of Information and Communication Technology (ICT) in Malaysia. In general, both surveys explore the unemployment issue from both graduates' and employers' point of view. The overall results and interpretation of the results serve as a basis for progression and the next data collection and analysis phase.

Phase Two, is the main data collection. Data is collected from questionnaires where final year undergraduates doing computer-related degrees are the respondents. The respondents' perceptions of their own critical thinking abilities and their perception on how important these abilities are to their future employment are measured using a Likert scale. The data collected then aim to answer the research questions.

5.3 Rationale for using mixed research

Mono-method research was not considered in this research because of the complexity of the research question. The research aims for a comprehensive and holistic inquiry seen through multiple and diverse perspectives presented in the research questions. Consequently, the mixed research design does justice in answering research questions through three ways: the appropriateness of each method and research topic, consideration of existing theory and previous research

method - existing theory and other similar research and the inadequateness of either quantitative or qualitative data to address the research issues.

Firstly, the appropriateness of each method and research topic is considered.

Method- research topics in this research are:

1. Web survey with questionnaire to collect what Computer Science graduates 2005/2006 think are the reasons for the Malaysian graduate unemployment issue (Refer to Appendix H)
2. Postal survey questionnaire to employers of ICT companies where employers rate the importance of employability skills for graduates to be employable and answer open-ended questions on the unemployment issue (Refer to Appendix I)
3. Formal questionnaire to final year students of computer-related degrees to assess their perceptions on own ability and importance of critical thinking strategies and answer open-ended question on employment (Refer to Appendix J1)

A quantitative survey with Likert scale is chosen for the formal survey because of its appropriateness in collecting such responses in relation to their perceptions of their critical thinking strategies and of the importance of these skills to future employment.

Secondly, research with similar objectives and methods of data collection are by

Nabi and Bagley (1998) and Nguyen et al. (2005). Nabi and Bagley (1998) assessed graduates' perceptions of the quality and importance of skills and competencies acquired through their degree courses. They used postal questionnaire with a five point Likert scale to measure transferable skills. They measured:

a) the quality of students' transferable skills with 1 = well below average and 5 = well above average.
b) the importance of these skills in coming years with 1=irrelevant and 5=very important

Nguyen et al., (2005) sought students' perceptions and the needs of employers in terms of personal qualities of higher education graduates' assessments of their own abilities with a Likert scale ranging from 1=lowest quality and 5=finest quality and the students' perceived importance of their abilities with 1= least important and 5=most important.

To conclude, neither type of either quantitative or qualitative data appears to be adequate alone to address the complexity of issues examined in this research.

5.4 Advantages of Mixed Research

According to the mixed research principle, the researcher should mix quantitative and qualitative research methods, procedures and paradigm characteristics in a way that the resulting mixture or combination has complementary strengths and

nonoverlapping weaknesses. When different approaches are used to focus on the same phenomenon, they provide the same result and there is corroboration, it means there is superior evidence for the result. Finally, mixed research complements one set of results with another, to expand a set of results, or to discover something that would have been missed if only a quantitative or a qualitative approach had been used.

5.5: Mixed model and research questions synergy

This synergy is explained and can be seen in figure I. The research design is a two phase sequential mixed model design where phase 1 precedes phase 2. Both phases 1 and 2 comprise of both quantitative and qualitative methodologies.

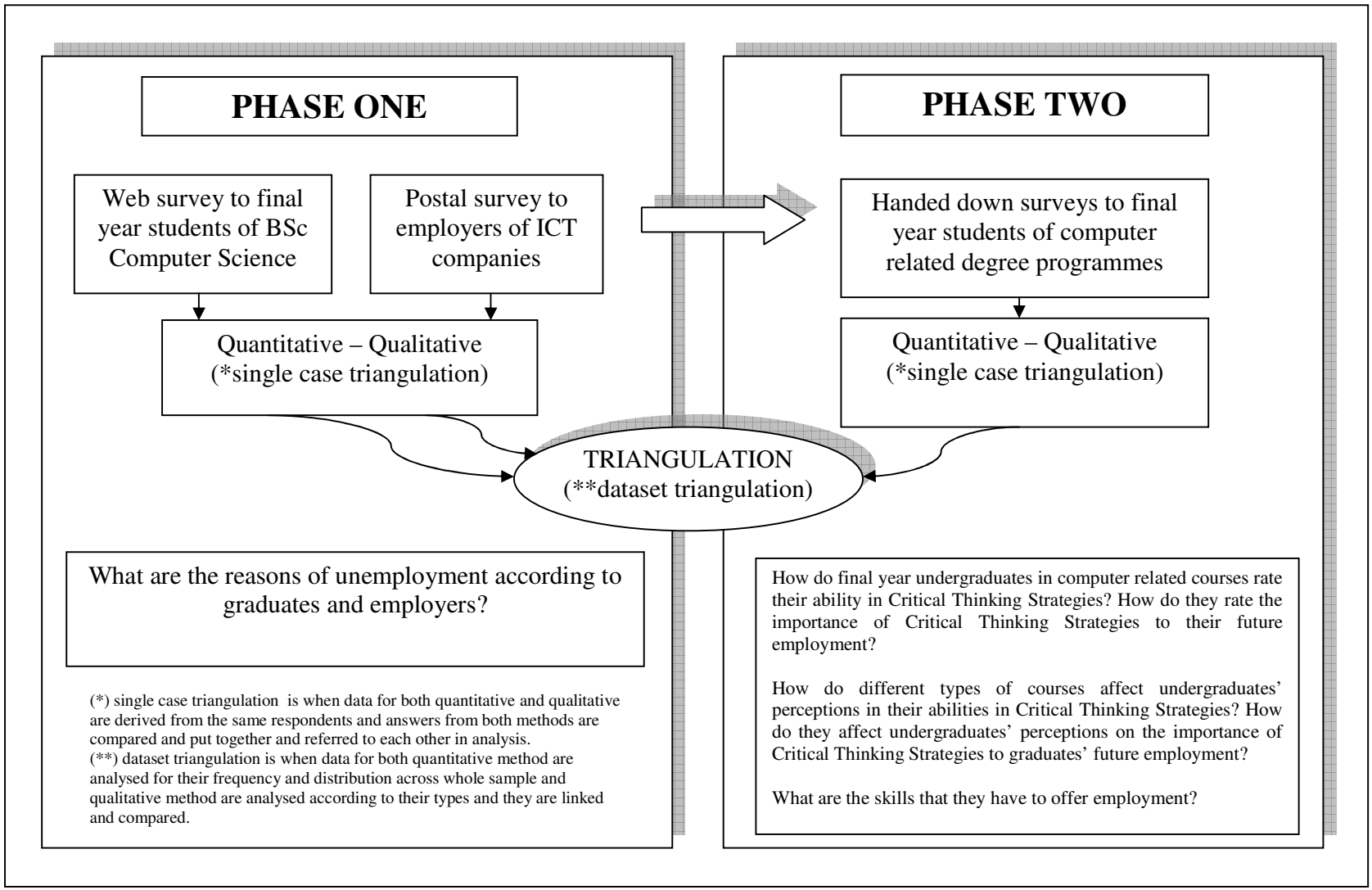
For survey 1, which is the web survey to final year students, the quantitative responses define the reasons for graduate unemployment from their point of view. The graduates choose the reasons under four main issues: graduates themselves, English, government and university. The qualitative responses in the form of comments offer personal reactions to the research topic where graduates support the earlier reasons for unemployment or supply other reasons for it.

For survey 2, which is the postal survey to employers of ICT-related companies, the quantitative responses from the employers produced a list of important employability skills under the headings of: essential attributes, personal competence, transferable skills and job seeking skills. These headings are drawn from column 1 of McQuaid

and Lindsay's (2005) model as presented in chapter 4. The other columns are not used as this thesis focuses on the relationship between skills, employability and critical thinking in an educational context and does not concern itself with the personal circumstances of each individual graduate (though aware of holistic approaches). The qualitative answers to open-ended questions elaborated findings by connecting employability skills to education and training, changes in skills requirement and personal comments from employers on unemployment issues that are not covered earlier.

The third survey is a formal survey to final year students of computer-related degrees. The quantitative responses from the final year students show how these final year students perceive themselves as having critical thinking strategies and how they perceive the importance of these strategies to their future employment. The qualitative part of this questionnaire is six open-ended questions which mainly ask the students to identify the skills they have to offer the working world. In conclusion, both quantitative and qualitative findings are of equal importance in defining the reasons of unemployment among graduates in Malaysia from both graduates' and employers' perspectives.

Figure I: Mixed model, triangulation and research question synergy



5.6 Data collection and analysis

Data was collected and analyse from three surveys:

1) Survey to recent graduates.
2) Surveys to employers.
3) Survey to final year students.

5.6.1 Data Collection and Analysis for online survey to final year students

For the online survey (See Appendix H1, H2 and H3) for recent graduates of Computer Science in University Teknologi Malaysia, data is collected online as graduates answer and submit a questionnaire on a webpage. Following internal ethical approval for the research, a formal letter was sent to the Deputy Dean for Research and Postgraduate Studies at the Faculty of Computer Science and Information Systems University Teknologi Malaysia, to inform the Deputy of the potential research, request consent and request data for potential respondents. Contact information in the form of email addresses was supplied and the webpage address was sent to the respondents using the email as a cover letter. A total of 190 questionnaires were sent out to potential respondents with 16 percent returned usable responses.

The items in the questionnaire are based on the responses to graduates' unemployment phenomenon in Malaysia as being widely discussed in the local media. The questionnaire is in Malaysia's first language, Bahasa Melayu. The questionnaire is translated into English (See Appendix H2). It consists of four multiple choice questions and a space where graduates comment on the

unemployment issue.

Answers to the four multiple choice questions are analyzed by manually counting the responses, jotting down the occurrences in a table, using Chart Wizard in Microsoft Excel to draw up a percentage bar chart to represent the data. The comments are analyzed using content analysis so that respondents' responses are read and themes which emerged from the reading are noted. The four main reasons of unemployment: the graduates, English, Government and universities helped shaped the discussion but there are other new themes which emerged such as the conservative ways of teaching and learning in higher education.

5.6.2 Data analysis for surveys to employers

For the postal survey to employers of Information and Communication Technologies in Malaysia data was collected via a questionnaire. This was posted out to employers of Information and Communication Technology (ICT) related companies listed under the Multimedia Super Corridor (MSC) in 2005/2006. The questionnaire consists of two parts:

(1) A list of employability skills adapted from Mc Quaid and Lindsay (2005) where employers need to rate these skills;
(2) Five open-ended questions on the skills that employers expect from new employees and their comments on the graduates' unemployment issue. The survey was sent out to 445 addresses and there is a 9% returned usable questionnaire.

Here it was important to rank the skills: In the questionnaire, employers are given employability skills under four headings: essential attributes, personal competencies, transferable skills and job seeking skills. Employers rank the skills from the most important (using the highest number) to the least important (using the lowest number). Using Microsoft EXCEL, the rankings are totalled up and the highest score represents the most important skill whereas the lowest will represent the least important skill.

5 open-ended questions were also asked. Answers to these questions were all transferred to EXCEL and analysed using content analysis quantitatively. The answers were categorised into the four sub skills under the employability skills list taken from McQuaid and Lindsay (2005). The occurrences of acceptable answers score a value of "1" and non-acceptable answers get a value of "0". If an answer has two occurrences, then the score will be "2". Later, the scores are totalled up and presented in percentage form.

5.6.3 Data analysis for final year students of computer-related degrees in 10 public universities in Malaysia

In the formal survey to final year students of computer-related degrees from ten public Malaysian universities (See Appendix C), a range of data was collected. The questionnaire is broken into three parts:

(1) demographic details such as gender, courses/degrees, universities and a question which asked respondents whether they are in their present courses with the belief

that English is unimportant;

(2) thirty-five (35) questions seeking respondents' perceptions on their Critical Thinking Strategies and another thirty-five (35) questions in parallel seeking respondents' perceptions on the importance of these Critical Thinking Strategies to future employments;

(3) six (6) open-ended questions asking respondents of their abilities and future jobs.

Data collection in Malaysia was conducted from 25 February 2007 to 24 May 2007. Distribution of questionnaires to the public universities is with permission from the Ministry of Higher Education and respective higher authorities in individual universities.

The mode of distributing and collecting the questionnaire varies according to the universities. It is best to note that when data collection was conducted, it was during study break for first semester examinations, a time when respondents are difficult to get hold of. At Universiti Sains Malaysia, I was fortunate enough to get the respondents in a lecture hall where they answered my questionnaire and handed it in on the spot. At another university, Universiti Malaya, I had to seek assistance from students to distribute and collect the questionnaire. Then at another, I was not allowed to have contact with the students and the questionnaire was asked to be put at a common place where students walk in and out and have the freedom to pick up and do the survey. This resulted in the least number of responses. In total, there are 671 usable returned questionnaires, which include 274 males and 398 females producing a response rate of 100 percent of handed out/collected questionnaires.

Data analysis is carried out to answer the following research questions:

a) How do final year under graduates in computer related courses rate their ability in Critical Thinking Strategies?

b) How do final year under graduates in computer related courses rate the importance of Critical Thinking Strategies to their future employment?

c) Being in the final year, respondents were asked about the skills that they have to offer their future employment.

Additionally, the research yielded statistically significant results relating to types of course. There were also additional and unexpected statistically significant results on how male and female undergraduates differ in their perception of having Critical Thinking Strategies as well as differing in their perception of the importance of Critical Thinking Strategies to their future employment. These are included in the discussion of findings due to their significance even though there is no research question around gender.

The Statistical Package for the Social Sciences (SPSS) Version 14 to analyse the quantitative data. Firstly, using this package, the usual descriptive statistics analysis such as simple frequency distributions was done for respondents' gender, courses and universities. The results are then presented graphically, for example through bar charts. As quantitative research involves measurements, like a number of variables across a sample, ways to summarise data from these variables was undertaken, for example by comparing means and standard deviation.

For the first two pairs of research questions, data is analysed by comparing mean

scores. A mean is an average score of any group on a test, as a common measure of central tendency. So for the first group, that is, respondents' perceptions on their ability in Critical Thinking Strategies, for each strategy, the scores from each respondent are added up together and the total is divided with the number of respondents. Then, for the second group, that is respondents' perceptions on the importance of these strategies to their future employment, the same step is taken. Finally, the mean score from the first group is compared to score from the second group for all the thirty-five strategies.

The third pair of research questions puts respondents in three different groups which are based on types of degrees: Bachelor Computer Science, Bachelor Information Technology and Bachelor Science. An analysis of variance (ANOVA) and post hoc test is run to see the effect of different types of courses on the respondents' perceptions of their ability and importance of critical thinking skills (CTS) to future employment. ANOVA is an inferential statistics tool which tells us whether considering more than one independent variable at a time gives us additional information compared to considering each independent variable separately. Basically, a one way ANOVA will test the null hypothesis that all three means from the three types of degrees are equal:

$$H_o = \mu_{CS} = \mu_{IT} = \mu_{SC}$$

ANOVA calculates the F statistics, and when F is significant, we may conclude that there is probably a difference somewhere among the three means.

5.7 Difficulties Encountered

There are a few major difficulties encountered while doing this research as detailed:

1. Time constraint: The first difficulty is due to time constraints in conducting my data collection. Data collection in Malaysia was for three months from 25 February 2007 until 24 May 2007. In that short period of time, I had to seek permission, meet up with representatives from the universities involved, deliver the questionnaires and collect them. Seeking permission from the Ministry of Higher Education took one month. Meeting with representatives and delivering the questionnaires are quite time-consuming because the universities are scattered all over the country. There was a lot of travelling which involves time, energy and cost. It has to be remembered that altogether there are eight universities in West Malaysia and another two in East Malaysia and there are significant distances which have to be covered.

2. Low response rate: Although the questionnaires were personally given out and collected, some universities have a low response rate. In total, there were only 702 usable returned questionnaires which consist of 31 questionnaires for the pilot test and 671 questionnaires for formal analysis. I expected a higher total of 1000. The ones with a low response rate are those where I had to leave the questionnaires or post them whereas the ones with higher response rate are those I handed out personally to students.

5.8 Limitations

There are issues regarding limitations to this research and are as follows:

1. The sample for this research is restricted to final year students in Malaysia public universities, which means that the result cannot be generalized to private universities.

2. The sample also comprises final year students of computer-related degrees, so that the data collected cannot be generalized to final year students of other courses.

3. The research methodology is confined to one type which is the survey. This is because a survey is seen as the best way to get maximum information within a limited time.

4. Related to this is also the issue of construction of items in my formal survey questionnaire. This survey intends to seek final year students' perceptions on their critical thinking strategies and the importance of these strategies to their future employments. Since there is no apparent or standardised list of critical thinking strategies related to higher education Malaysia, I compensated by using the list in Richard Paul's model.

Chapter summary

This research embarked on a mixed research design which is a combination of quantitative and qualitative research methods. It is a mixed model research where within a single stage of the research process, there is a mixture of both quantitative

and qualitative approaches. The instrument for data collection is questionnaires in surveys which includes online, postal and handed down questionnaires. Qualitative data collected from these questionnaires were analyzed through qualitative content analysis which involves thorough reading of responses and detection of themes. Quantitative data collected were analyzed using the Statistical Package for Social Sciences (SPSS) version 14 where data were analyzed through descriptive and inferential statistics.

The next four chapters present research findings followed by a discussion chapter and then the final concluding remarks.

Chapter 6 - Data analysis: Qualitative and quantitative data analysis: rating of employability skills and open-ended questions in postal questionnaire to employers

☙ It seems that what employers really want in their graduate recruits is someone who is academically able, is proactive without being hasty, can understand and solve complex problems effectively by 'thinking outside the box' without going completely off at a tangent, someone who can switch quickly between taking an operational or a strategic approach, a person who is self-confident without being arrogant, resilient without being insensitive, and someone who is able to be both practical and theoretical as the situation demands it.- Fiona Beddoes-Jones EUROGRADUATE Live at www. eurograduate.com ❧

Chapter outline

This chapter opens with the analysis of the qualitative data which discusses employers' perceptions of employability issues relating to unemployed graduates in Malaysia. The discussion does not take the questions in order but has arranged them to move the discussion from a general setting of the scene to a focus on the results from the quantitative data where the chapter presents the rating of more desired employability skills using the Employability Skills Framework by McQuaid and Lindsay (2005). The analysis then returns to the qualitative data again and then moves into the final stage which is a detailed discussion of the major reasons and issues regarding graduate's employability and its relationship to higher education, employers and graduates. It closes with a proposed model relating to skills resulting from the findings.

6.0 Introduction

This questionnaire given to employers has two parts, namely, a listing of the employability skills adapted from the Employability Framework by McQuaid and Lindsay, 2005 (see chapter 4) and also includes five open-ended questions. This adapted Employability Framework contains employability skills which come under four headings of: essential attributes, personal competencies, transferable skills, and job seeking skills and relate to column 1 of the model which focuses on individual factors. The postal questionnaire can be seen in Appendix I1 and responses in Appendix I2.

The five open-ended questions are:

Question 1: *How do you view the current state of education with regard to preparing graduates for employment within your company?*

Question 2: *Can you foresee any changes in employers' skills requirement which will necessitate changes in the education and training in the next five years?*

Question 3: *What are the key features of an employable person?*

Question 4: *Do you have any comments on the high number of unemployed graduates in Malaysia?*

Question 5: *Do you have any other comments on any related issues to the high number of jobless graduates in Malaysia?*

They are analysed from a content based perspective (Andren, 1981; Carney, 1972; Gallivan et al., 2004) where data were interpretively filtered under a predefined set of content variables or themes. The discussion begins with the last two open-ended questions.

6.1 Opening the discussion on unemployed graduates in Malaysia from the employers' perspective

There are five open-ended questions and the following discussion relates to questions four and five (Refer to Appendix I3 and I4) which probe deeper into the unemployment question of graduates in Malaysia according to employers' perspectives. The two questions are as follows:

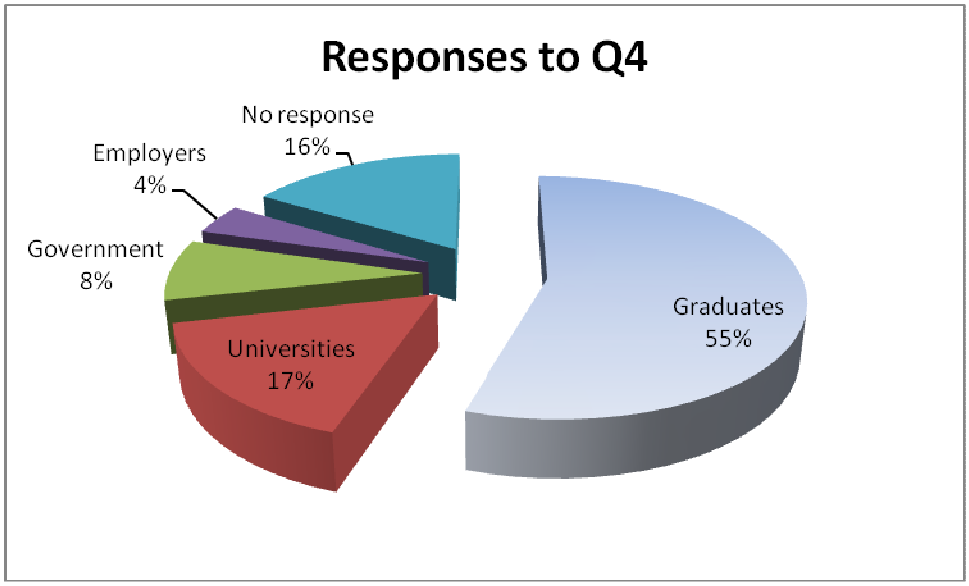
Question 4: *Do you have any comments on the high number of unemployed graduates in Malaysia?*

Question 5: *Do you have any other comments on any related issues to the high number of jobless graduates in Malaysia?*

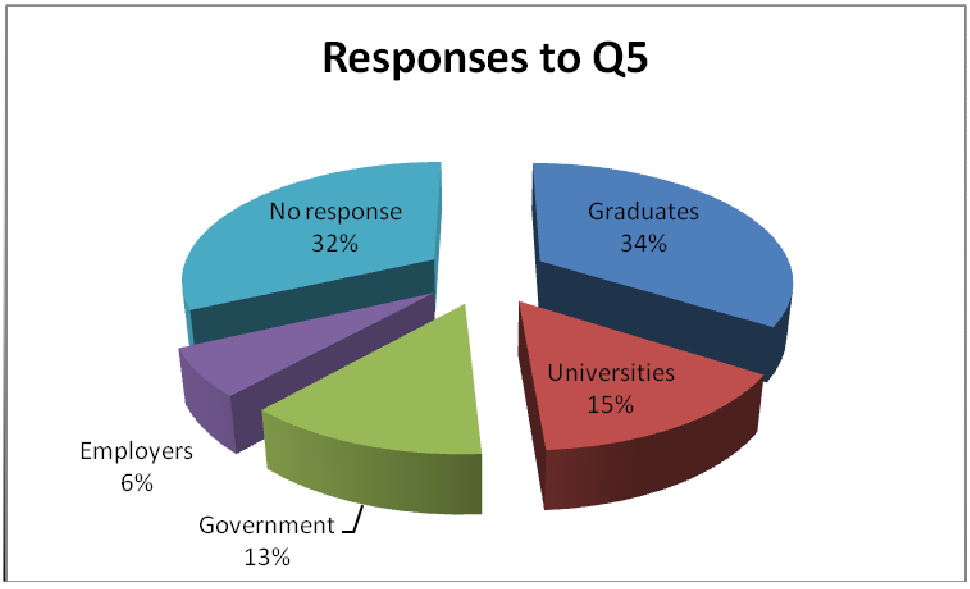
For Question 4, the majority of the employers (55 percent) commented on graduates, 16 percent on universities, 8 percent on the government and 4 percent on employers and 16 percent did not response. For Question 5, again when commenting about the graduate unemployment issue, the highest percentage is 34 percent comment on the graduates, 15 percent on universities, 13 percent on the government and 6 percent on employers while 32 percent no responses. Figure J below shows the quantitative data for these two questions.

In general, it can be seen that employers say graduates are responsible for their own unemployment followed by universities, government and, lastly, employers. Employers state that graduates lack appropriate skills and attitude and these are the main reasons for not obtaining employment. Importantly, employers also say that graduates are not proficient in the English language.

Figure J: Comments on the graduates' unemployment issue from questions 4 and 5



N: number of responses: 49



N: number of responses: 47

6.1.1 Graduates do not have English for the workplace

English is the second language in Malaysia and plays an important role in a person's advancement at individual and national progress as has been pointed out in chapter 2 and a good command of English helps job-seekers to become more employable (Tan, 2005). As chapter 2 notes, the falling standard of English has long been debated and has been quoted as another reason why there are many jobless graduates. Employers consider that improvement in communicative English is essential as English is the language of the world and business particularly ICT. One employer states:

> *English is so important in the commercial world.*

The reasons why the standard of English in Malaysia fluctuates and indirectly influences a graduate's opportunity for employment is that firstly, there is no focus on communication skills during an undergraduate's time at university as indicated in chapter 2. Also, though English is learned at school, students have no real-life exposure in using the language, especially those who are from the rural areas where English is hardly used (Hazita, 2002). There have also been numerous policy changes on English as the medium of instruction, which have also been referred in chapter 2.

At present, employers consider that there is not enough focus or emphasis on communication skills in English as this statement by one of the employers illustrates:

> *Graduates have poor communication and interpersonal skills. Poor English language skills produce lack of confidence.*

Employers suggest that students should be exposed to interviews. They also link the lack of communication skills to confidence which impact on how graduates present themselves during employment interviews:

> *Graduates are not trained how to conduct themselves during interviews*

An overall summary of the situation is provided by this statement:

> *It has often been said but it is true that the majority of graduates' command of spoken English is generally atrocious.*

Consequently, English usage should be strengthened to improve the level of English at third level in Malaysia and one employer comments that:

> *Courses should include a subject on this before graduation. Graduates should be trained to speak and write better English.*

Competencies in English which are linked to communication skills in general, will make graduates more confident in themselves, especially when participating in an interview for example. These skills also pervade the first section of McQuaid and Lindsay's (2005) holistic employability framework and so are of great relevance to this thesis.

Employers see that fluency in speaking English and the ability to write in English could be a strong guarantee for a graduate to obtain employment. As chapter 2 discusses, steps taken by the Government of Malaysia have included the controversial policy change in using English to teach Maths and Science at all levels which is currently being reviewed for its effectiveness. English is also offered as one module in the graduate training scheme for unemployed graduates. Finally, there is a

proposal to help boost the level of English in Malaysia by making English a compulsory passing subject at Sijil Pelajaran Malaysia level (June, 2009). Consequently, these findings are of significance as they contribute to this discussion from an employer perspective, are related to policy changes and create a positive link to McQuaid and Lindsay's (2005) holistic employability framework.

6.1.2 Graduates are choosy and picky

Employers claim that graduates are *"choosy"* and *"picky"* in employment. Graduates are very selective when they search for employment:

> *They are very choosy when looking for jobs. They are not mature enough.*
> *The high unemployment could be due to graduates are more choosy nowadays. They also like job hopping.*
> *The graduates are too picky, have too much self-esteem and not willing to invest own time even though they know they do not have the skills.*

Graduates are *"choosy"* because they not only want a job, but consider other aspects as well:

> *Graduates are choosy. They are more interested in the location, working hours, pay benefits and job titles.*
> *New graduates nowadays are generally picky with selection of jobs. They are more concern with remuneration than getting a job like allowances, training and exposure.*
> *As I have mentioned, Malaysian graduates are unrealistic in their job expectations. Most are too picky; I have applicants complaining about locations of the offices.*

Being *"picky"* and *"choosy"* at this level implies that graduates are not flexible in their job choice and are potentially unrealistic in their expectations.

Graduates tend to be too ambitious and seek employment with a high starting salary and other benefits.

Graduates expect to be managers straight away. They won't consider starting below their expectation level.
Graduates do not understand how the industries work. Getting a degree does not mean they can get good salary. Only performance will determine the salary.
The salary expectation of graduates and what company is willing to give do not match.
Graduates are looking for easy but high paid jobs. Employers are looking for fairly paid employees who are willing to work hard.
Graduates should not ask for high salary in their first job application as they still have to proof their capabilities.
Unemployment is due to unwillingness to take low pays by new graduates. It is the new generation's attitude of wanting luxurious jobs (high pay but low working hours)

In conclusion, when applying for a job, graduates want high level jobs which offer a high salary and other benefits such as good location, reasonable working hours, and job allowances. This conflicts with employers' expectations, and from these research findings, what employers are able or willing to offer graduates. These relate to McQuaid and Lindsay's (2005) holistic model, though to column three of their framework which is concerned with external factors such as labour market and recruitment factors. This is an important finding as they were not sought specifically and so underline the holistic nature of employability.

6.1.3 The government is not focused in providing relevant training programmes

Employers suggest that the state should take a more active role in ensuring that graduates have jobs when they join the working world. An employer says that government should subsidize the internship of students and this will resolve the unemployment issue:

Internship on the job training (with subsidiaries from the Government) would be key.

Another employer says that graduates lack skills due to insufficient training and the graduate training scheme run by the government is not successful:

> *Education is too theory oriented, therefore graduates are not well prepared in the skills that they should build parallel to their goal. Skills training programme is an initiative by the Government but it is kind of blindly focusing on unemployed graduates as graduates still do not know what they want.*

At present, as discussed in chapter 2, unemployed graduates in Malaysia can sign up for a Graduate Training Scheme but only graduates who have been unemployed for at least 6 months are eligible. There are 13 courses available and it is said that 70 percent of those who participated in this scheme obtain employment following course completion (Bernama, Dec 2008) suggesting a strong element of success.

6.1.4 Employers acknowledge the changing world of work

As chapter 4 notes, the world of work is changing, for instance because of fast technology transformations by new means of information processing, and communication and intense global competition among countries. Additionally, there are shifts in political thinking towards greater reliance on global markets and a reduced role for the State, and increased political pressure for improved living and working conditions (ILO, 2006). From the findings in this research on graduate unemployment of ICT graduates, employers say that these changes make the world borderless and that it invites competition. Consequently, if local graduates do not

have global skills, they will not be able to compete for jobs in the international job market.

For example, employers state:

> *Certainly yes, the world is getting smaller. Competition is getting more aggressive with barriers between countries removed. Labour movement between countries is currently causing more competition with local graduates. If local graduates cannot compete internationally, they will be left out.*
>
> *ICT technology becomes obsolete fast. The world is changing rapidly. Graduates need to master latest technology or they will be left behind*

This constant change brings changes to the skills requirements of the working world. It also brings changes to Higher Educational institutions as noted in chapter 4. Employers confirm this view this by saying:

> *Sure there will be changes in employer's skill requirement in the next five years because the world is changing every second.*
> *As time develops recruitment of employer changes.*

This need for change is summarised by the following employer response:

> *Absolutely, in time different skills are needed. Industries and institutions should keep abreast with these changes so that they can offer the needed skills to students*

Interestingly, this comment links both industry and Higher Education Institutions (HEIs) so that challenges can be faced by both.

Clearly, this linking has implications for the relationship between industry and education in terms of closer contact or collaboration in terms of industry requirements and higher level education meeting such demands. However, there are dangers in this process if education is viewed in purely utilitarian terms as well as

the fact that such a view does not take a holistic view of education as suggested in the Malaysian National Education Philosophy outlined in chapter 2.

6.1.5 Employers do not have strong links to the universities

When commenting about graduates' unemployment, employers wrote of the connection between industry and the universities. The link between universities and industries is of utmost importance to curb the unemployment issue especially in narrowing the gap between what is taught in education and what is wanted in the outside world.

Employers acknowledge the need to have this link and this can be reached through close relations between the two types of organizations.

> *Universities should get feedback from industries so that they can incorporate what is needed into curriculum.*
> *There should be more links between education and work industry in discussing mutual interest.*

The involvement of industries into academia will not only provide real-world examples especially for technology practices but the firm-faculty alliance is of more value when partners are complementary in their scientific capabilities and complement each other with different types of knowledge either diversified or specialized (Lautala, 2010; Mindruta, 2010). The responses show that employers are flexible: though they have concerns, they are willing to work with HEIs.

6.1.6 Employers are possibly biased when choosing candidates

A good employee is seen as an asset to the company where he/she will contribute to the growth of the company. Here employers tend to compare or show preference for

graduates from overseas over local graduates and private over public institutions. For instance, employers consider local graduate to lack initiative and that the education system has failed them. Employers prefer employees with overseas qualifications:

> *The quality of graduates is low especially local graduates.*
> *It's a big difference between overseas graduate and local graduate. UM graduates are good and very fast taken. I would say we need improvement; otherwise it will be hard to compete.*

One employer sums this up by stating:

> *From my personal experience, the Malaysian education system fails to educate its graduates to be more than information regurgitators. Not only are graduates from local institutions lacking in initiative and drive, they have the most unrealistic expectations when it comes to job hunting. Local institutions definitely do not prepare their graduates for the realities of the working world.*

Employers prefer graduates from local private institutions as they are considered to be better prepared for work. Additionally, the statement presents a strong critique of Malaysian HEIs.

Employers even comment on the quality of local graduated lecturers:

> *The quality of lecturers needs to be looked into. My experience with a few does provide a sample of the very low quality of lecturers that we have in our local universities. They result poor/low quality graduates who cannot perform. We should consider having lecturers who only graduate from good overseas universities for their post graduate degrees to increase the quality level of education.*

Overall, there is clear dissatisfaction with aspects of third level education from an employer's perspective.

6.1.7 Employers view unemployment from a narrow perspective

When asked about the unemployment issue in Malaysia (Question 4 and 5), quite a high percentage of employers, namely 59 percent spoke of individual factors only.

For example, one such viewpoint is expressed in the following statement by an employer:

> *Employers are looking for graduate who not only possesses the basic core skills, but also has good attitude and can adapt quickly to the organisation and contribute to growth.*

The potential employee is viewed in terms of a particular skills set. This employer describes four components that contribute to the employability of a graduate: basic core skills, good attitude, adaptability and productivity. This relates strongly to McQuaid and Lindsay (2005) and Bridgestock's (2007) model.

The core set of basic skills is closely associated to the type of job concerned and since the sample is from a computer related course, it can be assumed these are skills which are related to classical ICT professions such as dealing with software, hardware and networks. Even so, within a fast-moving global context, these expected skills are changing. Valenduc and Vandramin (2005) say that there is a progressive hybridisation of skills taking place in ICT professions and that business and management skills are gaining importance as ICT professionals' progress in their career. Consequently, the importance of links between industries and higher learning institutions is vital for updates changes taking place where skills are concerned. The next part of this chapter presents employer ratings of the qualities.

6.2 What employers seek in a graduate

This section of the data analysis relates to the rating of the employability skills adapted from the Employability Framework by McQuaid and Lindsay (2005) which

has four headings: essential attributes, personal competencies, transferable skills, and job seeking skills as outlined in chapter 4. These relate to individual factors only in the three sections of the model which also covers personal circumstances and external factors. As discussed in chapter 4, there are two ways which employability can be viewed, namely from a broad or narrow perspective.

The broad way of looking at employment includes all factors of employment as given in the holistic framework of employability by McQuaid and Lindsay (2005). The narrow approach stresses individual factors of an employee, normally skills. For example, when a university teaches a skill to a student, the skill has to be suitable for the qualification the student is seeking. This falls under individual factors and the narrow perspective focus on this type of skill. On the other hand, if one looks at employability from a broader perspective, the said skill taught to the student also has to be a skill in demand by the labour market where the labour market is an external factor. Consequently, even though the questions here only drew on individual factors in the model, there is a level of generalisation possible to external factors.

6.2.1 Employers' rating of Employability Skills

The first finding from the listing of employability skills is the ranking of skills under the heading of Essential Attributes (Refer to Appendix I5a) and the skills according to their importance as rated by employers are as follows:

1. Positive attitude to work
2. Honesty and integrity
3. Responsibility
4. Willingness to work

5. Self-discipline
6. Reliability
7. Understanding of actions and consequences
8. Basic social skills
9. Basic personal presentation

For the skills listed under Personal Competencies (Refer to Appendix I5b), the skills according to their importance are rated by employers as:

1. Initiative
2. Proactivity
3. Self motivation
4. Diligence
5. Confidence
6. Judgment
7. Assertiveness
8. Act autonomously

For the cluster of Transferable Skills (Refer to Appendix I5c), the first 10 skills rated according to their importance by employers are:

1. Team working
2. Problem solving
3. Adaptability
4. Basic ICT skills
5. Reasoning
6. Job-specific skills
7. Work-process management
8. Basic interpersonal and communication skills
9. Emotional and aesthetic customer service skills
10. Writing

Finally, for Job Seeking, the skills rated according to their importance by the employers are as follows:

1. Awareness of strengths and weaknesses
2. Interview skills/presentation
3. Ability to complete CVs/application forms
4. Awareness and effective use of informal social networks

In brief, these findings are important because they specifically tell us what employers of ICT companies seek in the new graduates who want to be employed by them.

Later, these skills presented from the employers' perspectives will be compared to the skills future graduates perceived themselves as having. The importance of the rated skills by employers is discussed next.

6.2.1 i Discussion of findings relating to Employers' rating of Employability Skills

Firstly, under the heading for Essential Attributes, employers expect graduates to have a *positive attitude towards work*, *honesty and integrity* and *responsibility.* As chapter 4 has discussed, the term attributes is wide-ranging in its application and relates not only to skills but also to attitudes and values. This point is important in relation to all the findings under discussion.

Secondly, under the heading of Personal Competencies, the employers rated *initiative*, *proactivity* and *self motivation* as most important. These three competencies are related to each other so that an employer views the graduate as being autonomous and able to work independently. This raises the question if this valued work culture is being promoted in the Malaysian education system. Referring back to chapter 2 on education in Malaysia, work culture is being promoted ideally in the Malaysian education system but in the practical sense it is not put into

practice. Therefore, it is already clear that there is a degree of mismatch between employer expectations and graduates coming to employment.

Thirdly, under Transferable Skills, the employers express the importance of *team working*, *problem solving* and *adaptability* skills as being important in new graduates to secure employment. These again relate to the potential expectation that a graduate can work autonomously which would involve thinking critically about a situation.

Lastly, for Job Seeking Skills, employers agreed that the most important skill among the four skills listed is the *awareness of own strengths and weaknesses* in new graduates. This would point to graduates being able to make judgments, in other words to think critically. It is clear that there is evidence of critical thinking pervading these findings concerning employers and this is a key finding in relation to this research on critical thinking and employability.

The next and final section of the analysis detailed in this chapter returns to the qualitative questions and concludes with a potential model relating to employability which draws together the findings in this chapter.

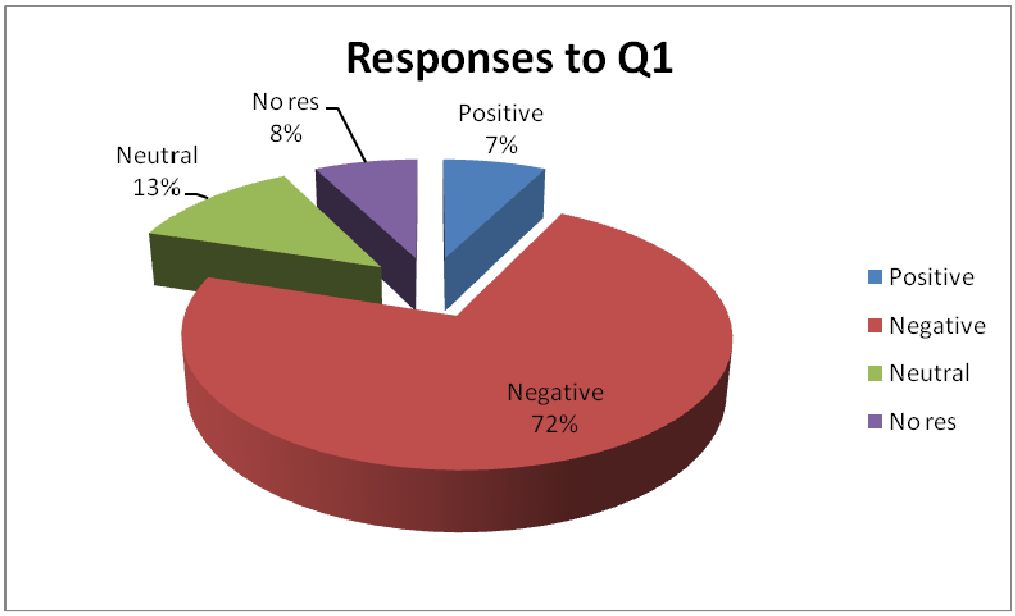
6.3 Relationship between Education (tertiary level) and Employment of Graduates

Questions 1 to 3 of the content-based analysis of the five open-ended questions to employers are discussed in turn beginning with question 1.

Question 1: *How do you view the current state of education with regard to preparing graduates for employment within your company?*

For this question, when commenting about the current state of education in Malaysia in preparing graduates for employment, there are 72 percent negative, 13 percent neutral and 7 percent positive responses and 8 percent did not response from employers as seen in figure K (Refer to Appendix I6).

Figure K: Breakdown of responses to Question 1 in percentage terms



N: number of responses: 40

Positive responses focus on having internships for practical experiences as this response illustrates:

The graduates are equipped with some working skills from internship training.

A neutral response does not connect education to graduates' employment:

As a small ICT company, we do field training and all training is internal, depends on heads of departments

An example of a negative response is:

> *Inadequate preparation by universities leads to graduates not being prepared for the real working environment .*

As 72 percent of employers provided negative responses, this is a key finding and the reasons for this high level of such responses can be summarised from the perspective that education in Malaysia is overly focused on theory. By implication it is not providing opportunities for the practical application of theory, a perspective discussed in chapter 2.

This is similar to saying graduates are unemployed because of insufficient training offered in the university curriculum which relates to the question raised in chapter 4 on the relationship between employability and third level education. Many employers say that higher educational institutions focus on the academic but ignore the practical aspects of work:

> *The current education and training programme is too academic focussed.*
> *A lot of theory is taught at the universities but not much practical and commercial exposure.*
> *They do not encourage creativity, initiative and the ability to be a solution provider.*

As stated in Chapter 2, education in Malaysia is exam-oriented where assessment is given emphasis. Education tends to be repetitive in a cyclical way: teaching methodologies are inclined to chalk and talk techniques which impart factual knowledge that students need and then use these to answer exams and obtain good

results. In this type of educational setting, there is no space for students to be critical and creative let alone to enhance real-life practices. Here, the question occurs as to whose responsibility it is to impart this practical knowledge to students.

Universities have a traditional role to impart knowledge rather than work-related skills as discussed in chapter 4. However, in their responses, employers see educators or universities as being responsible to provide work related skills:

> *Graduates are totally fresh and ignorant. Educators should provide more practical training to graduates and in collaboration with employers. On the job training should be incorporated into the curriculum.*
> *ICT technology becomes obsolete fast. The world is changing rapidly. The universities need to offer the latest technology and skill or graduates will be left behind.*

With these responses, employers are saying graduates come to them lacking work skills and that universities themselves are not keeping pace with the rapid changes in technology and presumably not teaching through or with change.

Apart from work skills, employers recognise the importance of soft skills too and suggest that it should also be nurtured in education.

> *Too much focus on theory. Not enough emphasis on non communication skills or English, emotional quotient and positive attitude.*
> *Education and training are a part of basic consideration for employment. More important are the soft skills such as honesty, sincerity, diligence and positive attitudes.*
> *I think there is an acceptable level for technical aspects. What is lacking is moral or ethics education which resulting in poor characteristics or attitudes.*

From the two last responses above, it is interesting to note that even with religious and moral subjects being taught in both primary and secondary schools, employers

are complaining of graduates lacking moral or ethical values. Again, this can be interpreted as the system being theoretical but not practical.

Additionally, employers tend to compare local graduates and overseas graduates and say that the latter is of better calibre.

> *Within Malaysia, the skill set is not geared to internationally.*
> *There's a big difference between overseas graduates and local graduates. I would say we need improvement; otherwise it will be hard to compete.*
> *Not only graduates from local institution lack initiative and drive, they have the most unrealistic expectations when it comes to jobs. Local institutions definitely do not prepare their graduates for realities of the working world.*

This in itself is interesting as chapter 2 referred to the significant numbers of students going abroad to study. It appears here that this investment has immediate benefits. In contrast, there are also responses which show employers are favourable to graduates from certain higher institutions of learning in Malaysia, with University Malaya to name one:

> *Graduates from University Malaya are good but taken up very fast.*

Such a finding is also interesting as University Malaya is Malaysia's oldest university established in April 1949 and ranked in the top 50 (42nd Asian university ranking) in the Top Universities Ranking 2010 carried out by Quacquarelli Symonds Limited.

Overall, employers consider that third level education plays a significant role in graduates' unemployment. They state that education has failed to produce employable graduates because it is an outmoded system in their view:

> *Most tertiary institutions in Malaysia fail to produce graduates with the right knowledge and skills for the industry. The current state is disappointing.*

From my personal experience, the Malaysian education system fails to educate its graduates to be more than information regurgitators.
I see the need to revamp the whole education system as it is far backdated.

What needs to be changed from an employer's viewpoint is discussed next.

6.4 Changes in skill requirements according to employers

The second question asks employers about necessary changes in education and training in the next five years.

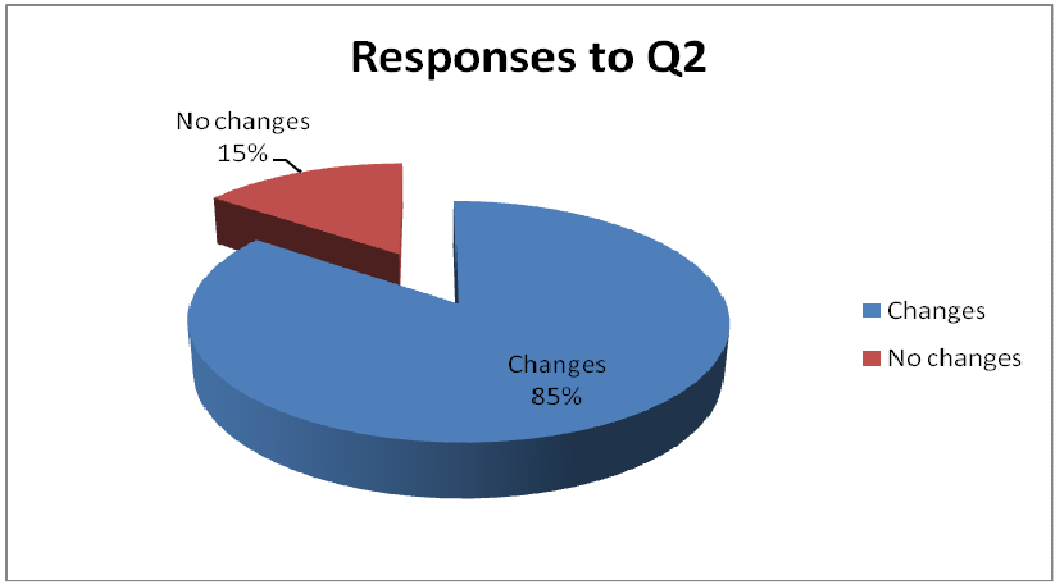
Question 2: *Can you foresee any changes in employers' skills requirement which will necessitate changes in the education and training in the next five years?*

For Question 2, regarding changes in skills requirements in the next five years, 85 percent of employers state they can foresee changes while 15 percent say things will remain the same. Out of the 85 percent of responses which state employers can foresee changes, 52 percent are about changes in employability skills as required by the job market as seen in figure L (Refer to Appendix I7).

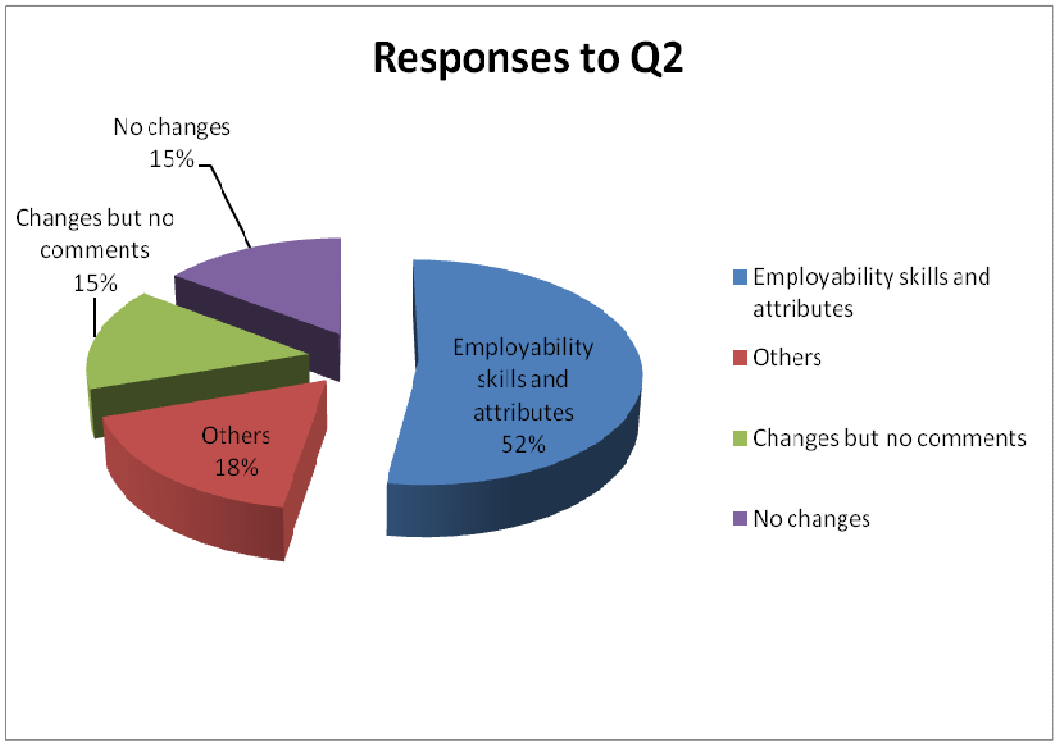
This is a key finding as this implies changes in education practices to match employment conditions that IT graduates will encounter in a rapidly changing world:

Employers' needs are not being fulfilled by the output of education in universities. Changes are taking place fast.
Absolutely, there will be changes. In time, different skills are needed and institutions should keep abreast with these changes so that they can offer these new knowledge and skills to students.
Varsities should be align with the changes requirement in the job industry and provide relevant courses in preparing the needed skills and knowledge in new graduates.

Figure L: Changes in employers' skills requirement which will necessitate changes in the education and training in the next five years



N: Number of responses: 40



N: number of responses: 40

Apart from changes in skills, employers talk of the importance for graduates in having a good attitude:

> *Yes, employers are looking for graduates who not only possess the basic core skills, but also have good attitude and can adapt quickly to the organization and contribute to its growth.*
> *Employers need graduates that are more proactive, have the initiatives and not merely textbook graduates.*
> *Education should inculcate practical application in real-life situations. There is a need to build graduates' values beside academic trainings.*
> *There should be more focus on moral/ethical issues to ensure healthy development in character building.*

These findings are of particular interest as they reflect the findings relating to employer-rated essential attributes and personal competencies which are two of the four individual factors drawn from McQuaid and Lindsay's (2005) model. There is thus a direct link between the two sets of findings, namely the quantitative-rated scales and the open-ended questions.

It can be concluded that employers seek a balanced graduate employee who is not only equipped with relevant job skills but soft skills too. Employers foresee changes in skills need and suggest universities contribute by preparing graduates for these changes and also nurture them with values as defined by both a broader definition on employability and supported by the National Education Philosophy. Having both work skills and a good attitude produces "*work ready*" employees for the IT industry. This can be gained through a "*more involved* and *well rounded education"* and also involvement from both university and industry:

> *Enhancing cooperation between universities and industries to secure excellent graduates especially at early stages.*

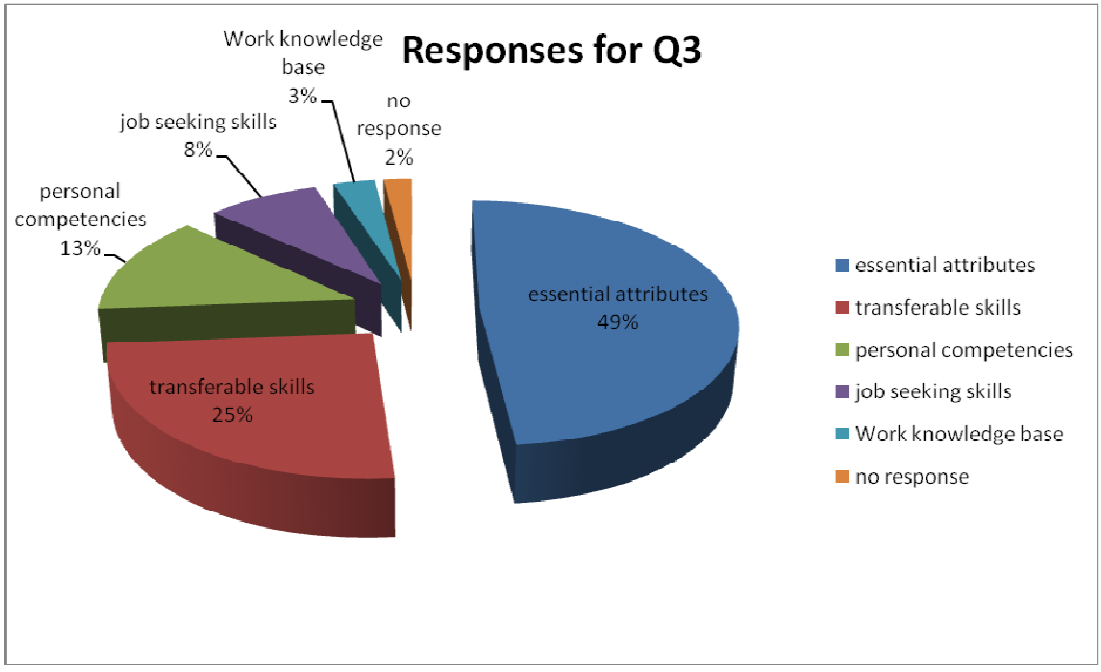
From the findings, it appears that the problem of skills mismatch between what is taught at universities and what is wanted in the world of work will not be solved without cooperation between both tertiary level education and the employment sector. The following discussion clarifies further what employers want in new graduate employees.

6.5 Key features of an employable graduate

Question 3 is as follows:

Question 3: *What are the key features of an employable person?*

Figure M: Key features of an employable person



N: Number of responses: 99

From responses to Question 3 (Refer to Appendix I8), Figure M shows that 44 percent mentioned skills in the essential attributes list, 30 percent skills in the transferable skills list, 14 percent in the personal competencies list, 6 percent in the

job seeking skills list, 4 percent in the work knowledge base, and 2 percent of no response. This is the preferred order of individual factors relating to the employability potential of a graduate.

The five categories are taken from the individual factors in the Employability Framework by McQuaid and Lindsay, (2005). Two main themes appear in relation to this question which are employability skills and attitudes of graduates.

6.6 Employability skills

It is interesting to note that in the 40 responses from Question 3, the word "skills" is mentioned 11 times and the word "attitude" is mentioned 19 times. With reference to the Employability Framework by McQuaid and Lindsay (2005), it should be noted that the employability skills and attributes presented under the headings in this framework are overlapping.

Table 6 relates the findings to McQuaid and Lindsay's (2005) framework which has three sections: individual factors, personal circumstances, external factors. Again, it has to be said that only individual factors were used in this research, namely the four rated employability skills of: essential attributes, personal competencies, transferable skills, job seeking. However, Table 6 shows the occurrences of these skills in employers' responses. This table thus presents a potential employability framework from an employers' perspective from the analysis of *all* data concerning employer responses and is based on McQuaid and Lindsay's (2005) framework but using the data from this research.

Table 6: An employability framework from employers' responses

Individual factors	Personal circumstances	External factors
Employability Skills and Attributes • *Essential Attributes (65)* Attitude Good characteristics Integrity Honesty Willingness to learn • *Personal Competencies (47)* Initiative Confidence Independent Open-minded Able to withstand pressure • *Transferable Skills (46)* Communication skills Thinking skills Speaking skills Team-work Adaptability	X	**Demand factors** • *Labour market factors(9)* Skills in need • *Recruitment factors(3)* Universities preferences
Work-based knowledge(*15*) Job specific skills		
Job Seeking(*7*) Interview skills		
Adaptability and Mobility(*6*) Flexibility		

Looking at the table, there are three columns which present individual factors, the personal circumstances of a potential employee, and the external factors as in McQuaid and Lindsay's (2005) framework. The column on individual factors presents the employability skills and attributes that employers would wish to see in the graduates applying for positions in their companies. In the first column, numbers in brackets represent the occurrence of skills mentioned in employer

responses as under transferable skills is 46 times and essential attributes is 65 times. It can be seen that more skills are highlighted by employers than were specifically used in the real working environment. In the third column the numbers in brackets are responses around the demand factors of the labour market. Again these were not specifically sought but emerged in employers' responses. This demonstrates an overlap across the factors in the three columns.

Most importantly, from Table 12, we can see that most employers' responses fall under the first column when they refer to unemployment of graduates. It is also clear that all three items under employability skills and attributes which are essential attributes, personal competencies and transferable skills have similar frequency counts. This means that the three items are of equal importance to make a graduate employable. For essential attributes, the following items are most referred to by employers: *attitude, good characteristics, integrity, honesty and willingness to learn*. For personal competencies, employers want a graduate who shows: *initiative, confidence, independent, open-minded and able to withstand pressure*. They also want to see graduates come to them with transferable skills such as *communication skills, thinking skills, speaking skills, team-work and adaptability.*

With regard to job seeking, employers are unhappy because they found that graduates do not have what it takes to succeed in an interview. They say that a graduate should be taught specifically how to prepare for the interview process and even suggest it as a course component. Employers want graduates who are flexible in many ways. Among the flexibility mentioned in the responses are flexibility to

working hours and pay. There is also a high occurrence of employers wanting graduates who are equipped with job specific skills. This not only shows that employers prefer work ready graduates but also again stresses the fact that graduates do not enter employment with relevant skills. The issue of a skill mismatch is thus highlighted here and is the overall key finding of this chapter.

6.7 Graduates' attitude

Secondly, a graduate's attitude is also seen as important and is closely related to the affective, behavioural and cognitive aspects of a person (as discussed in chapter 3). Consequently, a balanced individual, as suggested in the National Education Philosophy will be better in attitude and so more sought after in the job market:

A candidate who is adaptable and can assist in a company's productivity would be more sought after.

This response demonstrates that when discussing employability, employers view certain key individual factors in their consideration of potential graduate employees.

It is clear that a graduate's attitude is another reason why a graduate is jobless since so many employers say this in their responses. While some just mention the word "attitude", others emphasise the importance of it by saying that attitudes are very personal and are associated to values. Employers say:

> *Apart from academic and vocational competence, an employable person has to have great attitude. Skills can be taught but attitude is self decisive and quite permanent.*
> *An employable person needs 70-80% soft skills and academic training of 20-30%. He can be trained if he lacks skills but changing his attitude depends on his values.*

A graduate doesn't have good attitude because there is lack of moral/ethics education resulting in his poor characteristics/attitude.

Firstly, employers consider that merely academic and vocational qualifications are not enough to ensure a graduate's employment. A graduate needs to demonstrate positive attitudes to secure employment. Positive attitudes include showing self confidence, demonstrating problem-solving skills and the ability to reason. This shows that a balanced and well-rounded graduate is more marketable. This is supported by Malaysia's National Educational Philosophy which calls for further development of potential in individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonic, based on a firm belief in and devotion to God. So if this has been practised, it is problematic when employers are actually searching for such individuals. Again, there appears to be a gap between the aims of the state's National Education Philosophy and the depth of moral qualities of graduates.

In Malaysia, nurturing good moral values has always been an important agenda and it can be seen in the blueprints of the country's "Rukun Negara" or the declaration of the national philosophy instituted by royal proclamation on Independence Day and the National Education Philosophy (NEP) outlined in chapter 2. In Malaysian classes, Muslim students attend religious classes and non-Muslims go for moral education classes from primary until secondary school. How then does a university nurture attitude in tertiary level as employers are saying that education has not been successful in inculcating good moral values which influences a student's attitude.

Chapter Summary

This chapter concludes that employment is viewed from a narrow perspective by employers. Employers consider graduates are unemployed due to their own failings. They say graduates lack skills, have attitude problems and are too choosy or inflexible in their job hunt. Employers also acknowledge that a rapidly changing world seeks new skills in a workforce. They also say English is essential for employment. Additionally, they consider that graduates are unemployed because of universities over-emphasis on theory rather than practice. Employers feel that the government should play a more active role in providing relevant training programmes. Employers also blame themselves to some degree for graduates' unemployment as they do not have strong links to the universities and are also biased when choosing candidates. They therefore present a complex view of their needs and solutions to graduates unemployment.

The next chapter presents future graduates' perspectives on graduates' unemployment issue in Malaysia.

Chapter 7 - Data analysis: Qualitative data analysis: formal questionnaire to final year undergraduates

Critical thinking is best understood as the ability of thinkers to take charge of their own thinking. This requires that they develop sound criteria and standards for analyzing and assessing their own thinking and routinely use those criteria and standards to improve its quality (Elder, L. and Paul, R., 1994).

Chapter outline

This chapter focuses on the qualitative analysis of the questionnaire administered to the final year undergraduates of computer related degrees across ten public universities in Malaysia. The qualitative data analyzed and discussed in chapter 6, is supplemented by the quantitative and qualitative data presented in this chapter. The data was collected from six open-ended questions at the end of the formal questionnaire handed to final year students of computer-related degrees (See pg.66 in the Appendices). This data mainly concerns what soon-to-be graduates have to offer employers and graduates' strengths and weaknesses in relation to securing employment. The analysis of the findings from both quantitative and qualitative data is followed by detailed discussion of what graduates have to offer in employment.

7.0 Introduction to the questionnaire

This questionnaire can be seen in Appendix J1. Apart from finding out which jobs graduates will seek after graduation (Question 3a), the other five questions in the questionnaire are specifically constructed to explore two areas of concern. The first of these considers what soon-to-be graduates have to offer potential employers and is answered by the following questions:

Question 3b: If you are employed, why do you think you are successful in obtaining the job?
Question 3d: What do you think your potential employers are most interested in during the recruiting process?
Question 3e: What are your most important assets if you are in the job market?

The second area of concern is what weaknesses unemployed graduates bring to their future employment situation and is answered by Questions 3 and 6:

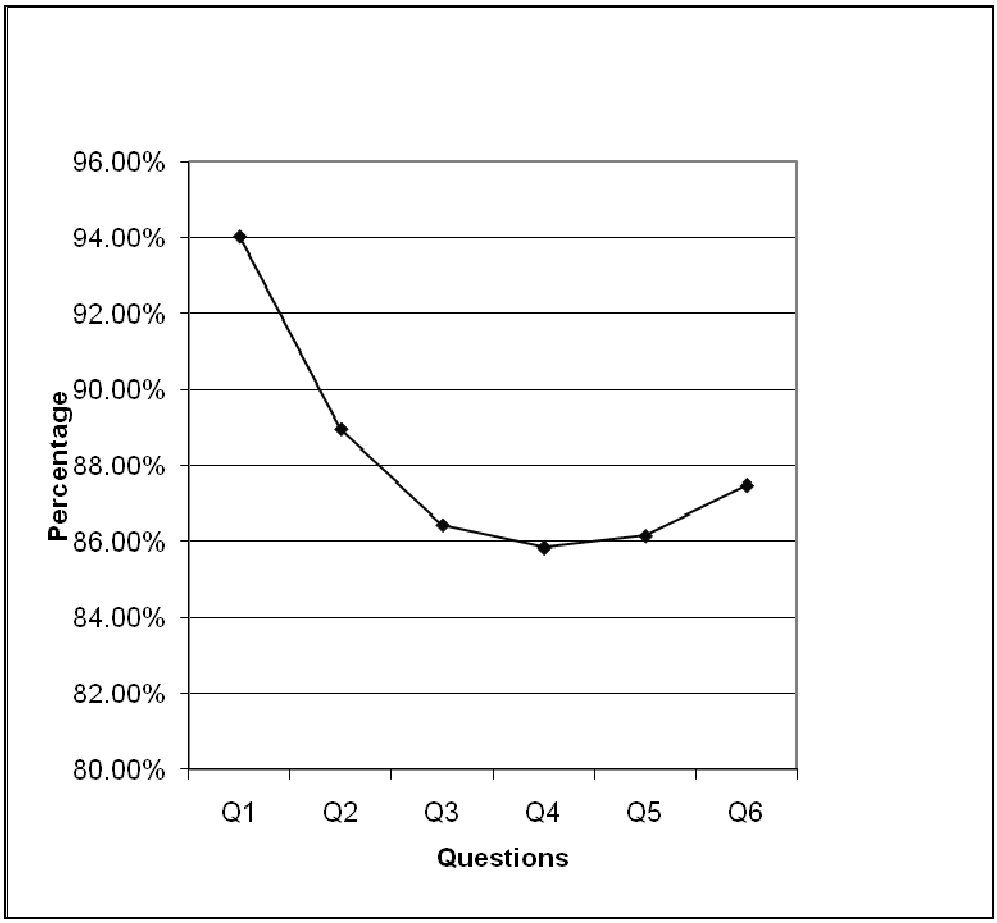
Question 3c: If you are unsuccessful, what explains your lack of success?
Question 3f: When considering employment, do you identify any weakness in yourself?

Figure N shows the percentage of answered questions in a line chart. The percentage of answered questions for question 3a is 94.04 percent, for question 3b is 88.97 percent, for question 3c is 86.97 percent, for question 3d is 85.84 percent, for question 3e is 86.14 percent, and for question 3f is 87.48 percent. It can be seen that there is a high percentage of answered questions which is positive and shows enthusiasm in respondents' cooperation as they are aware of the need to find a solution to the unemployment issue as it involves them.

It can also be seen that the percentage of answered questions decreases slightly from Question 3a to Question 3d. This small fall-off might be due to students having already answered or rated seventy questions in the first part of the questionnaire. Another possibility is because some of the questions are repetitive; respondents tend to write less and some left the questions unanswered. A small increase in Question 3e and Question 3f is probably because Question 3e sounds more personal to

respondents and Question 3f requires a yes or no answer with no pressure for respondents to explain their answers.

Figure N: Percentage of answered questions to six open-ended questions in students' questionnaire



N: 671

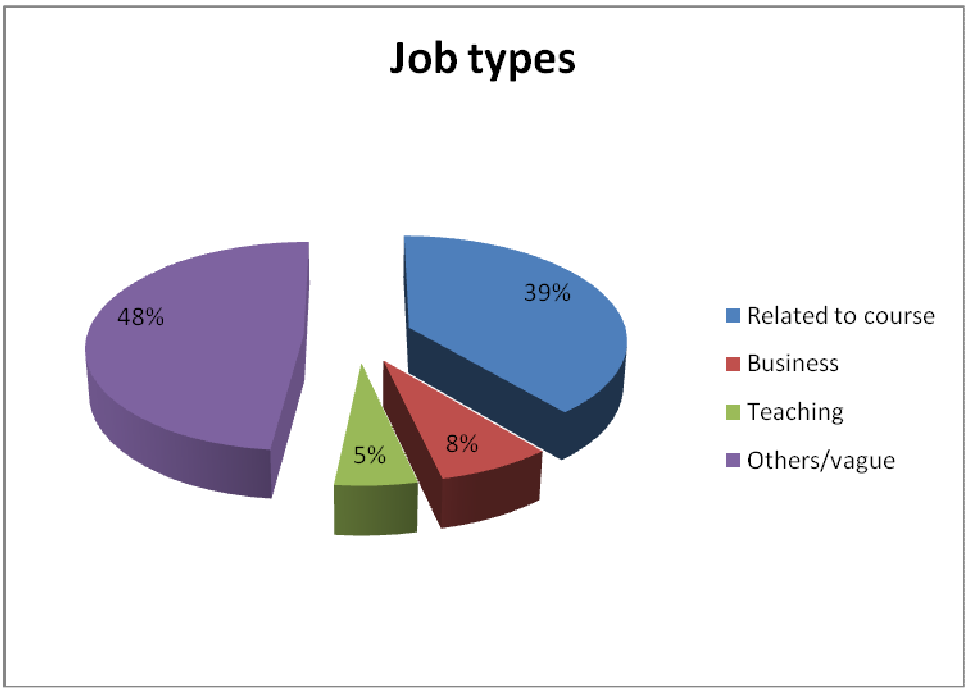
7.1 Employment expectations of future graduates

Question 3a seeks to clarify what respondents, that is students who will soon graduate, want to be when they graduate. The responses from the answers are analysed and categorised into four distinct groups. Firstly, there is a group of respondents who want computer-related jobs or jobs related to their degrees such as

programmer, system analyst and web developer. These are very course-specific and reflect that respondents are very clear about what they want to do.

Secondly, in contrast to this first group, there is also a high percentage of respondents who are vague about what they want to be. They either opted for jobs not related to the courses they are doing or simply wrote "any job will do". Here, respondents can be seen as either being realistic in facing the unemployment phenomena or they genuinely do not know what to be and how to consider their impending new reality and how to adapt to changes. Thirdly, a small percentage is very entrepreneurial and want to venture into business. Lastly there is a very small group who wish to go into teaching.

Figure O: Job types



N: 707

Figure O shows the breakdown of these jobs. 39 percent of the jobs are categorized as jobs related to the courses respondents are doing while 48 percent of responses are in the "other" or "vague" category. 8 percent want to venture into business and 5 percent mention going into teaching . These percentages will be discussed in depth (Refer to Appendix J3a).

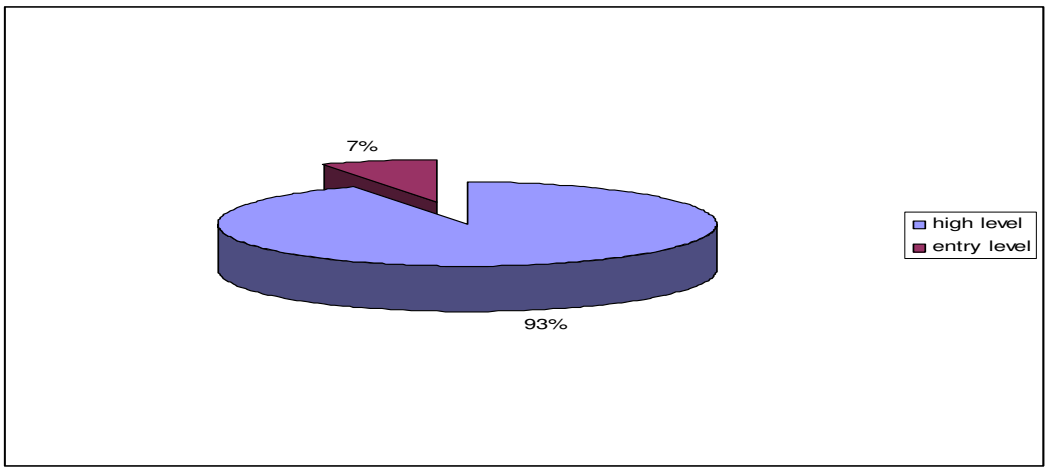
7.1.1 Respondents' desire for course related jobs

Firstly, 39 percent of the jobs are categorised as jobs related to the courses respondents are doing . The list of jobs that respondents want range from a computer executive to a system analyst. From the responses, it can be seen that respondents either want to be a Computer or Information Technology executive, programmer, developer, analyst, engineer or consultant. In this group, the jobs respondents are interested in fall under two categories: entry level and high level jobs. Entry level jobs can be considered as employment in a firm which usually requires either secondary or third-level education. It gives a recruit the opportunity to learn and gain experience, and serves as a stepping stone for higher-level jobs. In contrast high level jobs require experienced candidates and candidates with skills and competencies which are exemplary and who can also complete high level job-related tasks. The dispersion of both job categories from respondents' answers is given in Figure P.

From this figure it is strikingly evident that respondents have high expectations following their degrees and are aiming for high level entry into employment. A new

graduate who expects to enter the job market as a System Analyst with minumum or no experience will be frustrated because such positions are usually for people with more than one year's experience. This is evident for example in the Malaysian job search engine, jobstreet.com, where jobs advertised specifically require at least a year's experience.

Figure P: Job dispersion



N: 275

Respondents aiming for high posts can be interpreted as firstly following a social norm of expecting to be employed after getting a degree.Certainly, more than ten years ago, it was normal to enter into employment at a high level after graduation. In general, in those days, a degree was the equivalent of a job waiting for each graduate. Obtaining prestigious posts was not a problem as there were many available. This is not so at present, especially for computer graduates in Malaysia.

Consequently, respondents can be seen as being inflexible when it comes to employment as they continue to hold similar expectations. They are inflexible in

only wanting jobs that are related to what they have been studying as the following examples demonstrate:

> *I want jobs that are related to my study (Computer Science)*
> *I want jobs that are related to my studies such as database administration.*
> *I will search for jobs which are related to my degree and the positions can be a system or project analyst, and system designer or developer.*

They demonstrate a rigid attitude in the belief that completing a four to five year degree course will guarantee them a higher level post. They feel that they are entitled to jobs with good pay to justify their hard earned qualifications.

Respondents might also be pressured by family or have responsibility to start earning to pay for their study loans. This can be witnessed in responses which picture monetary achievement as important in employment:

> *I don't mind any job as long as it pays me a good salary*
> *I want a RM5000 job*
> *I will work in the private secor because they will pay me higher.*

These responses confirm respondents envisage themselves as holding prestigious posts after graduation in order to gain high social status even though they are without adequate experience.

Given a situation where there is a high rate of unemployment, being unsure of a career path may be expected from these new graduates, especially when the courses they graduated from are purely academic rather than vocational. On the other hand being ambitious can also be seen as an advantage. It represents motivation and willingness to work hard towards one's goals (Spenner and Featherman, 1978) where

higher expectations are associated with greater educational and occupational success (Jencks et al., 1979; Shanahan, 2000; Spenner and Featherman, 1978).

7.1.2 Respondents are unsure

The highest percentage of responses is for the "other" or "vague" category which is 48 percent. This may be because they are either unsure or have a flexible attitude since they are aware of the unemployment situation, especially in their job domain. Yet, it is still surprising to discover that most respondents are unsure of what they want to be when they graduate. There are two probabilities to support the responses in this group. Firstly, respondents are being realistic, in understanding a depressed economic situation. Almost every part of the world has a financial crisis and jobs are scarce and so these respondents are being strong enough to be flexible in choosing their jobs.

Their flexibility is apparent when most of them answered that they would like jobs which are related to their courses, or to their majors so not naming specific posts:

> *I am looking for IT related jobs.*
> *Any jobs as long as it is related to my studies.*
> *Any job which relate to my certification.*

In addition, respondents are even willing to work in non course-related jobs for survival with the hope that the present situation will not stagnate and will improve:

> *Any jobs that give good pay and I am interested in regardless of field.*
> *Anything that I can do.*
> *I would prefer jobs related to my course but I am willing to learn and gain experience in other fields.*

Therefore, there is a realistic expectation which the last example illustrates particularly clearly.

Secondly, the vagueness and indecisiveness of respondents to their own career paths is made clearer with responses, where they say:

haven't thought about it yet
still thinking
anything goes, still thinking

or they *"don't know"*. It can also be considered from the responses above that respondents are not sure of what they want to become when they graduate because they are probably not giuded on their career paths during university.

7.1.3 Respondents turn to entrepreneurship

Thirdly, 8 percent of respondents want to venture into their own business, a strategy which is highly supported by Government.

7.1.4 Respondents turn to teaching

Lastly, 5 percent would like to go into education. Based on the prevailling trend, there is a posibility that out of the 5 percent, most are female respondents. This is because in Malaysia, teaching is a popular option among female graduates. Reports reveal that women show greater interest in pursuing the field of teaching, with up to 70 percent of its applicants being female. (Malaysia: Education for all: Progress and Achievement in Elimination of Gender Gaps, 2001). Enrolment for the 1997/98 academic year into public institutions of higher learning shows that female students outnumber male students by a majority of 9,065 in a total student population of

112,299. This is not surprising and only reinforces the fact that teaching has always been an area associated with women in Malaysia. As reported in the Malaysia newspaper, The New Straits Times by Chin (2009) on 2nd of August, the declining number of male teachers is worrying and *"Educationalists predict that male teachers will be extinct in 20 years' time if the decline in the number of men in the teaching profession is not checked."*

Teaching is seen as a respectful profession, giving women more time for the family and is also linked to the possibility of further education opportunities. The teaching profession, which was once considered as a noble job, is now seen more as a secure post. Teaching was seen as a respectful profession before in Malaysia, as the teaching profession had always produced leaders who were the early freedom fighters and who now provide intellectual leadership in society (Bajunid 2008). Apart from that, the act of teaching and imparting knowledge itself is distinctive where it allows one to be of service to society and have an elevated social position. Nowdays, most graduates consider pedagogy because it promises security in the sense of fixed monthly wages, pension security, and the chances for further studies and retrenchment is rare.

In addition, there is a growing shift from trying to gain employment after a degree to doing a masters among graduates in Malaysia. This can also be seen in some responses that mention continuing education rather than going to work straight after a degree. It confirms the fact that respondents themselves are aware of the job

shortage problem and have planned for their future. However, this is a very small percentage.

In conclusion, as presented in the above discussions, more respondents are unsure of what they want to be when they graduate. The next section discusses what respondents perceive as having to offer employment.

7.2 Students' perception of strengths and weaknesses and employers' expectations

This part of the analysis deals with graduates' strengths and weaknesses in facing employment and relates to the three clustering of questions, namely questions 3b, 3d for strength (Refer to Appendix J3b and J3d) and questions 3c, 3f for weaknesses (Refer to Appendix J3c and J3f) and question 3e on what respondents think employers want from them (Refer to Appendix J3e).

Questions 3b, and 3d seek to identify respondents' strengths where as questions 3c and 3f seek to identify respondents' weaknesses in future employment. Question 3e is on what respondent think employers want from new employees. Percentages from both sets of questions are added up and divided for their mean, that is, for the average. From the percentages, a line chart is constructed to show the contrast between students' strengths and weaknesses as in Figure Q1 and what respondents think employers' expectations are in Figure Q2. It should be noted that while doing tabulation of occurrences, a strict ruling is implemented: when these six words (skills, attitude, qualification, confidence, experience, language) appear in the

answers only then it is taken as an occurrence. An occurrence is a mark on the tabulation chart where the total is added up for percentage. There is no "reading between the lines". The value of these occurrences shows the important criteria of employment perceived by future graduates. In answering all questions and from the tabulation of frequency counts, the six most frequent categories which appeared in respondents' answers are: skills, attitude, qualification, confidence, experience, and language as in Figure Q (Refer to Appendix J4a and appendix J4b).

Figure Q1 : Contrast between students' strength and weaknesses

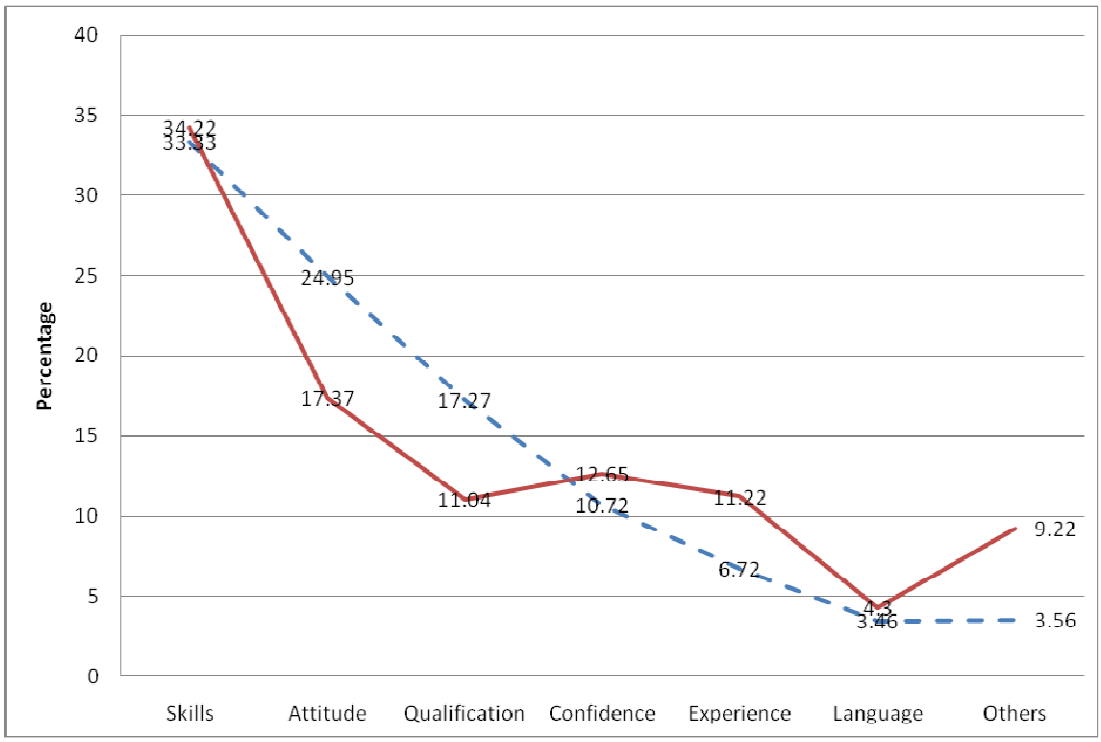
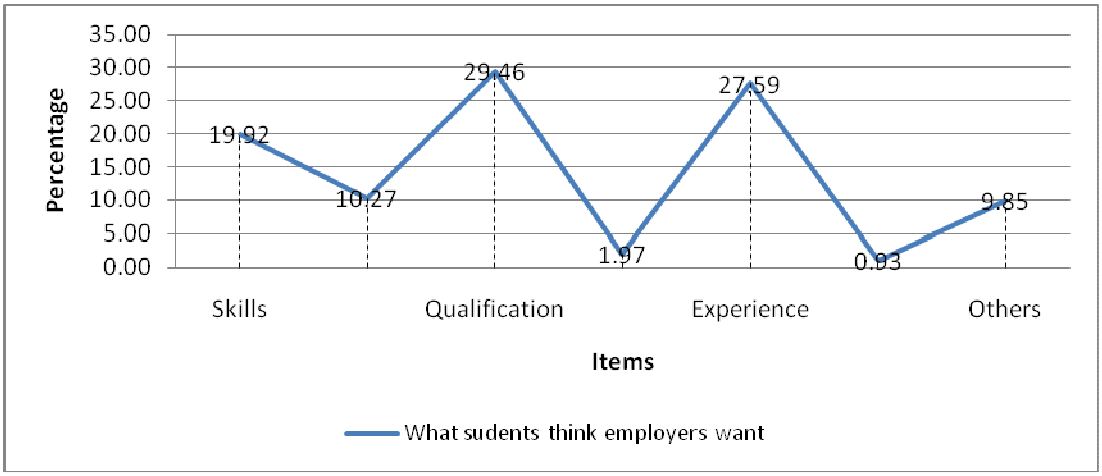


Figure Q2: Students' perception on employers' expectations



Skills are seen as learned capacities needed in accomplishing tasks and some skills that respondents mentioned are communication skills, hard and soft skills. *Attitude* refers to respondents actions towards employment and it is bounded by their beliefs and feelings. *Qualification* relates to formal certification received at the end of computer-related courses whereby it is an awarded degree here. Respondents wrote of levels of qualification through the cumulative grade percentage average, known as CGPA. *Confidence* is respondents' trust or faith in their own capabilities and confidence is interlinked to the ability to communicate, level of English proficiency and working experiences of respondents. For *experience*, respondents might have had experience from their internship. They might also obtain experience if they had worked prior to their degree courses. Lastly, in relation to *language*, respondents mostly refer to English. There are some responses citing foreign languages which may have an added value for employment. Finally, it should be noted that some of these categories may overlap with each other.

The line graph in Figure Q is explained in depth according to these categories and begins with skills. (Please refer to Appendix J4a and J4b)

7.2.1 Skills

Under the "skills" category, the total percentage for all three; respondents' strengths, weaknesses and perceived employers' expectations are the highest (87.47), denoting that respondents are aware of the importance of having skills in employment. Respondents say that they are not able to get jobs because they lack skills (34.22 percent). They recognise the importance of having skills for employment (33.33 percent) and they perceived employers would want them to be skill-ready when they enter employment (19.92 percent). The word *"skills"* has been repeated the most in answers which stresses the recognition of importance in having skills for employment. The skills that have numerously appeared in responses are communication skills, soft skills, job-related skills, thinking skills and interview skills.

7.2.1.i Communication skills

There is a repetition of the words "communication skills" in responses. Respondents say that their success in being employed is because they have communication skills:

I am employed because I have good communication skills.

Yet they also say that the reason for not being employed is because they lack such skills:

I lack communication skills especially when I am communicating with another person.

In this case, it can be derived that though they claim they have this skill, they may not actually be able to put it into practice and shows that they recognize the importance of this skill in employment. One respondent says that having the ability to communicate can convince employers to employ him/her:

> *I will be employed because of the way I communicate and the confidence I show the interviewers beside my education achievements".*

Even before employment, respondents recognize the importance of this skill.

Other respondents claim that lacking this skill impedes them from being confident especially during interviews. Some respondents relate their low proficiency in English to being a reason for not being able to communicate properly:

> *I do not have communication skills. My confidence level on job interview is low.*
> *I have communication problem and I am scared when I attend interviews.*
> *I am bad in English and communication skills.*
> *I lack communication skills. I can only communicate with people I know.*

These responses show the link between communication skills and poor interview performance and significantly to English language skills. It also demonstrates the interlinked nature of these skills where one can impact on the other. It can be concluded that lacking both communication skills and English proficiency made respondents lack confidence and not know how to act appropriately especially during interviews thus placing them at a disadvantage in the job market.

7.2.1. ii Soft and hard skills

Soft skills complement hard skills such as an emotional quotient complementing an intellectual quotient. An emotional quotient is the index or, how one measures

emotional intelligence. Some of the emotional quotient competencies are: self-control, empathy and self-confidence. Without an emotional quotient, one can be academically brilliant but socially and interpersonally inept. In fact research shows that social and emotional abilities can be more important than an intellectual quotient in determining professional success and prestige (Cherniss, 2000; Feist and Baron, 1996; Sternberg, 1996). For example, McMurtrey et al. (2008) consider soft skills as the most important skill for entry-level IT professionals, specifically the personal attributes of problem solving, critical thinking and team skills. Soft skills are seen as personal traits and are sometimes termed as people skills. Examples of occurrences being classed as this type of skill in responses are: interpersonal skills, social skills, emotional quotient and public relation skills.

There is clear evidence of a connection between having soft skills and the ability to communicate. Lack of soft skills in respondents prohibits them from meaningful communication thus making them lack confidence in their own employability.

> *I lack soft skills so I m not so confident.*
> *I have quite low self confidence and not good in communication skills.*
> *I identify weaknesses in myself especially in people's skills*

It is interesting to note that respondents are aware of the importance of having soft skills to make them employable. When asked what makes them employable, one respondent says he/she is employable because he/she:

> *has the technical skills as well as soft skills needed by companies.*

When asked what they lack, more respondents say a lack of technical skills and then soft skills. When asked what they think employers are interested in, another

respondent says both "*personal and technical skills"*. Thus, this confirms the importance of having both skills in relation to employment. The importance of hard skills in employment according to respondents is discussed next.

7.2.1.iii Job-related skills

Job-related skills or work-related skills are also mentioned repeatedly in the responses. As respondents are from computer-related degrees, the job skills mentioned are: programming skills, multi media skills and design skills. Respondents say they do not have the appropriate hard skills for employment and clarify this by writing that having just theory is not enough to guarantee them employment. This is demonstrated below:

> *I lack technical skills because only theories are taught at the university*
> *I lack practical skills from my course*
> *I should have more skills to do a system such as JAVA and NET because the job market needs these skills.*

Higher education institutions are seen as places offering theories but not practical experience for respondents. If respondents are not supplied with adequate training, they will not be ready for the working world. Consequently, there is a huge debate and pressure everywhere on higher education to produce employable graduates as discussed in chapter 4.

From the last example it can be seen that the skills for computer and information technology graduates are very job specific. Since the evolution of technology in a knowledge based economy is rapid, these skills are also undergoing rapid change. According to Bakar and Hanafi (2007) the advancement of technologies changes the

working world and there is a need for well-informed and highly-skilled workers. Because of these changes, the skills offered in courses at a university may be obsolete once respondents graduate, hence the need for a strong connection between universities and ICT-related industries to constantly update such changes.

Respondents who have "extra" certification on specific job skills not only see their skills as their most important assets but are also more determined and confident they will be employed:

> *I will be employed because I have JAVA, PHP, ADOBE and open CMS*
> *I am successful because I have SAP certificate, CCNA 1 AND CCNA 2 and experience in handling RV2AJ Mitsubishi robot.*

Globalization, which also speeds up the growth of technology, forces future graduates to be equipped and keep abreast with high technical skills. Future graduates need to acquire these extra skills to be competitive in the job market. The best equipped respondents may have acquired the skills from previous work experience or from their own initiatives such as enrolling themselves on courses.

7.2.1. iv Thinking skills

From the responses it can be seen that respondents are aware that having thinking skills helps boost their employability. They show an ability to think critically, as a respondent puts it: "*I think out of the box*". They relate having critical thinking skills to the ability to adapt, to make decisions and to solve problems. They also relate having creative thinking skills to having ideas. Malaysia has an education system which embeds critical and creative thinking skills (CCTS) and this is taught to

students from primary school up to tertiary level. How well these skills are being nurtured to students is, however, questionable as evidenced by the following:

> *I am successful because of my language skills, ability to think critically, willingness to learn and adapt.*
> *I do not consider every possibility when making a decision, I have no critical thinking skills and no decision making skills.*
> *Employers are interested in critical thinking skills and the ability to problem solve and knowledge.*
> *Past work experience and the ability to think critically and solve workplace problem.*

Othman (2002) finds that teachers are well prepared to disseminate thinking skills yet Rajendran (2001) found teachers claim they find difficulties in teaching higher order thinking skills through languages. In fact, in Malaysia, it is realized that many teachers are not fully capable of incorporating thinking skills in their teaching strategies (Mahyuddin. et al., 2004). The findings here appear to support this.

7.2.1.v Interview skills

A job interview is seen as something very challenging where one respondent says that *"the killer part is the interview, not the resume"*. The interview is the first part of a compulsory process one has to go through to obtain employment. It is apparent from the responses that many respondents feel that they are not equipped with interview skills. They state that a lack of interview skills leaves them unable to impress interviewers or convince them of their abilities in getting jobs done as demonstrated in the following statement: *"I did not present my skills and abilities well in the interview"*. There are many factors to succeed in interviews. Apart from having an interesting resume, giving a good first impression, learning about the

company and preparing for questions are some things that an interviewee should be prepared with.

Students should also have the language and confidence to communicate effectively and have exposure to real-life situations like interviews and so not be nervous in the real setting. Kopp and Butterfield (1986) studied graduate students' acquisition and use of verbal interviewing skills in field settings and found that predicted changes from pre-training to post-training interviews were not significant. This raises the question as to why the respondents in this study are so concerned by interviews and how interviewing skills can be taught effectively.

7.2.2 Attitudes

Respondents imply that graduates with a good attitude will be more employable. They reveal important attitudes in their answers by writing about typical behaviour in obtaining employment:

> *I am successful because I am hardworking, a fast learner and able to work in a team.*

Here, the attitudes mentioned are "*being hardworking*" and "*working in a team*". Among attitudes respondents consider as important for employment are: being hardworking, willingness to learn, having a positive attitude towards work, and adaptability. These attitudes are discussed next.

7.2.2.i Hardworking

Being hard working is important (Wye and Lim, 2009) especially if an intern wants to secure employment with the same company. The examples of working hard given

are trying not to be good but excellent, coming in before the boss and staying at the office longer. She also mentions finishing projects early, taking time learning new software and offering to do more work. Respondents did not specify such examples of being hardworking, but mostly wrote that being hardworking will secure them employment. This articulated behaviour is no surprise because respondents do work hard to obtain good grades at university. They also see this trait as something they can bring to their workplace and impress future employers with. However, in reality respondents are working hard because they are nurtured to do so by an education system which is theoretical and exam oriented (Lee, 1999). Consequently, hard work is not necessarily translated into either skills or behaviours, as these responses demonstrate.

7.2.2.ii Willingness to learn

Many respondents say that in employment, they are willing to learn new knowledge or job traits expected of them. They say that what is taught at the university does not cover what is needed in the working world. This indirectly relates to the fact that universities are too theoretical and not practical where skills are concerned as illustrated below:

> *I learn more by myself, because at the university we learn not much compared to what is needed by job market*

Willingness to learn means respondents are willing to learn from new situations and people around them.

> *My most important asset is my ability to learn more and be resourceful.*
> *I am young and I am willing to learn from people around me.*
> *I am willing to do anything, learn new skills or travel for a job.*

Regardless of qualification and experience, in general, employers appreciate graduates with this attitude. In fact this attitude is closely related to soft skills or an emotional quotient. It supports learning as a lifelong process. Therefore, questions to consider are whether respondents who can be high achievers are willing to change for the better and how a third level institution can cultivate open-mindedness and readiness to learn.

7.2.2.iii Adaptability

Being adaptable is closely related to one's willingness to learn. This attitude is essential in new employees especially if the working world is viewed as a completely new setting for graduates. The new world is also moving rapidly with ideas and practices which simply sweep away the norms. Thus, being adaptable is needed to cope with these changes:

> *I am successful because I can adapt to surrounding environment.*
> *I am open-minded, confident and can speak out as well as adaptable and can work as a team.*
> *I can adapt to any work situation.*

It is a positive sign that respondents know the importance of being adaptable and also see themselves as being adaptable.

7.2.3 Qualification

Specific qualifications or certification make some graduates more employable than others. Referring back to the line chart in Figure Q2, it is clear that respondents perceived employers will look at their grades slightly more than at their experiences. It is particularly important to obtain good grades in the Malaysian educational setting as it is so examination oriented. For example in the 1980s, in a national examination,

a candidate could only take nine papers maximum. Now, the examination is an open paper and the maximum numbers of papers one can sit has risen to twenty-one.

Subsequently, it is not surprising that employers will consider grades the most because they conclude that respondents with better grades have reached a certain level of ability and will be easier to train for the workplace. The respondents see that their good grades will impress employers to hire them:

> *Employers will look at the title of my qualification and my cumulative grade point average (CGPA).*
> *Employers look at qualifications and results, and my capabilities in recent computer technologies.*

Paper qualifications are not the only thing employers look for but respondents perceive that with better grades they stand a better chance of employment.

7.2.4 Confidence

With reference to the line chart in Figure Q1 and Q2, respondents see themselves as not having confidence, although they do not think employers consider confidence particularly during the recruitment process. Respondents spoke of being confident and that this enables them to become employed. They also link having communicative skills, language proficiency and experience with confidence:

> *Lack of communication skills and inability to speak English can cause problem for me.*
> *I lack of self confidence and communication skills.*

This is not surprising as according to Evans (2007), good communication skills consist of confidence or the ability to speak out. Naturally, for one to communicate one needs a medium of communication which is a language, so the more proficient

one is in the language the more confident one is when using it. Also it should be considered that communication involves both verbal and non-verbal skills. Finally, respondents say that having working experience is a confidence booster. In-depth discussion on experience as an employment expectation is discussed next.

7.2.5 Experience

Again, from the line chart in Figure Q2, it is interesting to see that respondents know employers expect them to come into the working world with experience (27.6 percent). This percentage is slightly lower than the category "qualification" which is 29.5 percent. As fresh graduates, respondents will not have the expected experience unless their courses are designed with an internship or job specific training. The effectiveness of such programmes depends on the length of internship or training which varies from ten weeks to more and if the internship or training is compulsory in the first place. Making internship voluntary means some students do not take it up and fail to see the importance of having initial exposure to the working world.

7.2.6 Language

The percentage of students saying their language is weak is higher than that of language as strength. Respondents do expect that they should be good at language but the percentage is low. Respondents say that they are not good at English. They cannot converse fluently and this restricts them from conveying ideas effectively. As chapter 2 discussed, the importance of English as the language of knowledge is accepted in Malaysia and English is also the country's second language.

Proficiency in a language makes respondents able to communicate better and be more confident in expressing themselves:

> *My language and capability in public speaking, the way I convey my ideas, and maturity I showed when answering questions.*

There are also responses which show knowing other languages help respondents be more employable. Because Malaysia is a multiracial country, being multilingual is an added advantage.

Knowing a foreign language is also seen as an asset for employment:

> *I have knowledge in Arabic, Japanese and Thai languages.*

Although only a small percentage in these results, the importance of proficiency in English is regarded essential for employment. Additionally, knowing a foreign language is an asset if one plans to work for a multinational company.

Chapter summary

This chapter raises questions around the role of education in third level institutions in relation to employability. The findings reveal that soon-to-be graduates are unsure of what they want to be and that they are aiming unrealistically for computer-related high-level posts. They perceive that future employers look at their qualification and experience whereas what they have to offer most are skills and a positive working attitude. Yet, they also claim that they need more skills and a good attitude to guarantee them employment.

The following chapter discusses responses to the critical thinking questionnaire based on Paul's model and which has been adapted for this research.

Chapter 8 - Data analysis: Quantitative data analysis: formal questionnaire to final year undergraduates

Less than fifteen percent of the people do any original thinking on any subject ...
The greatest torture in the world for most people is to think.
Luther Burbank (1849-1926).

Chapter outline

This chapter examines the main quantitative questionnaire which was administered to the final year undergraduates of computer related degrees across 10 public universities in Malaysia. This finding in general discusses respondents' perceptions on thirty-five Critical Thinking Strategies by Richard Paul et al. (1990) on a Likert scale adapted and developed for this research (See Appendix J1). Firstly, Chapter 8 analyses the question whether graduates enrolled themselves into respective courses with the belief English is not important and this is presented in a simple pie chart which is discussed in detail. Next, this chapter also discusses: respondents' perception on the ability to think critically and the importance of these thinking strategies to future employment.

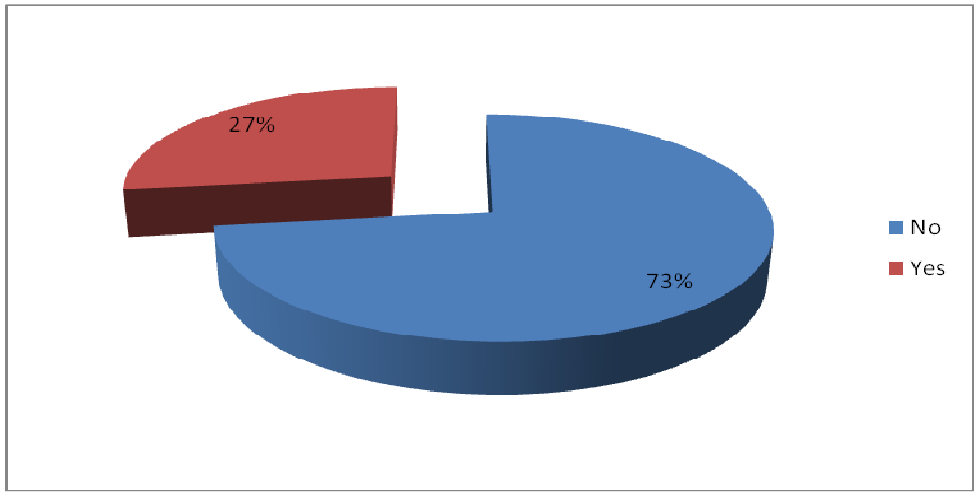
8.0 The importance of English

Respondents answer a question "Did you enrol yourself in the course with the belief English is not important?" by answering "Yes" or "No". The total of answers is turned into percentage form as given in a pie chart in Figure R. Respondents were not asked to support their choice. This question was included to see if the

respondents perceive that computer related courses as more technical without having to consider communicative interaction in English. In technical courses, English is just to understand textbooks rather than a medium of communication as IT are mainly coded software programmes with very little structured English

73 percent say they enrolled themselves into computer-related courses with the belief that English is important. 27 percent enrolled themselves into their courses with the thought that the courses would not demand English both at the university and in the working environment.

Figure R: Enrolment with the belief that English is not important



N: 671

The possible reason why respondents agree to the importance of English is: the influence of British colonisation, as mentioned in chapter 2. English during the colonisation period was used as the medium of communication in commercial and professional sectors including courts of law. There were also English medium schools where those who graduated from such schools are highly looked upon and given chances to hold important civil service positions. English is seen as a language

of status, and its importance as a language of knowledge is acknowledged by Malaysians, which is why English is Malaysia's second language. English is also seen as the world's most important language for knowledge, and, as mentioned earlier, Malaysia has decided to teach more subjects in English. In 2003, English was made the medium of instruction for mathematics and science subjects in schools. The mastery of the English language is much encouraged at all levels of education, from the primary to the tertiary level. This action is taken in hope that the declining command of the language among students will improve. This also confirms the high status of English in Malaysia as English is readily accepted as the language associated with globalization. It is also the international language of business communication and the information technology (IT) sector. The result shows that respondents are aware of the necessity to have a certain level of English proficiency to be able to obtain employment. In chapters 2 and 6 employers also stress the importance of English in employment; it is the language for formal interaction in Malaysia and widely used in education as well as business and economic sectors in this country.

The Malaysian International Chamber of Commerce and Industry welcomed the government's decision to increase the number of English teachers and teaching hours. Gooch (2009) wrote in the New York Times, the online version, quoting the executive director of the Malaysian International Chamber of Commerce, Stewart Forbes saying that the need to emphasise English must continue to be part of the government's policy as there are companies that complain about graduates' communication skills in general, and English skills in particular . This is however, a

complex issue as there are also some changes in the country's policy which make English less important. One example is the medium of instruction for mathematics and science which is to be reverted back to the country's national language in 2012, Bahasa Malaysia.

By saying English is important, respondents are acknowledging the use of the language in interaction, especially in employment. English would not be seen as important if an employee is working with machines and, in general, involvement with the Information and Technology (IT) sector means working with systems. However, any place of employment requires human interaction, that is, communication, cooperation and colloboration. Respondents who did not see English as not an obstacle in their studies and future employment probably say so because they see computer-related jobs as more technical than dealing with people and where less communication is needed in the former. These respondents see future employment will involve more of their own hands on experience of computers, which typically consists of activities related to gaming, web-browsing, and word-processing.

8.1 Respondents' ability and importance of critical thinking strategies to future employment

As explained in the introduction to this chapter, respondents rate their perceived ability on their critical thinking strategies and also rate the importance of these strategies to their future employment. The thirty-five strategies are listed in table 7

and mean scores for both sets of ratings and the differences are given in figure S. They are included here for ease of comparison. The critical thinking strategies are

Table 7: List of 35 critical thinking strategies (Paul, 1996)

1 Thinking Independently	19 Generating or assessing solutions
2 Developing insight into egocentricity or sociocentricity	20 Analysing or evaluating actions or policies
3 Exercising fair-mindedness	21 Reading critically: clarifying or critiquing texts
4 Exploring thoughts underlying feelings and feelings underlying thoughts.	22 Listening critically: the art of Silent Dialogue
5 Developing intellectual humility and suspending judgement	23 Making interdisciplinary connections
6 Developing intellectual courage	24 Practising Socratic discussion: clarifying and questioning beliefs, theories, or perspectives
7 Developing intellectual good faith or integrity	25 Reading dialogically: comparing perspectives, interpretations, or theories
8 Developing intellectual perseverance	26 Reasoning dialectically: evaluating perspectives, interpretations, or theories
9 Developing confidence in reason	27 Comparing and contrasting ideas with actual practice
10 Refining generalisations and avoiding oversimplifications	28 Thinking precisely about thinking: using critical vocabulary
11 Comparing analogous situations: transferring insights to new contexts	29 Noting significant similarities and differences
12 Developing one's perspective: creating or exploring beliefs, arguments, or theories.	30 Examining or evaluating assumptions
13 Clarifying issues, conclusions, or beliefs.	31 Distinguishing relevant from irrelevant facts
14 Clarifying and analysing the meaning of words and phrases	32 Making plausible inferences, predictions, or interpretations
15 Developing criteria for evaluation: clarifying values and standards	33 Giving reasons and evaluating evidence and alleged facts
16 Evaluating the credibility of sources of information	34 Recognising contradictions
17 Questioning deeply: raising and pursuing root or significant questions	35 Exploring implications and consequences
18 Analysing or evaluating arguments, interpretations, beliefs, or theories	

also broken down into three sections: nine (9) affective strategies, seventeen (17) cognitive strategies macro skills and nine (9) cognitive strategies micro skills to make a total of thirty-five (35) strategies. The 35 strategies in table 7 are not arranged in descending order of significance.

Explanation on each strategy is given in Appendix A as an excerpt from Paul (1990). The analysis will firstly focus on the strategies in general before discussing the three separate sections.

8.1.1 Overview of 35 critical thinking strategies from highest to lowest ratings

In comparing the scores of ability and importance, it is clear that these respondents rated their own ability lower than they rated the importance of these strategies to their future employment, with the exception of strategy 32 which is *making plausible inferences, predictions or interpretations*. These results support previous studies using similar methodology, for example Nabi and Bagley (1999) and Nguyen et al. (2005). Nabi and Bagley (1999) assessed the importance and quality of graduates' generic transferable skills and competencies using the survey method. They found that, in terms of skills development, graduates rated the importance of particular skills higher than their own ability in those skills with the lowest rated skill being IT skills and the highest rated skill being to work without supervision.

Nguyen et al. (2005), when using similar methodology, assessed ratings on twenty-three (23) personal qualities and found the same; where job-seeking students tend to have a lower assessment of their own abilities than their perceived importance of

those abilities. They concluded that such results indicate respondents were dissatisfied with their current abilities in comparison with employers' requirements and there is a need for improvement in the personal qualities of undergraduate students through the efforts of both universities and students themselves. From this research, it can be concluded that the respondents are aware of the importance of critical thinking strategies for their working world and admit that they have not reached a level where they are ready to meet the challenges of that world.

Firstly, with reference to Figure S (Refer to Appendix J2), it can be seen that only for strategy 32 did the respondents rate their ability higher than the importance of this strategy to employment. Strategy 32 was rated with a mean score of 3.74 which is making plausible inferences, predictions or interpretations (I am extremely careful in my observations in making inferences). The respondents perceived themselves as being confident and equipped with this strategy which they possibly obtained from courses at university, to face the challenges of the working world. If this is true, one possible reason would be there is something in the courses that enhances this particular critical thinking strategy precisely which allows respondents to infer, predict and interpret. This is evidence that the education system has reached its objectives in producing graduates who have this particular strategy. Yet, it is still unclear and difficult to know what or which part of the course undertaken by respondent contributes to having this critical thinking strategy whether a module or the degree overall.

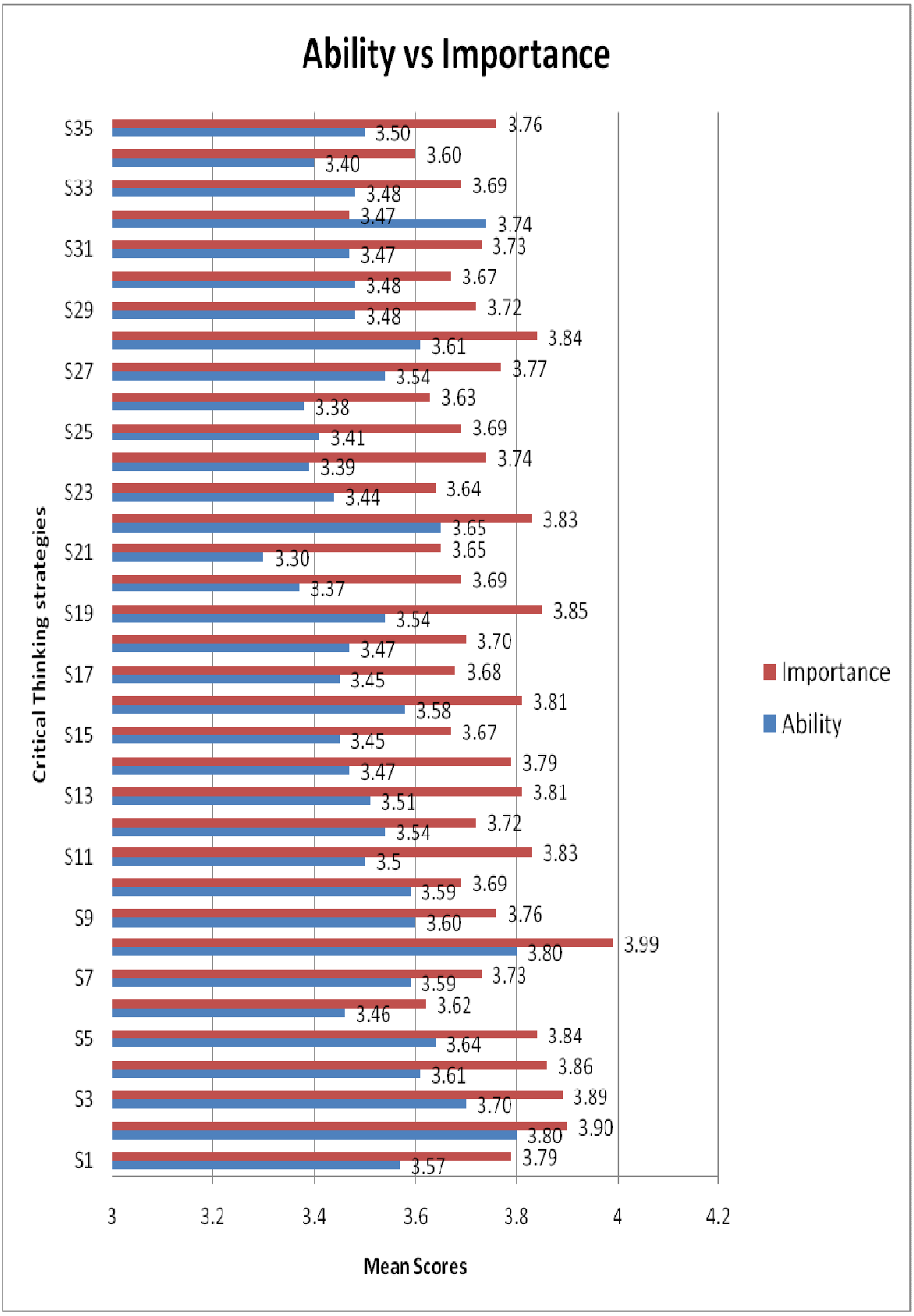
Secondly, from Table 8 the highest rated strategy for respondents' "ability" is strategy 2, with a mean score of 3.80. Strategy 2 is *developing insight into egocentricity or sociocentricity.* According to Paul (1996), if a person has knowledge of and use of strategy 2, he/she does not confuse what is being thought with reality. It can be concluded that, respondents are saying they are very realistic where they are able and willing to consider others' points of view to the extent of accepting ideas even if it prevents them from getting what they want. It supports the notion that the respondents have been taught how to be realistic, possibly through teaching and learning at universities. On the other hand, this contradicts the finding in chapter 7, where they are seen as being picky in choosing employment.

The lowest rated strategy rated under "ability" is strategy 21, with a mean score of 3.30. Strategy 21 is *reading critically: clarifying or critiquing texts*. Respondents say that they have a weak critical reading strategy which, according to Paul (1996), indicates they do not read with heavy scepticism. People who do not read critically; do not question themselves as they read, wonder about the implications of, reasons for, examples of and meaning and truth of the text they are reading. This finding agrees with those by Ambigapathy (1997), Kaur and Thiyagarajah (2000), and Posner and Rothbert (2007). This is also a key finding in the analysis as chapter 2 explained that even when the 3Rs (reading, writing and arithmetic) and CCTS (critical and creative thinking skills) are stressed in the education system, it is still unsuccessful in embedding an "active reading" culture among Malaysian students.

Thirdly, with reference to Figure S the highest rated strategy for the importance of the future working world is Strategy 8 with a mean score of 3.99, which is *developing intellectual perseverance.* According to Paul (1996) it is the ability of a critical thinker who is willing to pursue intellectual insights and truths in spite of difficulties, obstacles and frustrations with the realization that any significant change requires patience and hard work. Respondents see having intellectual perseverance as the most important skill to have when they join the workforce. They know that the working world is very different, tough and challenging from their university days and only when they persevere, will they be able to progress in their personal and working lives. This finding also relates to chapter 7 where it is found that respondents are aware of present unemployment problems and so some opt to change their employment expectations from normal course related jobs to being entrepreneurial or teaching. Respondents also stress the importance of being hardworking, an attitude which is crucial and associated to strategy 8 which stresses that significant change requires patient and hard work. Respondents are also willing to work hard as they know that they have much to learn in new working environment. Respondents are hardworking, an attitude which is possibly the product of an education system which is theoretical based and exam oriented.

The lowest rated strategy in the important skills for future employment strategy is strategy 32 with a mean score of 3.47 which is *making plausible inferences, predictions or interpretations (I am extremely careful in my observations in making inferences).*

Figure S: Mean scores on the ability and importance of 35 critical thinking strategies



Respondents see making plausible inferences, predictions or interpretations as the least important strategy as they step into the working world. Paul (1996) defines this strategy as the ability to reach sound conclusions based on observation and information. As it can be said that this is an important strategy in making correct interpretations, the possible reasons why respondents do not think this strategy is important are that as new employees they do not think that they opinions count or they are more ready to take instructions than their interpretations being heard. This contradicts with what is found in chapter 6 where employers want new employees who are self dependent, who can work autonomously, fair minded in decision making or making their own judgements.

In conclusion, respondents are realistic, able and willing to consider other people's point of view. Yet they are poor in critical reading. Perseverance is the utmost important skill in employment and making plausible inferences, predictions or interpretations is the least important strategy to the world of work according to these undergraduate respondents.

8.1.2 Three highest and lowest rated skills for 35 Critical Thinking Strategies

Table 8 shows the dispersion of highest and lowest rated strategies (the highest and lowest rated strategies are explained in detail in other sections of this chapter). The three highest and lowest rated critical thinking strategies by respondents are given in this table and the overall discussion of results is expanded in following sections.

Table 8: Highest and lowest rated critical thinking strategies by respondents (Refer to Appendix J2)

	Ability Strategy/Mean Score	Importance Strategy/Mean Score
High rated strategies	3.80 S2 **Affective strategy** Developing insight into egocentricity or sociocentricity	3.99 S8 **Affective strategy** Developing intellectual perseverance
	3.80 S8 **Affective strategy** Developing intellectual perseverance	3.89 S2 **Affective strategy** Developing insight into egocentricity or sociocentricity
	3.74 S32 **Micro-skills** Making plausible inferences, predictions, or interpretations	3.89 S3 **Affective strategy** Exploring thoughts underlying feelings and feelings underlying thoughts.
Low rated strategies	3.38 S26 **Macro-skills** Reasoning dialectically: evaluating perspectives, interpretations, or theories	3.62 S6 **Affective strategy** Developing intellectual courage
	3.37 S20 **Macro-skills** Analysing or evaluating actions or policies	3.60 S34 **Micro-skill** Recognising contradictions
	3.30 S21 **Macro-skills** Reading critically: clarifying or critiquing texts	3.47 S32 **Micro-skills** Making plausible inferences, predictions, or interpretations

From table 8, it can be seen that the respondents rate their ability in the affective critical thinking strategies higher than other cognitive strategies as well as acknowledging their importance for employment. It also shows that respondents

rated their abilities in affective strategies stronger than cognitive strategies. As affective strategies are directly related to moral, ethics and religious strength, this finding is not surprising as it can be related to education in Malaysia in general which inculcates moral values in subjects such as Islamic and Moral education as explained in the country's Vision 2020. However, this contradicts findings in chapter 6 in relation to employer expectations, where graduates are said not to have soft skills.

Also, of importance to this thesis is the fact that affective strategies are associated with having soft skills as discussed in chapter 3. From this it can be inferred that this directly means respondents do have soft skills in readiness for employment. Yet it is in contrast with employers' claims in chapter 6 which is that new graduates lack soft skills. Consequently, this highlights the importance of having affective strategies/soft skills for employment as both employee and employer stress them. Additionally, having these skills can also be attributed to the higher education system as being a successful outcome.

From this table, looking at the lower ratings, respondents tend to rate themselves lowest in the macro-skills of cognitive strategies for ability and micro-skills for importance to future employment. As explained in chapter 3 and accompanying explanation on the 35 critical thinking strategies by Paul (1996) in the Appendices (Refer to Appendix J1 and J2), macro-skills are when one uses a combinations of elementary skills or the micro-skills to perform a "real action". This is not surprising as macro skills generally are more difficult, complex and holistic as one needs to use

certain combination of interdependent and integrated micro-ability skills in concert with one another to perform an action. Strategy 21, *reading critically* provides an example. When one reads critically (macro-skill), one has to make use of a variety of critical thinking micro-skills and use them in concert with each other. Some of the fundamental skills (micro-skills) needed in reading critically are: reflecting on the implications of a title, identifying basic issues or objectives of the text from its preface or introduction, identify particular vague sentences, referring to background knowledge and experience for possible examples, and noticing an author's assumptions. A student is expected to make all these individual moves as a part of an integrated activity which is an attempt to make sense of the reading.

As affective strategies are given more emphasis in data collected, the ratings of all the 9 affective strategies are discussed next.

8.2 Affective Critical Thinking Strategies

Table 9 presents the ratings for the nine (9) affective critical thinking skills in descending order of importance. It shows highly rated strategies for both perceived "ability" and "importance" of critical thinking strategies to respondents with computer related degrees. These strategies are the first strategies on Paul's (1996) list and are derived from seven interdependent traits of mind as explained in detail in chapter 3.

Table 9: Ranking for 9 affective critical thinking strategies in descending order of Importance (Refer to Appendix J2b)

Perceived Ability			Perceived Importance to Future Employment	
Critical Thinking Strategies	Respondents' perceived CTS ability (Mean Score)		Critical Thinking Strategies	Respondents' perceived CTS importance to future employment (Mean Score)
(S2) Developing insight into egocentricity or sociocentricity	3.80		(S8) Developing intellectual perseverance	3.99
(S8) Developing intellectual perseverance	3.80		(S2) Developing insight into egocentricity or sociocentricity	3.90
(S3) Exercising fair-mindedness	3.70		(S3) Exercising fair-mindedness	3.89
(S5) Developing intellectual humility and suspending judgement	3.64		(S4) Exploring thoughts underlying feelings and feelings underlying thoughts.	3.86
(S4) Exploring thoughts underlying feelings and feelings underlying thoughts.	3.61		(S5) Developing intellectual humility and suspending judgement	3.84
(S9) Developing confidence in reason	3.60		(S1) Thinking Independently	3.79
(S7) Developing intellectual good faith or integrity	3.59		(S9) Developing confidence in reason	3.76
(S1) Thinking Independently	3.57		(S7) Developing intellectual good faith or integrity	3.73
(S6) Developing intellectual courage	3.46		(S6) Developing intellectual courage	3.62

Respondents perceived themselves as having ability in affective strategy 2 the highest which is *developing insight into egocentricity or sociocentricity.* This is followed by strategy 8 which is *developing intellectual perseverance*. Firstly, strategy 2 suggests that one should make do without the "all or nothing attitude" where an individual is 100 percent right and other people are 100 percent wrong. Egocentricity and sociocentricity are the opposites of critical thought and the way to overcome them is through reflecting on one's reasoning and behaviour as explained in chapter 3. This result shows that student respondents do overcome their egocentricity and sociocentricity and reflect and think critically. Secondly, strategy 8 which is developing intellectual perseverance suggests that perseverance in the quest of becoming a critical thinker in spite of difficulties, obstacles, and frustration. It is also important in the quest for new work knowledge and experience. This confirms what was mentioned earlier, where respondents agree that any change require patience and hard work. Respondents see themselves with this strategy, having patience and being able to work hard in embracing new working surroundings which provides the opportunity for lifelong learning as suggested and hoped in the 9th Malaysian plan where there is lifelong learning at all levels.

Similarly, for strategies important to their future employment, again, respondents think strategies 8 and 2 are most important. Respondents rated strategy 8, *developing intellectual perseverance* higher than *s*trategy 2, *developing insight into egocentricity and sociocentricity*. It can be concluded that respondents are confident in both strategies 2 and 8; also, according to respondents they are expected by employers for new employees. This is a critical finding in relation to employer expectations as

employers seek employees who are patient and hardworking, as found in employers' expectations in chapter 6. Again, it stresses the fact that these respondents, members of a future workforce, do have critical thinking strategies (although not all) as expected by employers and equipped by HEIs in helping them obtain employment.

Also in terms of ability and importance for future employment, respondents consider that they lack strategy 6 which is *developing intellectual courage*. Firstly they may not attach any importance to it or secondly, they really do not have this strategy which is important for both the individual and employment. This strategy suggests that respondents need the courage to admit the truth in some ideas which are considered dangerous and absurd, and the distortion or falsity in some ideas strongly held in social groups such as in a working environment. This strategy in effect sees an individual as questioning what is viewed as self-evidently true or acceptable and therefore it is a strategy which carries a measure of risk. If respondents do not have the intellectual courage to actively and critically question what is given to them, then they will not be able to think independently, hence the connection to the second lowest rated strategy, strategy 1, which is *thinking independently*.

Of importance to employment, respondents think the least important strategies are strategies 6 and 7. Strategy 6 is *developing intellectual courage* and strategy 7 which is *developing intellectual good faith and integrity*. The respondents do not think these are important in employment as when they become employees, they will not be asked to give opinions or perform tasks such as conduct meeting, as most of the time such duties are the responsibilities of senior personnel. Where graduates of

computer related degrees are concerned, their roles are more technical related, where for instance a programmer deals with programmes where less interaction and communication with people. Thus, they do not need such courage as they are seen more as being behind the scenes.

When comparing respondents' least ability in critical thinking strategies to what they think is least important in employment, table 9 shows the rated strategies to be similar. These strategies are strategies 1, 6, 7, and 9 which are: *thinking independently*, *developing intellectual courage*, *developing intellectual good faith and integrity*, and *developing confidence in reason*. All these strategies are related to the ability of being a member of a dynamic and independent new workforce. Since the Malaysian education system has instilled in students to be passive learners in the classrooms as explained in chapter 2, these respondents feel that they are not expected to be vibrant and self sufficient during employment.

8.3 Cognitive Critical Thinking Strategies

According to Paul et al. (1990), the cognitive strategies are divided into two: the macro and micro strategies. Basically, to critical think, one needs to use a combination of micro strategies to perform a macro strategy.

8.3.1 Cognitive Critical Thinking Strategies: Macro-Skills

Results are presented in table 10. For macro-skills, respondents rated their ability highest in Strategy 22, *listening critically: the art of Silent Dialogue.* Listening

Table 10: Ranking for 17 cognitive critical thinking strategies-macro skills in descending order of importance (Refer to Appendix J2b)

Perceived Ability			Perceived Importance to Future Employment	
Critical Thinking Strategies	Respondents' perceived CTS ability (Mean Score)		Critical Thinking Strategies	Respondents' perceived CTS importance to future employment (Mean Score)
(S22) Listening critically: the art of Silent Dialogue	3.65		(S19) Generating or assessing solutions	3.85
(S10) Refining generalisations and avoiding oversimplifications	3.59		(S11) Comparing analogus situations: transferring insights to new contexts	3.83
(S16) Evaluating the credibility of sources of information	3.58		(S22) Listening critically: the art of Silent Dialogue	3.83
(S12) Developing one's perspective: creating or exploring beliefs, arguments, or theories.	3.54		(S13) Clarifying issues, conclusions, or beliefs.	3.81
(S19) Generating or assessing solutions	3.54		(S16) Evaluating the credibility of sources of information	3.81
(S13) Clarifying issues, conclusions, or beliefs.	3.51		(S14) Clarifying and analysing the meaning of words and phrases	3.79
(S11) Comparing analogus situations: transferring insights to new contexts	3.50		(S24) Practising Socratic discussion: clarifying and questioning beliefs, theories, or perspectives	3.74
(S14) Clarifying and analysing the meaning of words and phrases	3.47		(S12) Developing one's perspective: creating or exploring beliefs, arguments, or theories.	3.72
(S18) Analysing or evaluating arguments, interpretations, beliefs, or theories	3.47		(S18) Analysing or evaluating arguments, interpretations, beliefs, or theories	3.70
(S15) Developing criteria for evaluation: clarifying values and standards	3.45		(S10) Refining generalisations and avoiding oversimplifications	3.69
(S17) Questioning deeply: raising and pursuing root or significant questions	3.45		(S20) Analysing or evaluating actions or policies	3.69
(S23) Making interdisciplinary connections	3.44		(S25) Reasoning dialogically: comparing perspectives, interpretations, or theories	3.69
(S25) Reasoning dialogically: comparing perspectives, interpretations, or theories	3.41		(S17) Questioning deeply: raising and pursuing root or significant questions	3.68
(S24) Practising Socratic discussion: clarifying and questioning beliefs, theories, or perspectives	3.39		(S15) Developing criteria for evaluation: clarifying values and standards	3.67
(S26) Reasoning dialectically: evaluating perspectives, interpretations, or theories	3.38		(S21) Reading critically: clarifying or critiquing texts	3.65
(S20) Analysing or evaluating actions or policies	3.37		(S23) Making interdisciplinary connections	3.64
(S21) Reading critically: clarifying or critiquing texts	3.30		(S26) Reasoning dialectically: evaluating perspectives, interpretations, or theories	3.63

critically is an important skill in employment where an employee listens first before taking any action or from a more complex perspective, listens to arguments in the discussion of a problem. If respondents really have the ability or strategy, then it is clearly a valuable skill. What is worrying, however, is that if students perceived themselves to be active critical learners when actually they are passive ones. One possible reason why respondents perceived themselves as having a high ability in this strategy is because, again, as stated in chapter 2, education in Malaysia is synonymous with teacher-centred classrooms where students listen most of the time. This skill (listening) is used more than others as the teacher is seen as the knowledge provider and students are passive receivers. These undergraduate respondents have plenty of practice in listening. This result, rather than being positive at first glance may in fact be somewhat negative. If it is interpreted as being negative then it points towards change in the education system such as more interactive classrooms where students are responsible for their own learning and have the possibility to become critical thinkers. This takes teaching and learning towards a constructivist perspective as discussed in chapter 3.

Respondents perceived themselves as having least ability in strategy 21 which is *reading critically: clarifying or critiquing texts.* This potentially supports the negative interpretation in relation to strategy 22. It reinforces the argument surrounding the urgent need to embed "active reading" culture among Malaysian students (Ambigapthy, 1997; Kaur and Thiyagarajah, 2000; Posner and Rothbert, 2007). Additionally, respondents rate themselves with low ability in reasoning and

analysis as in strategies 25, 24, 26 and 20 (*reasoning dialogically, practising Socratic discussion, reasoning dialectically and analysis or evaluating actions or policies*) which again would tend to view that students should be provided with opportunities for discussion, for offering differing views or solutions to a problem. Such activity carries an element of individual judgment and involves a certain amount of risk or courage.

Respondents think that employers want new employees with strategy 19 rated most which is *generating or assessing solutions*. This is to say respondents are aware that when they are in employment, employers will expect them to be solution providers, in other words, problem-solvers. In chapter 6 employers rated problem solving as a crucial employability skill which they expected in fresh graduates. This would also lend support to the discussion of students being more passive than active so that the transition to employment is a significant one for a graduate. Consequently, results indicate the there is potential for some transformation in higher education, and even at secondary level.

Respondents see strategy 26 which is *reasoning dialectically: evaluating perspectives, interpretations, or theories* as needed least in employment. One possible reason for this rating is that respondents do not think it is appropriate to reason orally especially when they are new employees with the least experience. It can be also because they are neither confident nor vocal enough to stand by their perceptions, interpretations and understanding of theories or have enough language proficiency to communicate effectively. However, at some point an employer will

want employees who are proactive and are able to discuss an issue or problem, find ways to solve it and communicate the rationale for actions taken. Clearly a mismatch is emerging between student and employer concerns particularly as employers explicitly consider graduates should have strengths in such skills.

Looking at the groups of strategies near the top of this table, these are the strategies respondents think they have most and are most important to their employment: strategies 10, 11, 16, 19, and 22. They are *refining generalisations and avoiding oversimplifications*, *comparing analogous situations*, *transferring insights to new contexts*, *evaluating the credibility of sources of information*, *generating or assessing situations*, and *listening critically: the art of silent dialogue*. This data not only shows respondents' acknowledgement to the importance of the critical thinking strategies but also see respondents gaining some critical thinking skills as they have been exposed to them since primary school. However it is not clear exactly as to which skills are being developed fully throughout the formal education years.

Additionally, respondents see they lack and employers least expect them to have strategies 20, 21 23 and 26. These strategies are: *analysing or evaluating actions or policies*, *reading critically*, *clarifying or critiquing texts*, *making interdisciplinary connections, and reasoning dialectically*, *evaluating perspectives, interpretations, or theories*. These strategies are perhaps not so expected in a new employee as they are more expected out of middle and higher management employees. Clearly, a new employee is not expected to evaluate a company's policies, although having the ability is definitely a plus point. The ability to read critically has been explained in

detail earlier, so there is evidence of a need to instil an active reading culture among Malaysians, especially students. One has to have the ability to critical read for knowledge before being able to reason and making interdisciplinary connections, and these are what these graduates lack and perhaps such reasoning is not given enough emphasis in the education system. Even though respondents perceived employers least expect them to have these strategies, in general, as found in chapter 6, employers do want employees to come in with thinking skills.

8.4.2 Cognitive Critical Thinking Strategies: Micro-Skills

Table 11 contains the ranking for micro skills related to cognitive critical thinking strategies in descending order of importance.

For these micro-skills, respondents perceived themselves as having highest ability in strategy 32 which is *making plausible inferences, predictions, or interpretations.* Respondents keep in minds how their own egocentric and sociocentric world view influences their inferences therefore they will be careful in evaluating the interpretations they make. On the other hand, respondents perceived the most important strategy in employment is strategy 28 which is *thinking precisely about thinking: using critical vocabulary* which is an interesting finding as it contrasts with rated abilities in the macro skills discussed in the previous section. This ability relates to being able to be engaged in 'metacognition' where one thinks while thinking to make thinking better. According to Paul et al. (1990), this is achieved by

Table 11: Ranking for 9 cognitive critical thinking strategies-micro skills in descending order of importance (Refer to Appendix J2b)

Perceived Ability			Perceived Importance to Future Employment	
Critical Thinking Strategies	Respondents' perceived CTS ability (Mean Score)		Critical Thinking Strategies	Respondents' perceived CTS importance to future employment (Mean Score)
(S32) Making plausible inferences, predictions, or interpretations	3.74		(S28) Thinking precisely about thinking: using critical vocabulary	3.84
(S28) Thinking precisely about thinking: using critical vocabulary	3.61		(S27) Comparing and contrasting ideas with actual practice	3.77
(S27) Comparing and contrasting ideas with actual practice	3.54		(S35) Exploring implications and consequences	3.76
(S35) Exploring implications and consequences	3.50		(S31) Distinguishing relevant from irrelevant facts	3.73
(S29) Noting significant similarities and differences	3.48		(S29) Noting significant similarities and differences	3.72
(S30) Examining or evaluating assumptions	3.48		(S33) Giving reasons and evaluating evidence and alleged facts	3.69
(S33) Giving reasons and evaluating evidence and alleged facts	3.48		(S30) Examining or evaluating assumptions	3.63
(S31) Distinguishing relevant from irrelevant facts	3.47		(S34) Recognising contradictions	3.60
(S34) Recognising contradictions	3.40		(S32) Making plausible inferences, predictions, or interpretations	3.47

using analytical vocabulary, verbs such as assume, infer, conclude, interpret and distinguish. By doing this, one is better in reasoning. This trend of using such analytical vocabulary has been stressed in the Malaysian education system since the introduction of Bloom's taxonomy of educational objectives, where such terms appear in the terminal objectives of lessons, as discussed in chapter 3. Such skills are needed in ensuring the ability of students in macro skills just discussed.

The micro skills that respondents think they have most and are perceived as most important for employments are strategies 32, 27, and 28 which are: *making plausible inferences, predictions, or interpretations, compare and contrast ideas with actual practice*, and *thinking precisely about thinking*, *using critical vocabulary.* This directly shows the positive outcomes or evidence of success from the teaching of critical and creative thinking skills (CCTS) in the education system where certain skills are emphasised. To compare and contrast, to think about what respondents actually have in their minds before doing any tasks, and to be able to relate cause and effect of a situation are all very familiar and well practiced in the country's educational setting. This is not surprising because, as mentioned earlier, the usage of the terms in the six levels of Bloom's taxonomy sets a predefined goal of any lesson being carried out in Malaysian classes. However it should be noted that Bloom gives an uneven emphasis in his model of critical thinking as he stresses only the micro cognitive strategies represented through the six levels of thinking. Bloom's model throughout the years has stressed and improvised only the cognitive domain and less attention given to the affective and psychomotor domains. This is not parallel with the national educational philosophy to nurture balanced individuals who are

competent physically, emotionally, spiritually and intellectually as explained in chapter 2.

Respondents also rated themselves lowest in their ability relating to Strategy 34 which is *recognising contradictions* and they also think that this strategy is second least expected of them in employment. Paul et al. (1990) say a critical thinker needs be able to pinpoint specifically where opposing arguments contradict each other and distinguish the contradictions from compatible beliefs, thus focussing analyses on contradicting views. A possible reason for rating this lowest would be the inappropriateness for a new employee to voice an opinion or to win arguments using views from different perspectives. Respondents may feel they are the ones who need to be shown the correct ways of performing tasks. This also hints at the idea that a task only has one correct way of being carried out which suggests a certain level of inflexibility or possibly fear of a range of choices in decision-making.

The micro skills respondents think they lack and are least important in future employment are strategies 29, 30, 33, 31, and 34 which are: *noting significant similarities and differences, examining or evaluating assumptions, giving reasons and evaluating evidence and alleged facts, distinguishing relevant from irrelevant facts and recognising contradictions*. These strategies are no doubt important to employment yet respondents claim they lack these and there are possible reasons for this. For one, a strategy like making inferences is extensively taught in any curriculum, yet not being confident in it can be due to reasons such as: inefficient teaching, educators' understanding and incompetency of teaching the skill themselves, the methodology

of imparting such skill. How critical thinking skills are taught also raises questions: whether it should be integrated into lessons or taught separately. Also, when critical thinking is integrated into a lesson, there is the further question of how much emphasis should be given to it as at the same time, educators have to ensure they finish their core syllabus, which is also time consuming.

8.5 Overall perspective on critical thinking strategies

Employer expectations in chapter 6 state that they want graduates who are responsible for their readiness to join the work force. Employers also want graduates to be equipped with relevant skills, a good attitude and have an acceptable level of English proficiency. They seek employability skills where essential attributes, personal competencies, and transferable skills are given a balanced emphasis. All the critical thinking strategies rated important for employment by respondents correlate to employers' expectations, a key finding of this chapter.

Additionally, relating to undergraduates own concerns in chapter 7, they say they are aware of the skills expected from them. These are communication skills, soft skills, job-related skills, thinking skills and interview skills. All the low rated strategies which show what respondents lack both in cognitive and affective skills denote graduates as not being work ready. This can be due to many factors such as the skill mismatch phenomenon where what is being taught in HEIs is not wanted in the workplace. Even when many actions have been taken to ensure cooperation between industry and tertiary level educational institutions, the impact is still minimal. This

also relates to the question of whose responsibility it is to determine graduates employability, whether the universities, industries or graduates themselves.

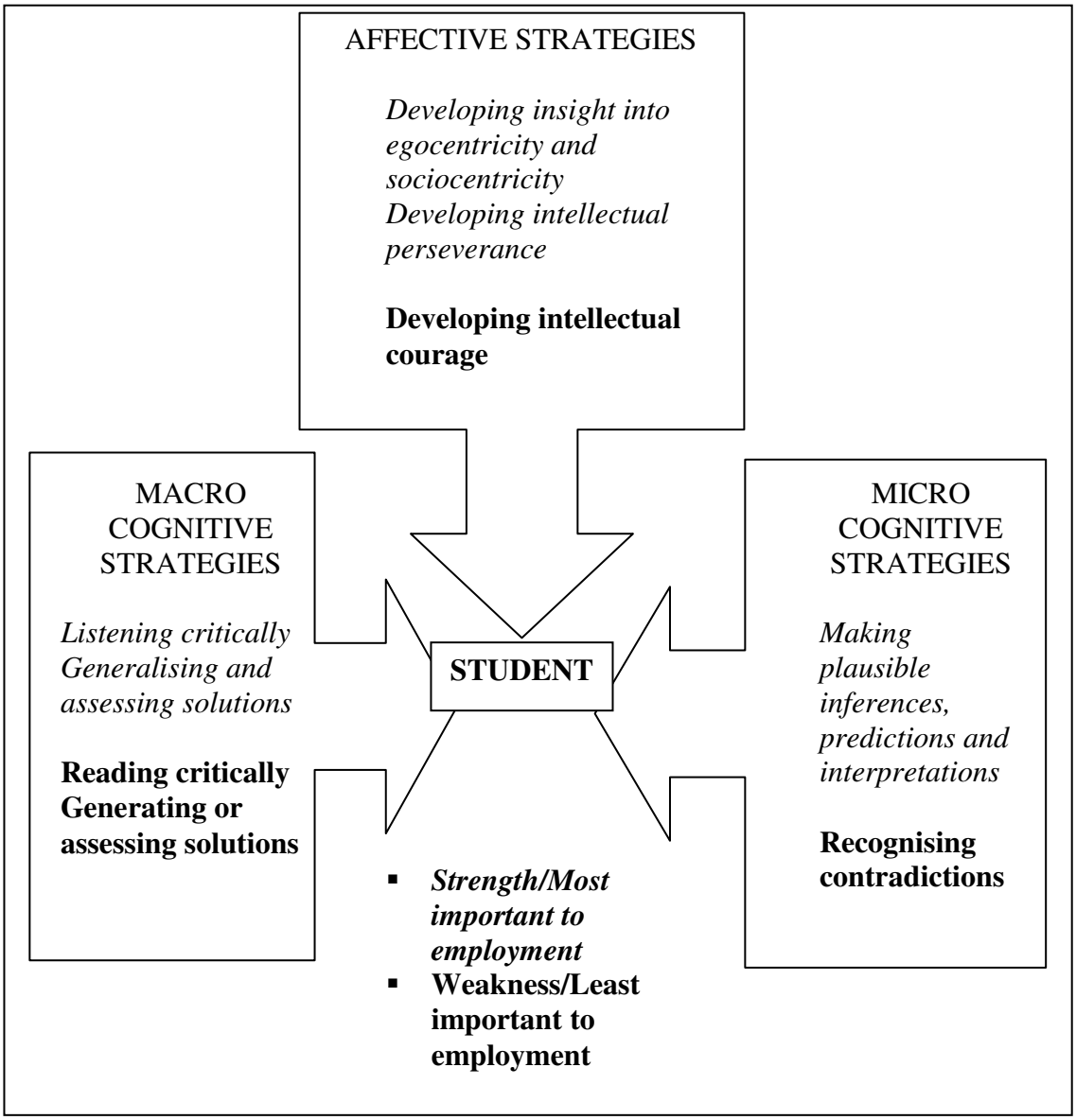
In conclusion, firstly, affective strategies are stressed most by these undergraduate respondents whereas macro cognitive strategies are considered least for ability and micro cognitive strategies are considered least for importance to employment. Respondents see themselves as best in developing insight into egocentricity and sociocentricity while what is wanted most by employers according to respondents is developing intellectual perseverance. Respondents also see themselves as not competent in developing intellectual courage and they also say this affective competency is least needed for employment. The implications for not having intellectual courage are that graduates will not be outstanding employees, but rather ones who will take orders without questioning.

Next, for macro cognitive critical thinking strategies, respondents see themselves best as critical listeners over readers. They also consider that employers look for people who can assess situations and arrive at solutions and that employers have least interest in new employees who can reason dialectically. Employers want problem solvers yet they do not want employees to voice their opinions or thoughts. These two forms of thinking are closely related but employers' needs raise a contradiction in a situation where the ability to reason is essential in promoting solutions in problem solving.

Lastly, for micro cognitive critical thinking strategies, respondents perceived themselves as efficient in making plausible inferences, predictions and interpretations and they also perceived thinking precisely about thinking and the ability to use critical vocabulary as most important for work. This means respondents think they are able to look beyond the facts, to know the implications of those facts. In the working environment, respondents acknowledge the ability to think is of crucial importance as thinking precedes actions. As micro cognitive strategies are subset of a macro cognitive strategy, thinking precisely about thinking is essential in many macro skills such as strategies 16, 19, and 23: *evaluating the credibility of sources of information, generating or assessing solutions*, and *making interdisciplinary connections*. It can be seen clearly the importance of thinking precisely about thinking in relation to all three strategies mentioned. What respondents rate least is again making plausible inferences, predictions and interpretations and they think this strategy is also least expected from them in employment.

Overall, the mix of high and low rated strategies shows that the education system is successful in developing certain critical thinking traits. Yet there are areas which need to be enhanced as critical thinking strategies are of critically importance for graduates' readiness to work. Figure T summarises these complex findings.

Figure T: Respondents as critical thinkers: strengths and weaknesses



Looking at the strategies respondents rated lowest, it can be seen that there is a tendency with respondents to bring their experiences in learning to their expectations on how their future employment will be. If in the past, this experience of education has been merely being passive learners where they are receivers of knowledge which is then displayed mechanically in exams, then in employment the perceived situation

is similar. These undergraduate respondents perceive intellectual courage, generating or assessing solutions and recognising contradictions as least important for employment. However, these three strategies are closely related and important to problem-solving which is essential in new employees. New employees will eventually have to make decisions and be proactive rather than being passive in the workplace.

Chapter Summary

This chapter has examined respondents' ability and the importance of critical thinking strategies to their future employment. Respondents generally rated their abilities lower than their perceived importance of those abilities suggesting possible dissatisfaction with their current abilities in comparison with employers' requirements. Overall, the low ratings on certain critical thinking strategies by respondents show an inclination towards perceiving employment as similar to teaching and learning in a classroom. Additionally, it appears as if there is some success with the teaching and learning of some critical thinking strategies. However, trends towards passivity and a reluctance to take risks or have courage also appear as part of these results in contrast to employers' expectations of having proactive employees.

Chapter 9 - Data analysis: Course and Gender Differences in Critical Thinking

More research is needed to study gender roles in various computer programming environments (Grant, 2003).

Introduction

This study presents differences relating to critical thinking skills by degree. Secondly, though it is not concerned primarily with gender, analysis has revealed a gender difference which is presented in this chapter. The differences relating to degree type are presented first and are followed by a discussion in relation to other research.

9.0 Respondents' ability and importance of critical thinking strategies according to degree types

Tables 12 and 13 show the ANOVA and post hoc tests results of the effects of different courses types on the perceptions of the ability and importance to future employment of the critical thinking strategies.

It can be seen that respondents of different types of degrees had different ratings of their ability in critical thinking strategies in seven strategies:

Strategy 2	Aware of egocentricity/ sociocentricity when making decisions
Strategy 3	Fully understand unfamiliar ideas
Strategy 4	Consider positive aspects of life
Strategy 8	Significant change requires patience and hard work
Strategy 11	Able to use, transfer and apply ideas to new situations
Strategy 20	Examine consequences of actions
Strategy 30	Evaluate assumptions

Table 12: Differences between the ratings on perceptions of Critical Thinking Strategies of ability by three groups of respondents

Strategies	ANOVA test	Multiple Comparison/LSD
Strategy 2	Significant $F(2,669)=3.789$; $p<0.05$	IT›Sc›CS
Strategy 3	Significant $F(2,669)=4.363$; $p<0.05$	IT›Sc›CS
Strategy 4	Significant $F(2,669)=3.126$; $p<0.05$	Sc›IT›CS
Strategy 8	Significant $F(2,669)=5.578$; $p<0.05$	IT›Sc›CS
Strategy 11	Significant $F(2,669)=4.635$; $p<0.05$	Sc›CS›IT
Strategy 20	Significant $F(2,669)=3.209$; $p<0.05$	Sc›IT›CS
Strategy 30	Significant $F(2,669)=3.060$; $p<0.05$	Sc›CS›IT

CS: Bachelor of Computer Science (n=351)
IT: Bachelor of Information Technology (n=241)
Sc: Bachelor of Science (n=80)
Significant difference is set at 0.05 level

*Null hypothesis is rejected (accepts alternative hypothesis)
$H_A: \quad \mu_{CS} \neq \mu_{IT} \neq \mu_{Sc}$
There are significant variances in means.

The respondents of Bachelor in Science rated their ability higher than the respondents of Bachelor in Information Technology and Bachelor in Computer Science for most of the strategies above. The respondents of Bachelor in Computer Science rated lower than other respondents for most of the strategies. Referring to other strategies, there are no significant differences among the three groups of respondents.

Table 13: Differences between the ratings on perceptions of Critical Thinking Strategies of importance to future employment by three groups of respondents

Strategies	ANOVA test	Multiple Comparison/LSD
Strategy 3	Significant $F(2,669)=4.419$; $p<0.05$	IT›Sc›CS
Strategy 7	Significant $F(2,669)=3.669$; $p<0.05$	Sc›IT›CS
Strategy 12	Significant $F(2,669)=5.060$; $p<0.05$	Sc›IT›CS
Strategy 17	Significant $F(2,669)=3.286$; $p<0.05$	Sc›CS›IT

CS: Bachelor of Computer Science (n=351)
IT: Bachelor of Information Technology (n=241)
Sc: Bachelor of Science (n=80)
Significant difference is set at 0.05 level

*Null hypothesis is rejected (accepts alternative hypothesis)
H_A: $\mu_{CS} \neq \mu_{IT} \neq \mu_{Sc}$
There are significant variances in means

It can be seen that the different course types present different perceptions on the importance of the critical thinking strategies to future jobs in four strategies which are Strategies 3,7,12 and 17:

Strategy 3 Fully understand unfamiliar ideas
Strategy 7 Consistent in applications of intellectual standards
Strategy 12 Create and explore own beliefs
Strategy 17 Not limited o accepted ways of doing things

The respondents of Bachelor of Science rated their ability higher than the respondents of Bachelor of Information Technology and Bachelor of Computer Science for most strategies above. The respondents of Bachelor of Computer Science rated lower than other respondents for most of the strategies above. Referring to

other strategies, there are no significant differences among the three groups of respondents.

There is a considerable body of research related to the differences in critical thinking according to courses (Gadzella and Masten, 1998; Walsh and Hardy, 1999). Walsh and Hardy (1999) grouped respondents into two groups: a non practice discipline (English, History and Psychology) and a practice discipline (nursing, education and business). The research sought to find dispositional differences in critical thinking among college students in different academic majors. They found that the non practice group had higher dispositional critical thinking scores using Facione's California Critical Thinking test. This result is seen as pertinent to university missions for undergraduate education and strengthen information for educators into encourage development of critical thinking dispositions that may be important to academic major.

Another study by Gadzella and Masten (1998) used the Watser-Glaser Thinking Appraisal (WGCTA) and the Inventory of Learning Processes (ILP) to address the importance and need of teaching students' critical thinking skills and effective learning processes in two major fields: students majoring in Psychology and Special Education and students majoring in Sociology, Social Work and Criminal Justice. They discovered that respondents from the Psychology and Special Education scored significantly higher in the total of the critical thinking appraisal test. According to Gadzella and Masten (1998) a student studying humanities and social science shows

better critical and logical thinking than others because disciplines such as sociology and psychology put more emphasis on critical thinking.

The literature shows that what makes them different in critical thinking according to their courses, points to two important issues: classroom instruction or what is being taught in the courses and students' learning styles. This issue is not investigated further as it is not the focus of this study. Nevertheless, in conclusion, there is bound to be a difference in rating on critical thinking ability and importance to future employment across course types, just as there are differences found across disciplines. There must also be a factor relating to the teaching and learning of Bachelor of Science students to make respondents perceive themselves as being better in critical thinking strategies.

9.1 Respondents' ability of critical thinking strategies according to gender

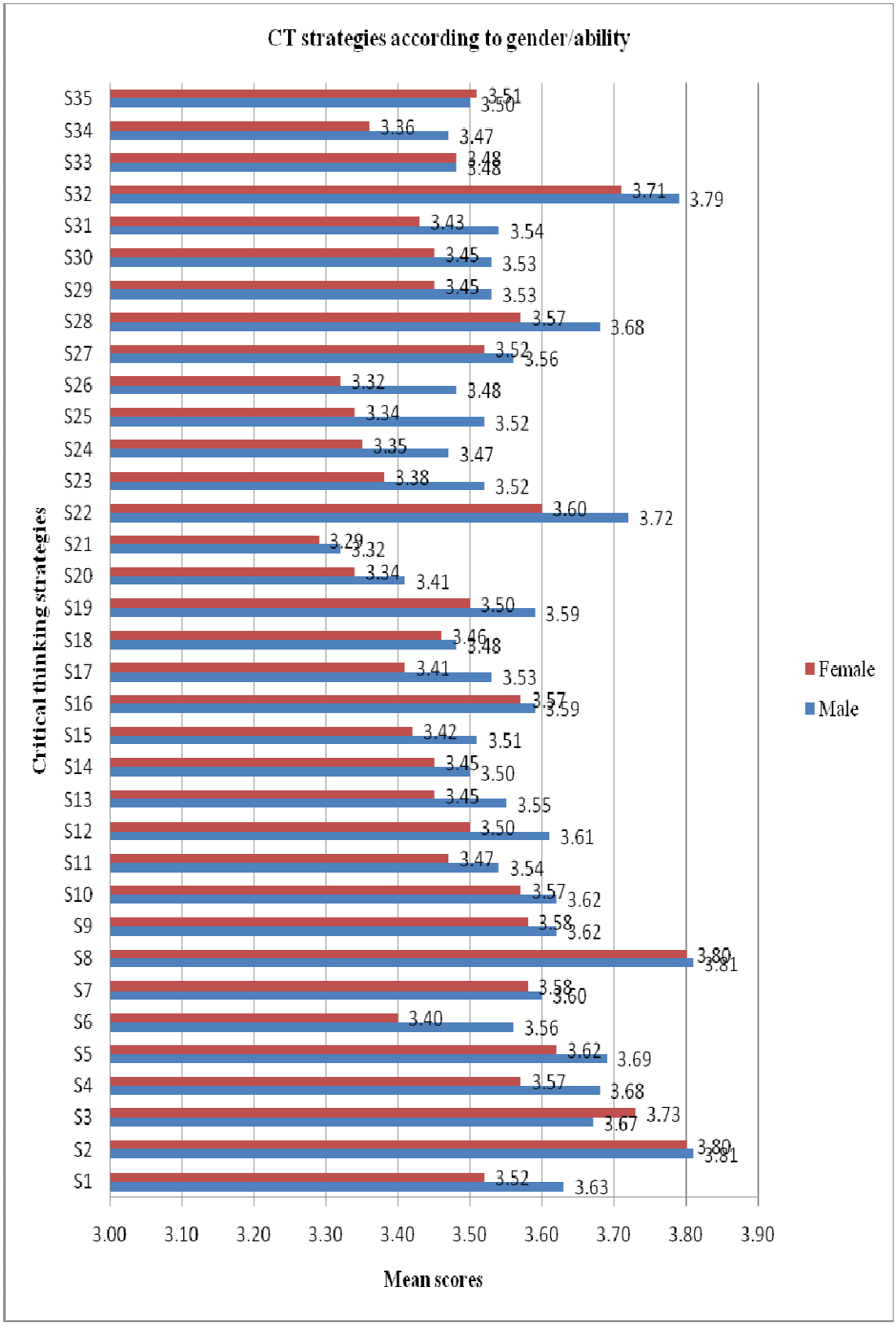
Once again, it should be noted that the thirty-five items in the questionnaire come in pairs where the first one seeks a respondent's perception on his/her ability to think critically and the second one seeks the respondent's perception on the importance of the skill to future employment. The data is analysed to examine which critical thinking strategies respondents are perceived as being from most to least and were also compared across gender. The findings of this quantitative data analysis are presented in 2 bar charts in Figure U and Figure V and later discussed in detail.

Figure U shows the differences between the responses from male and female respondents in terms of their perceptions on their ability of Critical Thinking

Strategies which are not overwhelmingly different but are statistically significant and so merit discussion in this thesis. From the bar chart, it can be seen that male respondents perceived themselves as having higher critical thinking strategies than female respondents. This supports the findings from research by Rudd, Baker, and Hoover (2000) who found gender to be a significant contributor to critical thinking disposition. In addition, Kardash (2000), Correll, (2001), and Hargittai (2006) found that male respondents rate themselves higher. Other research studies note gender gaps in attitudes and beliefs about ICT such as by Vekiri and Chronaki (2008), Cassidy and Eachus (2000), van Braak (2004) and Singh et al. (2007) found significant differences in gender. Yet Meyer and Dyer (2004) found no difference in their samples' disposition to think critically by gender.

Based on Figure U (Refer to Appendix K), the small difference between the two groups on their ability was most evident for strategies 6, 25, and 26, where male respondents are perceived as having higher critical thinking strategies than female. Strategy 6 which is *developing intellectual courage* has a difference of 0.16; strategy 25, which is *reasoning dialogically,* has a difference of 0.18 and strategy 26, which is *reasoning dialectically*, has a difference of 0.16 between the two genders. Summarizing the principles of these three strategies suggests having the courage to stand up to a point and being able to reason by bringing in relevant concepts, knowledge and insights. The differences in ratings between genders in general show that female respondents lack courage and independent thinking, lack the ability to

Figure U: Respondents' perceptions on their ability in critical thinking strategies according to gender



admit truth in absurd ideas, acknowledge arbitrary distinctions between academic subjects or think dialogically in order to test the strengths and weaknesses of opposing points of view. However, the strategies where the mean score from female respondents is higher than the mean score from male respondents are strategy 3 and 35. Strategy 3 is *exercising fair-mindedness*, where one is able to consider the strengths and weaknesses of opposing points of view, to imaginatively put oneself in the place of others to genuinely understand them, to overcome one's egocentric tendency to identify truth. Strategy 35 is *exploring implications and consequences*. This suggests females can explore better both implications and consequences at length. This also suggests a balancing out of the negative scores.

The strategies with the highest mean scores for both male and female respondents are Strategy 2 which is *developing insight into egocentricity and sociocentricity* and Strategy 8 which is *developing intellectual perseverance*. This is also discussed in chapter 8 in relation to the dominance of highly rated affective strategies in the study. For Paul et al. (1990), critical thinkers must be willing to pursue intellectual insights and truths in spite of difficulties, obstacles, and frustrations. This result is interesting as seems to indicate that undergraduates do persevere even if they are not being critical.

The strategy with the lowest mean score for both male and female respondents is Strategy 21. Strategy 21 is *reading critically* which involves clarifying or critiquing texts and the need to read with healthy scepticism. This is a critical finding for this thesis as it relates to critiques of aspects of the Malaysian education discussed in

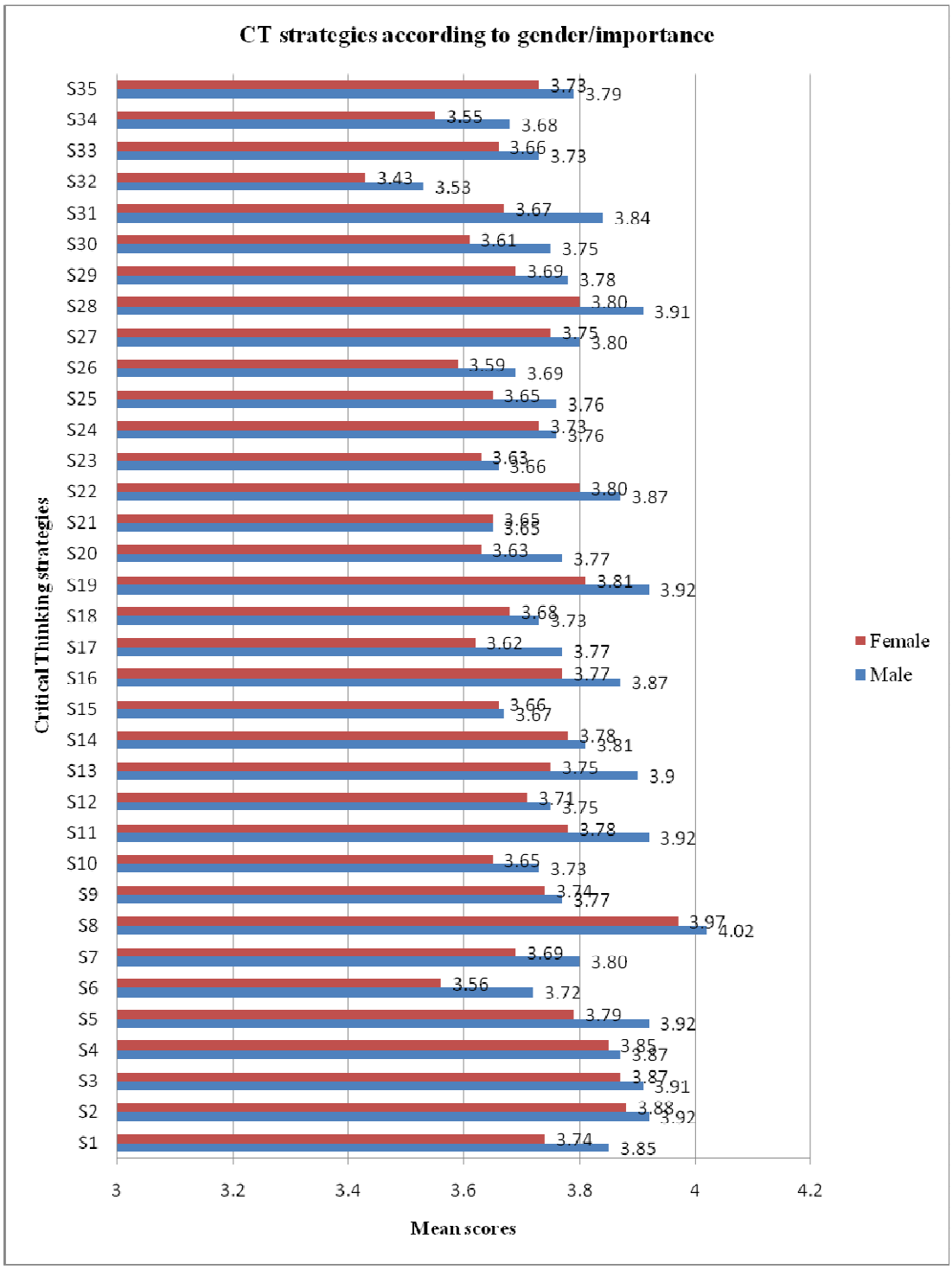
chapter 2 where there is dissatisfaction with the 'spoon feeding' approach. This is a consistent theme in this study and such teaching methods would relate to a behaviourist approach as opposed to the constructivist approach to teaching and learning as discussed earlier.

9.2 Respondents' perceptions on the importance of critical thinking strategies to future employment according to gender.

Figure V shows the differences between the responses from male and female respondents in terms of their perceptions on the importance of Critical Thinking Strategies to future employment. Again the differences between genders are not huge but they are statistically significant and so require discussion. From the bar chart, similar to Figure U, it can be seen that the males rate the importance of critical thinking skills for employment higher than the females. Again, this supports the findings from research by Rudd, Baker, and Hoover (2000), Kardash, (2000), Correll (2001), Hargittai, (2006), Vekiri and Chronaki (2008), Cassidy and Eachus, (2000), van Braak (2004) and Singh et al. (2007). Again, it must be noted that Meyer and Dyer (2004) found no difference in gender.

Based on Figure V (Refer to Appendix K), the small difference between the two groups on the importance of these strategies to employment was most evident for strategy 6 with 0.16 difference, strategy 31 with 0.17 difference, and strategies 13 and 17 with 0.15 difference. Strategy 6 is *developing intellectual courage*, strategy

Figure V: Respondents' perceptions on the importance of critical thinking strategies to future employment according to gender



31 is *distinguishing relevant from irrelevant facts* and strategies 13 and 17 *clarifying issues, conclusions or beliefs* and *questioning deeply*.

Firstly, the ratings do not differ much where affective strategies are concerned. In general, this enhances the fact that both genders agree that affective strategies are more important than cognitive ones in employment. Strategy 31 which is a cognitive micro strategy, namely *distinguishing relevant from irrelevant facts* and Strategy 6 which is an affective strategy, namely *developing intellectual courage* has the highest differences in ratings. The inability in having intellectual courage could be expected as female respondents in Vekiri and Chronaki's (2008) study appeared less confident compared to the males. The high difference in rating between genders for strategy 31 which is *distinguishing relevant from irrelevant facts* with female respondents perceiving this strategy as less needed in employment than male respondents.

Summarising the principles of the two next strategies, namely, *clarifying issues, conclusions or beliefs* and *questioning deeply*, suggests that the male respondents see these two strategies as more important in employment than the female respondents. The differences in ratings between genders in general appear to show that female respondents appear to be easily sidetracked, unable to analyse behaviour or policy, and do not have the courage to seek out or reject false assumptions. What these three strategies have in common is the ability to "reason", which is an important skill as suggested strongly in Paul's (1996) model. Female respondents in Vekiri and Chronaki's (2007) study tend to have low self-esteem and she suggested employing

mastery-orientation to learning which supports the constructivist theory of learning to develop self confidence and efficacy in students. This is not so true for female students in Malaysia. Though it is a culture in which to be shy and quiet and is sometimes conservative, young women in Malaysia do have a high level of confidence as they outnumbered the male students in Malaysian universities. However, these findings are no doubt contentious and need further study in relation to Paul's model.

Finally, there is no strategy where the mean score from female respondents is higher than the mean score from male respondents. Table 14 summarises the differences between male and female respondents in their critical thinking strategies.

Table 14: Strengths and weaknesses in male and female respondents in critical thinking strategies for future employment

MALE RESPONDENTS	FEMALE RESPONDENTS
Strength: Developing insight into egocentricity or sociocentricity Developing intellectual perseverance	**Strength:** Developing insight into egocentricity or sociocentricity Developing intellectual perseverance
Weakness: Reading critically: Clarifying or Critiquing Texts	**Weakness:** Reading critically: Clarifying or Critiquing Texts

These findings are of interest but would require further research as gender is not the main focus of this thesis.

Chapter summary

This is the final chapter of data analysis and notes some variation across degree type in relation to critical thinking. It also reveals unexpected data on gender difference in this research focusing on critical thinking and employability in relation to Malaysian graduates. From the discussion of the results relating to gender it is clear that they require further investigation.

Chapter 10 - Discussion of findings

The idea that the 'more you learn the more you earn' has a degree of validity as long as other people are not learning the same things, otherwise one is running to stand still. (Brown, Hesketh and Williams, 2003, p 9.)

Chapter outline

Malaysia faces an unemployment phenomenon among graduates. According to the structural unemployment theory, this is caused by structural problems in the country's economy and in this research it is the mismatch between the supply and demand of labour with necessary skill sets. Among other findings from this research, the issue of skills mismatch is clearly apparent and can be seen in data from both employers and future graduate respondents. Employers say graduates who come to their companies are not ready and arrive with irrelevant skills while future graduates are dissatisfied with what they obtained from their university and think they are not ready for employment; they rated their abilities lower than what they think is needed in the outside working world. General analyses of the findings see the skills needed for employment according to both respondents are related to critical thinking skills hence the step to assess critical thinking skills of future graduates. Chapter 10 makes the connection between the findings of the study to literature. Firstly, findings from the four previous chapters (Chapter 6, 7, 8 and 9) are presented as summarized and where possible are used in graphical form to make clearer the relationship to critical thinking.

Next, the data on future graduates' critical thinking ability and importance of critical thinking to employment start a discussion on what could be done to existing practices of critical thinking in the context of Malaysian higher education to ensure effective teaching and learning in preparation for employment. A more holistic framework to teach critical thinking is suggested through the 35 critical thinking strategies by Paul et al. (1990). Finally, this chapter presents a critical thinking-employability model which is a higher education contribution towards engagement with the phenomenon of unemployed Malaysian graduates.

10.0 What employers say

In sequence of importance, employers relate unemployment causes to graduates, universities, government and employers themselves. Firstly, employers say graduates lack communicative skills in English. The graduates are also choosy, picky and are not aware of the fact that jobs available are market driven and they are not ready for employment. Employers suggest that graduates should be realistic and keep abreast with skill requirement changes. When commenting on universities, employers say universities have greater responsibilities where they have to ensure they impart "global skills" to future graduates as the skills requirement of the globalization era is dynamic and ever changing. The employers also complain that the government is not serious and helpful in providing trainings to graduates. From the findings too, it can be deduced that employers see graduates' employability from a narrow view where most responses emphasized individual factors of graduates. The individual factors frequently mentioned and wanted by industries according to employers are a positive attitude to work, initiative, team working and awareness of strengths and

weaknesses. It can be seen that critical thinking pervade these preferred individual factors.

Commenting on the connection between education and graduates unemployment, employers say:

- Education in Malaysia is overly theory focused.
- Education in Malaysia does not provide the practical application of theory.
- Education in Malaysia is exam oriented. Teaching is repetitive in a cyclical way, factual knowledge is imparted then memorized and tested. There is no space for students to be critical and creative.
- Employers consider education/universities responsible in providing work related and soft skills.
- Overseas education is better as employers show a preference for overseas graduates than local ones.
- Employers concluded that the education system has failed to produce employable graduates and need to be revamped thoroughly.

The employers also envisaged changes in their skills requirement in the next five years which stresses the importance of changes in educational practices to match new conditions through strengthened university-industry cooperation. Employers strongly stressed that they want graduates who are balanced in both relevant job skills and soft skills. Apart from essential attributes, personal competencies and transferable skills, employers want graduates with interview skills which to them is lacking in the future workforce. Prospective employees must also have positive

attitudes if they want to be considered for employment. It should be noted that all the skills that employers want in their new employees can be nurtured by critical thinking as it emphasizes the cognitive, affective and psychomotor domains to ensure the balanced development of individuals.

10.1 What future graduates say

Data from future graduates revealed that they are mostly vague about what they want upon graduation. They are unsure and a possible reason would be they were not guided on their career path. On the other hand, this indecisiveness also shows that future graduates are being realistic and have a flexible attitude towards employment as they understand the unemployment problem the country is facing. Another group of respondents wanted course related jobs which is only natural but most are aiming for high positions rather than entry-level posts. These future workforces are being rather unrealistic or too ambitious and the findings support what employers say about them being too choosy and picky when it comes to employment. A small number want to start their own business which is entrepreneurial and would be encouraged by government. Going into teaching was another option where respondents see the profession as giving more time for family, provides a service to society and is a noble and secure job for it has a fixed salary, pension security, further education opportunity and retrenchment is rare. A few responses mention the option of continuing their study rather than working after a degree.

In addressing their strengths, weaknesses and what they think employers expect from them, two significant themes emerged which are skills and attitudes.

10.1.1. Skills and attitudes

Respondents repetitively mentioned five skills in their answers which are: communication skills, soft skills, job-related skills, thinking skills and interview skills. Respondents claim that they lack communication skills and English proficiency, which shows the concurrence between both employers' and future graduates' answers. Most responses from the future graduates support employers' responses such as:

- Respondents admit they lack soft skills which prohibit them from having meaningful communication. They are aware of the fact that employability needs both technical and personal skills.
- Respondents say they do not have adequate job-related skills as the university focussed on theory more than technical skills. Computer science and information technology skills are very job specific and change rapidly which is the reason to strengthen university-industry links to update these changes. Respondents agree that extra certification on specific job skills makes them more employable.
- Respondents are taught critical thinking skills and know that having such skills makes them more employable.

- Respondents feel that they are not well equipped with interview skills as they do not have the language and confidence to communicate effectively.

This mutual agreement is also seen in future respondents answers which touches on graduates' attitudes:

- Respondents are used to working hard so they see this as something employers will be impressed by.
- Respondents are aware when they become employed, there will be many things which are not covered or taught at the university, so they are willing to learn this new knowledge to secure employment.
- Respondents see the need to be adaptable as the working world is completely new to them, changes rapidly, thus the need to cope with changes.

Working hard, willingness to learn and adaptability are skills expected by employers in graduates. The similarity in answers from both student respondents and employers demonstrates that both parties agree to the fact that graduates are not equipped for employment because they lack certain essential criteria. Therefore, the effort to remedy the unemployment problem should be approached collaboratively not only by higher educational institutions but also involve both employers and future graduates themselves.

10.1.2 Other findings from future graduates' data

From data collected related to respondents' critical thinking ability and its importance to future employment, it can be seen that the rating on respondents'

perceptions differ by respondents' degree and gender. Although they are not the primary concerned of this research, the difference suggests that:

- Critical thinking can be taught.
- To ensure effective teaching of critical thinking, students' differences should be considered.

This research suggests that all the problems seen as the cause to graduates being unemployed can be tackled through the teaching of critical thinking. From the above summary on responses from both employers and future graduates, it can be seen that the main issue emergent from this research which is related to critical thinking are:

- Both employers and students are dissatisfied with the level of critical thinking skills in graduates.
- Malaysian computer related degree students perceived soft skills to be important but perceived they have weaknesses in these areas.
- Malaysian computer related degree students perceived themselves to be weakest in the more macro-thinking strategies of critical thinking.
- Students in some academic courses seem to have higher perceived critical thinking skills, which again supports the notion critical thinking can be taught.

Critical thinking is considered as the most probable solution to the graduates' unemployment problem because graduates already have the basis of critical thinking. However, there is a need to revise or review its component in the Malaysian educational curriculum and the process of its implementation.

10.4 What could be done to existing practice of critical thinking in Malaysia?

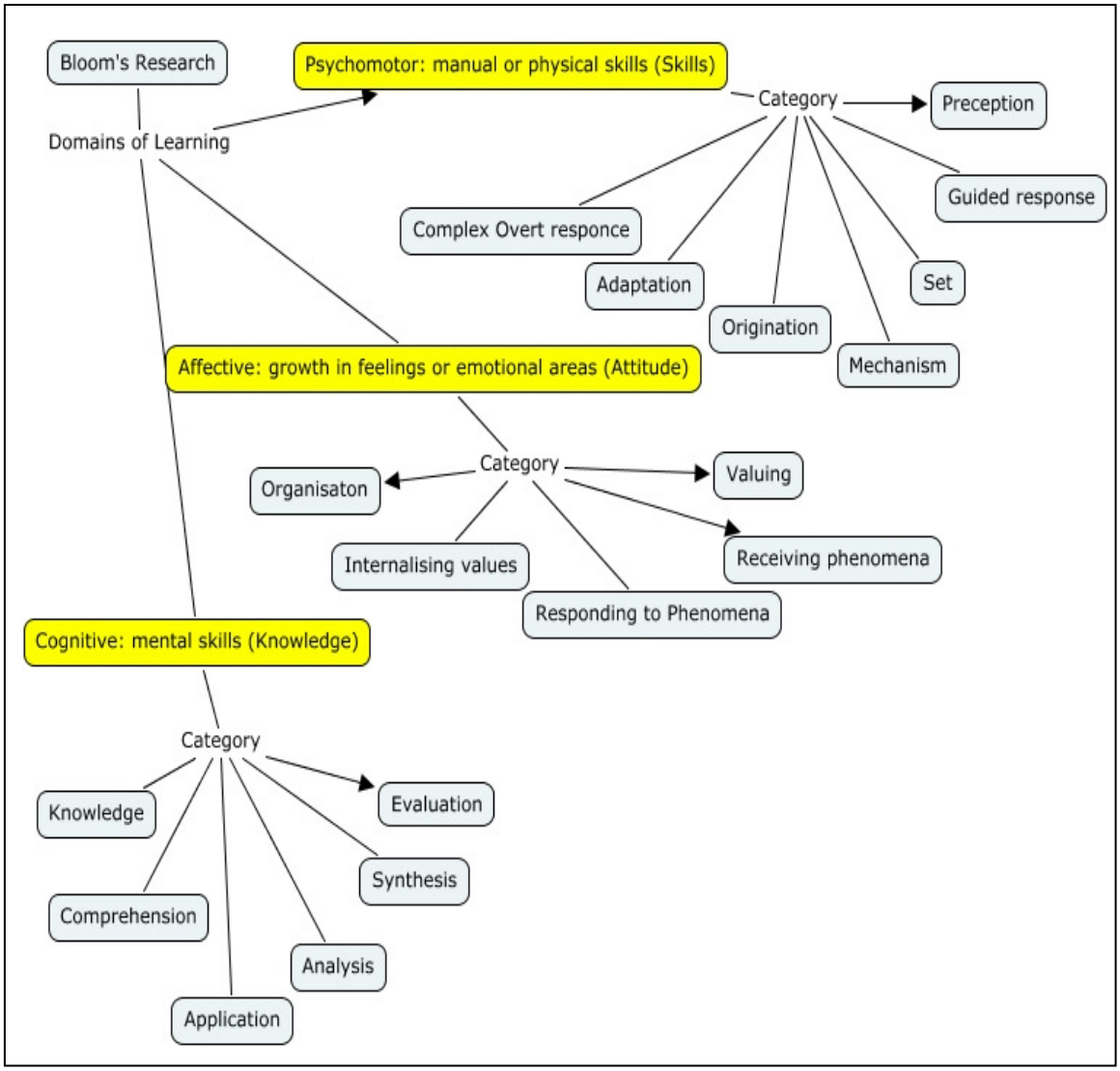
The teaching of critical thinking in Malaysia started in the early 1990s with the introduction of critical and creative thinking skills into the integrated curriculum of both primary and secondary schools. As in schools, critical thinking is taught in higher education institutions (HEIs), integrated into subject matter and also taught as a separate subject. After almost twenty years of its implementation, the effectiveness of teaching critical thinking is still doubtful. Overall, data from this research see undergraduate respondents as being unsure of their own critical thinking abilities as opposed to the importance of having such skills for future employment. The possible reasons for low ratings in ability and competency in critical thinking points to several underlying factors such as: the inability to grasp the true definition of critical thinking, pedagogical issues and most importantly the model of critical thinking used in Malaysia. This is based on the original taxonomy by Bloom (1956) which is seen as inadequate in relation to a graduate's holistic development while at university.

10.4.1 A comparison between the Bloom and Paul models of critical thinking

In general Bloom's Taxonomy of learning domains was created to define the goals of learning processes. Even with three types of learning domains namely cognitive, affective and psychomotor (as seen in figure W), only the cognitive domain is stressed or emphasized in the Malaysian education system so that the educational environment in Malaysia is well versed with the six levels in this taxonomy. The six levels of the taxonomy, as discussed in chapter 3, are: knowledge, comprehension, application, analysis, synthesis, evaluation. These six levels have sequential,

hierarchical links where mastery of each simple category is a pre-requisite to mastery of the next, complex higher level. This pre-requisite is often taken as one of the weaknesses of Bloom's model: the levels should be flexible instead of being envisaged as rigid.

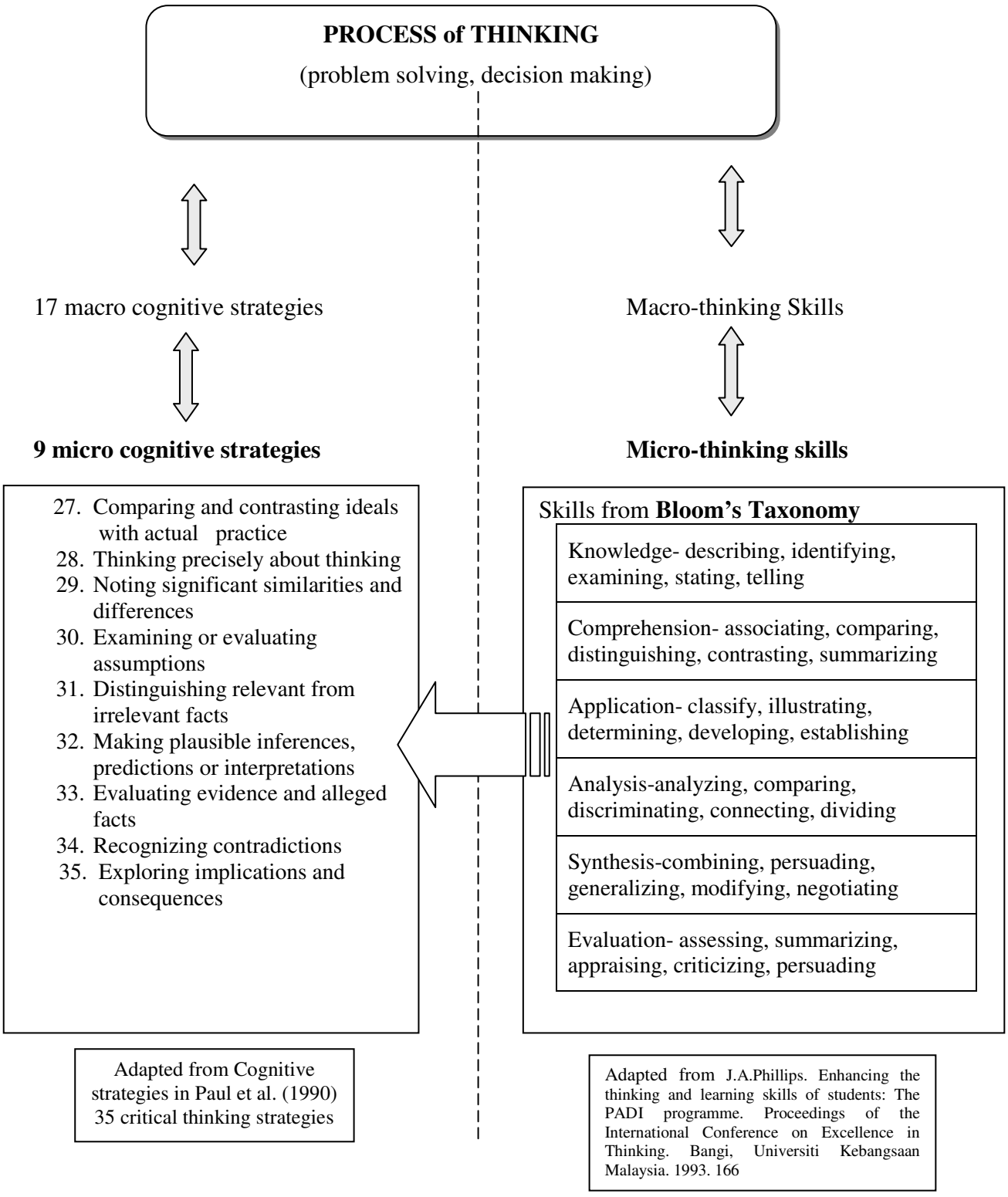
Figure W: Three domains in Bloom's Taxonomy of Learning Objectives



In comparison with Paul et al.'s (1990) model of critical thinking, the stress on both affective and cognitive domains is more or less equal. Paul et al. (1990) list the affective domain first by listing the nine affective critical thinking strategies before the twenty-six cognitive thinking strategies (see chapter 3 for the outline of the strategies). Paul's model clearly acknowledges the importance of affective strategies which are related to social skills in individuals. In relation to this, a key finding from data collected in this research, has been the importance of such affective strategies in enhancing employability.

In Phillips (1993) diagram of the process of thinking, precisely for problem solving and decision making, Bloom's taxonomy would fit well under the micro thinking skills. Parallel to this, are Paul et al.'s cognitive micro skills. Figure X shows the positions of these two models in the process of thinking and stresses the importance of both macro and micro skills in thinking. The Malaysian education system stresses more on these micro strategies of critical thinking in its learning objectives, activities and assessments using Bloom's taxonomy. The focus on micro critical thinking strategies is important but the macro level should also be given emphasis. Additionally, equal attention should be given to the affective domain.

Figure X: The position of Bloom's (1956) taxonomy Paul's (1996) CT Model in Phillips (1993) process of thinking.

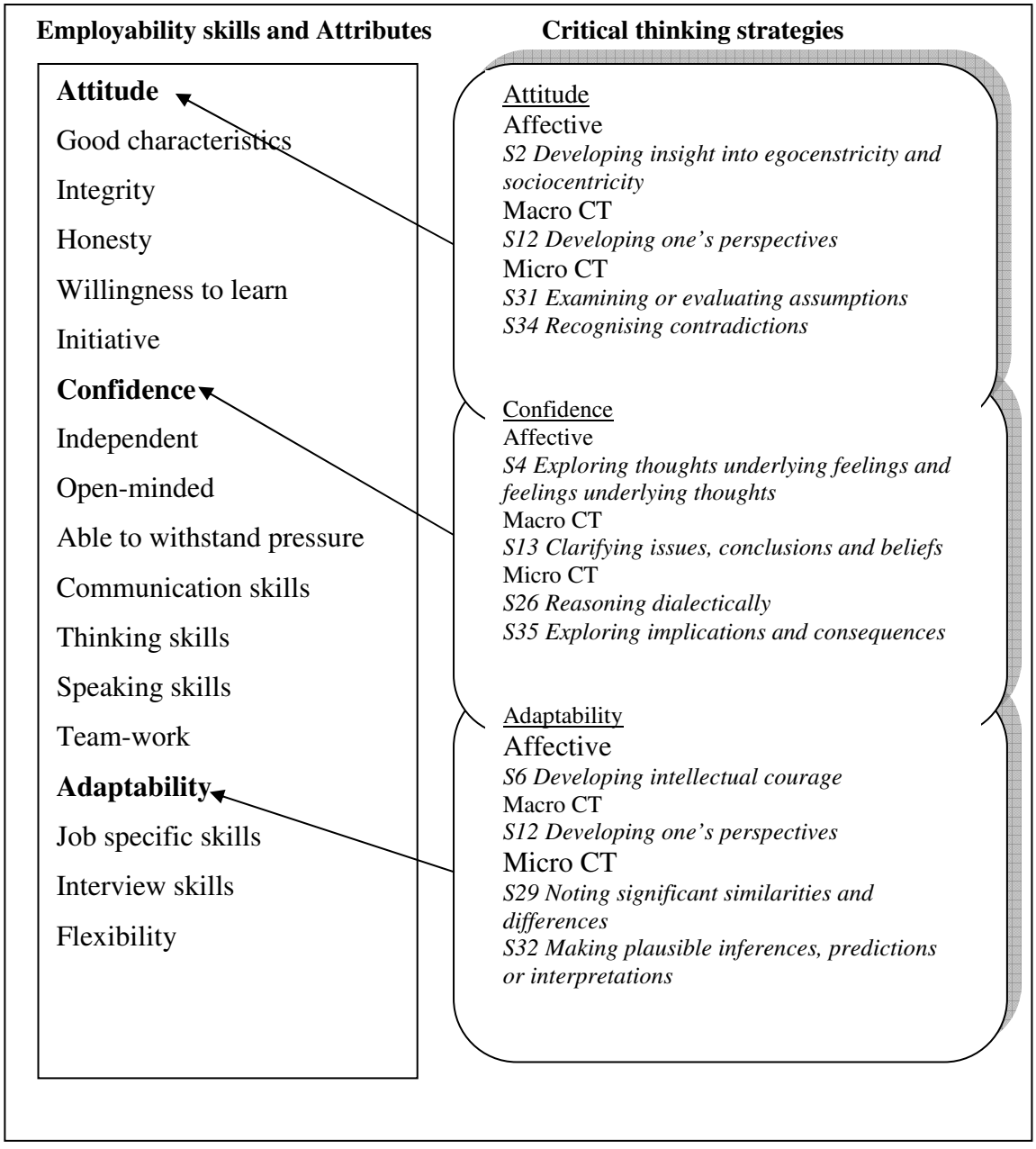


10.5 Connecting critical thinking to employability

Figure Y, created for this thesis, represents employer respondents' expectations of graduates using the employability framework by McQuaid and Lindsay (2005) and its connection to critical thinking strategies from Paul et al. (1990). It should be noted again that the employability skills and attributes presented under the headings in this framework are overlapping.

With references to the employability framework from employers in chapter 6, under **essential attributes**, the items attitude, good characteristics, integrity, honesty and willingness to learn are most referred by employers. For **personal competencies**, employers want a graduate who shows initiative, has confidence, and is independent, open-minded and able to withstand pressure. They also want to see graduates come to them with **transferable skills** such as communication skills, thinking skills, speaking skills, team-work and adaptability. There is also a high occurrence of employers wanting graduates who are equipped with **job specific skills**. This not only shows that employers prefer work ready graduates but also again stresses the fact that graduates do not enter employment with relevant skills. It can be seen from the employers claims in their answers to open ended questions (chapter 6) saying new employees lack skills, (with one reason being due to the rapid skill changes in the work environment). The issue of a skill mismatch is thus highlighted here and is the overall key contribution of this chapter.

Figure Y: The connection between the findings from employers using Framework from McQuaid and Lindsay (2005) and CT strategies - three examples



With regard to job seeking, employers are unhappy because they found that graduates do not have what it takes to succeed in an interview. They say that a graduate should be taught specifically how to prepare for the interview process and

even suggest it as a course component. Employers want graduates who are flexible in many ways.

Figure Y shows an example of how employers' expectations on three employability skills of a future graduate relates to critical thinking attitude, confidence and adaptability. These three employability skills are discussed next in-depth and how they can be enhanced by critical thinking strategies.

10.5.1 Attitude

A graduate's attitude is seen as important and is closely related to the affective, behavioural and cognitive aspects of an individual. It is clear that a graduate's attitude is an important reason why a graduate is jobless since so many employers say this in their responses. An example is:

> *An employable person needs 70-80% soft skills and academic training of 20-30%. He can be trained if he lacks skills but changing his attitude depends on his values.*

Employers consider that merely academic and vocational qualifications are not enough to ensure a graduate's employment. A graduate needs to demonstrate positive attitudes to secure employment such as showing self confidence, demonstrating problem-solving skills and the ability to reason. This appears to take a holistic view of a balanced and well-rounded graduate as being more marketable. In addition, employers connect bad attitude to lack of moral or ethics education and suggests:

There should be more focus on moral/ethics issues to ensure healthy development in character building.

How then does a university nurture attitude at tertiary level as employers say that education has not been successful in inculcating good moral values which influences a student's attitude?

Nurturing a good attitude can potentially be achieved through the teaching of critical thinking. For example, having the ability to distinguish relevant from irrelevant facts and recognising contradictions can help in developing a student's perspectives through critical analysis of experiences and points of view. A work-related scenario could be the issue of double standards practiced in an organisation. There are contradictions where a superior may say one thing but practises something else. In such a situation a critical thinker is sensitive towards contradictions and uses the analysis of the contradicting views to arrive at an understanding of fair-mindedness, which can hopefully be put into practice.

At the same time, before a critical thinker is strong in his or her beliefs, s/he will have to distinguish between right and what is wrong, what is absurd, what is acceptable and what is either relevant or irrelevant. These strategies of recognising contradictions and the ability to differentiate irrelevant and relevant facts help a critical thinker to develop his or her perspective and shape attitude. This is supported by Malaysia's National Educational Philosophy which calls for further development of potential in individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced, based on a firm belief in and devotion to God. From findings, however,

there appears to be a gap between the aims of the state's National Education Philosophy and the depth of moral qualities of graduates, certainly according to employers.

10.5.2 Confidence

From the data collected, many undergraduate respondents claimed a lack of confidence, especially during employment interviews. Employers also stated that graduates are not confident and they both assume this is due to lack of communication skills and competency in language proficiency. Examples from respondents' statements are:

> *Graduates have poor communication and interpersonal skills. Poor English language skills produce lack of confidence.*
> *I lack of self confidence and communication skills.*

Both responses show clearly how the respondents connect being confident to language proficiency and the ability to communicate. Although it is undeniable that having language competency gives one confidence in communication, there are critical thinking strategies which also prove useful in developing confidence.

As can be seen from figure Y, if one is able to examine assumptions, then, one has a passion for truth, thus having the intellectual courage to seek out and reject false assumptions. Another relevant strategy is the ability to explore implications and consequences. This strategy sees a critical thinker knowing that to any acceptance of a statement, there will have to be an acceptance of the implications and consequences raised by that statement. Both these strategies can develop self-

confidence and help a critical thinker to clarifying issues that are faced in employment. In addition, in the affective domain, a critical thinker will need to understand and be aware of how his or her actions are influenced by thoughts and feelings.

10.5.3 Adaptability

Adaptability is the potential to blend, adjust, and change according to the environment. It can also be seen as the ability to be flexible and as a response to tolerance. In the face of far-reaching changes in the world of work, adaptability is deemed to be one of the most important skills of work survival as it not only helps one to blend into a new environment but also contributes to the welfare of a company. An employer response in the data summarises this in the following statement:

> *A candidate who is adaptable and can assist in a company's productivity would be more sought after.*

How this employability skill is connected to and can be catalysed by critical thinking strategies is given in figure W. Noting significant similarities and differences and making plausible inferences, predictions or interpretations, are micro-cognitive strategies which are useful in performing the macro skill which is developing one's perspectives. All these skills can be related or used in having the ability to adapt to change. Having intellectual courage makes one strong and confident and able to cope with change.

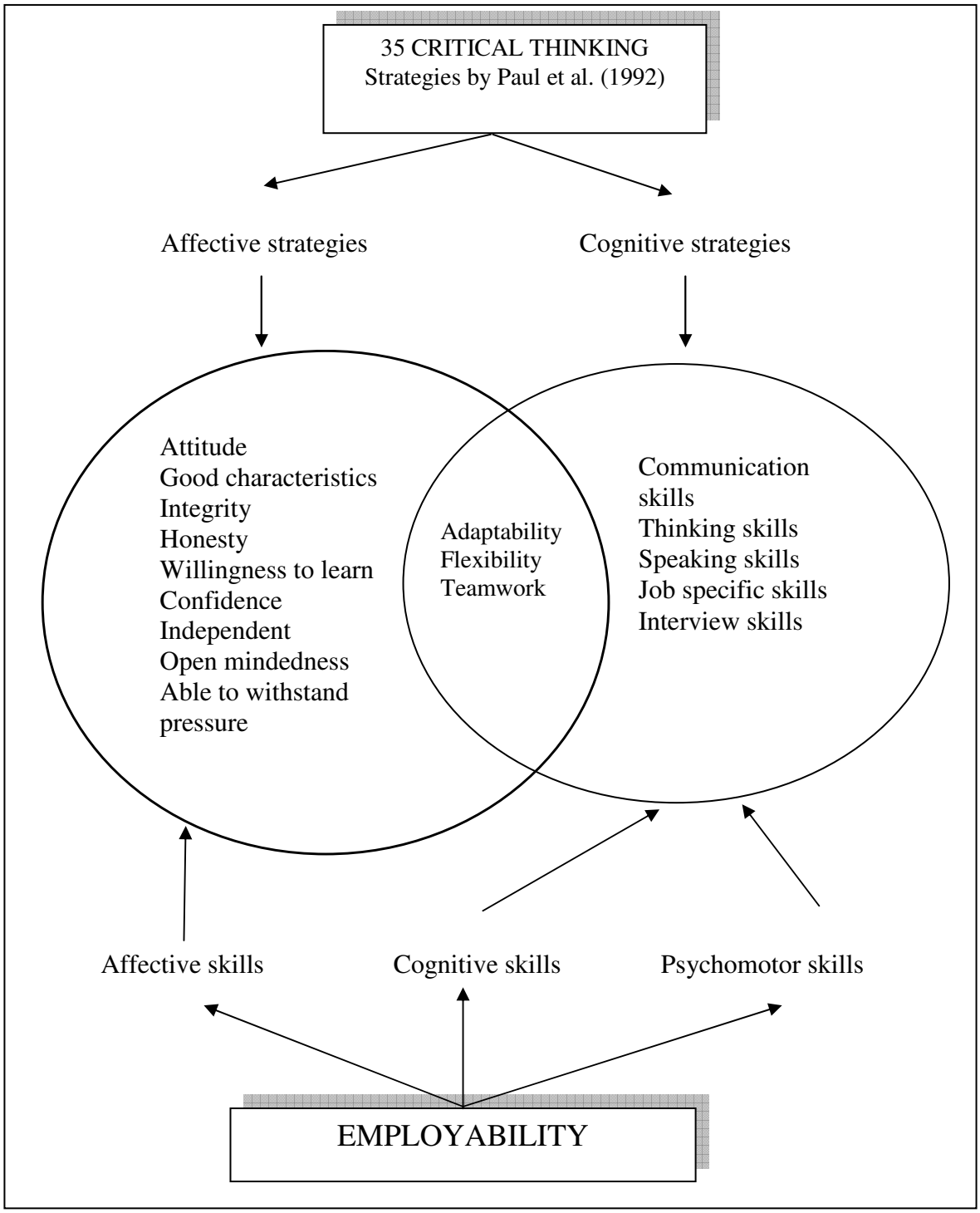
To sum up, figure Y shows the interconnectivity between employability skills and critical thinking strategies desired by employers in their new employees. It stresses the idea that being able to think critically strengthens a graduate's employability.

10.6 Critical thinking and employability in graduates of computer related degrees in Malaysia

The list of employability skills by employers and the list of employability skills that future employees have to offer employment are illustrated in figure Z in a framework of employability skills for graduates of computer related degrees in Malaysia created specifically for this thesis from findings. This research suggests Paul et al.'s (1990) strategies of critical thinking enhance both social and hard skills in graduates; the connection between these strategies and employability can be seen in Figure AA. This suggests critical thinking strategies by Paul et al. (1990) which incorporate both cognitive and affective strategies, can be implemented in student-centred activities to support both technical and non-technical skills for employment. Affective strategies can enhance soft skills in students whereas cognitive strategies can be used in teaching and learning of technical skills through linking theory and practice sessions.

Next is a discussion on how higher educational institutions can play a role in promoting employment among graduates.

Figure Z: Employability Skills Framework for Graduates of Computer related Degrees in Malaysia



10.7 Higher education and the graduate employability skills agenda

In general, figure Z and the employability skills framework by McQuaid and Lindsay (2005) suggests a mismatch between the skills taught in HEIs and what is expected by employers. Due to this mismatch, there is a great deal of research focus on the skills crisis, where the jobless do not fit the vacancies (Aken and Michalisin, 2007; De la Harpe et al., 2000). There is also research to say that it is a university's responsibility to develop these employability skills (Andrews and Higson, 2008; Bridgstock, 2009; Prokou, 2008; Roodhouse, 2007). For instance, universities in the United Kingdom hope to equip graduates with more than just the traditional academic skills. The aim is to try to match employers' expectations where, employability is 'work-readiness', that is, possession of the skills, knowledge, attitudes and commercial understanding that will enable new graduates to make productive contributions to organizational objectives soon after commencing employment.

In response to this agenda, Mason et al. (2009) say that universities have modified existing course content, sometimes with feedback from employers, introduced new courses and teaching methods, and expanded provision of opportunities for work experience. All these steps are taken to enhance the development of employability skills and/or to ensure the acquisition of such skills is made more explicit. In some cases university departments have sought to 'embed' the desired skills within courses; in other departments, students are offered stand-alone skills courses that are effectively 'bolted on' to traditional academic programmes. Many university

departments now use a mix of embedded and stand-alone teaching methods in their efforts to develop employability skills.

Cranmer (2006) presents an expanded model of methods of delivering employability skills in a higher education curriculum compiled from data collected in a study for the Higher Education Funding Council for England (Mason et al., 2009). With reference to Table 15, total embedding refers to the style of delivery whereby a student may not be aware he is developing employability skills. Bolt-on skills refers to the learning of skills being isolated from mainstream academic concern, with students' motivation to study them also being marginalized. Explicit embedding and integration is midway between embedded and bolt-on approaches. The table also shows that the careers and employability unit personnel have the option whether they want to deliver study skills and employability skills. It also states that bolt-on study and generic skills have become the responsibility of lecturing staff, incorporated within mainstream curriculum within specifically focused modules. This raises the issue of training lecturers in HEIs for this new teaching environment.

Cranmer (2006) notes that different methods are being used to address the employability skill agenda. For example, in New Zealand, various measures have been deployed, such as the National Qualification Framework (NQF), in consultation with education and industry specialists. In Canada several universities have introduced 'critical skills deemed necessary for the Canadian workforce into their careers programmes, whilst both Canada and the USA assess students through work-based or work related learning criteria.

Table 15: Expanded model of methods of delivering employability skills in higher education curriculum, Cranmer (2006)

Delivered by subject lecturers (mandatory)				Delivered by Careers and Employability Unit Personnel (Optional)	
Total embedding of employability skills	Explicit embedding and integration	Bolt-on Professional Skills	Bolt-on Generic Skills	Parallel development Study Skills	Parallel development Generic Skills
Employability skills	Employability skills	Specific modules aimed at enhancing study and generic skills	Specific modules aimed at enhancing generic skills, developed by Careers and Employability Unit Personnel, integrated into mainstream	Developing writing Creative thinking Using web resources	CV writing Career guidance Making effective job applications
Lose skills without trace Skills disappear in context No explicit assessment Low impact on curriculum	Visible skills Skills in context Explicit assessment High impact on curriculum	Visible skills (Study and generic skills) in context Explicit assessment High impact on curriculum	Visible skills (Generic) skills in context Explicit assessment High impact on curriculum	Bolt-on development Limited contextualize-ation Separate assessment Low impact on curriculum	Bolt-on development Limited contextualize-ation Separate assessment Low impact on curriculum

In Denmark, the Qualifications Framework requires the completion of a 'competence' profile. In Finland, skills courses are available and integrated into the curriculum and students' personal study plans. In South Africa, The NQF includes two sets of outcomes-'critical and specific'-which contribute to the graduate's personal development and the social and economic development of society (Harvey & Bowers-Brown, 2004). Overall, Cranmer (2006) says that while these countries may constitute 'employability' differently, there are commonalities in their approaches. However, these approaches will all have taken time to develop while in

Malaysia, as chapter two discussed, the employability agenda is still new and forms the platform of enquiry for this thesis which examines critical thinking in relation to employability.

Chapter summary

This chapter presents models in relation to critical thinking in employability developed specifically from this research which are inter-connected or are mapped onto models currently existing in the literature. It uses data from the surveys conducted in this study to show the connection between high level thinking and employment. It reveals the weakness in the teaching of critical thinking in Malaysia where only the micro level of critical thinking is practised through the use of Bloom's taxonomy of educational objectives, which is seen as outdated. Lastly, this chapter suggests developments in relation to current teaching of critical thinking in Malaysia.

Chapter 11 - Conclusion

☙ Effective measures need to be taken at the HEIs to prepare university graduates to be effective employees who are able to think critically. These future graduates should also be enhanced in their ability to attend critical, complex and real life situation at their workplace (Tarmizi et al., 2008)❧

Chapter outline

This chapter, in brief, revises the findings of this research to draw conclusions which will illustrate in what ways the research will impact the current practices in Malaysia in improving employability among graduates. It discusses the research implications in a sequential balanced manner followed by relevant recommendations. Next, this chapter acknowledges the questions not addressed by this research, in other words, limitations on the topic scope. Lastly, it also sets a foundation for further studies.

11.1 Linking the findings of the research

To connect the different findings of this research, individual findings are discussed in turn with quotations of major data obtained and contributing to the argument. These findings should ideally answer the research questions which are:

- What are the desired employability skills in new graduates as perceived by employers?
- What are the reasons for the unemployment of graduates as perceived by employers?
- How do soon-to-be graduates perceive themselves as having the ability to

think critically and perceive the importance of the thinking skills to their future employment?

Discussion of findings will follow the mentioned research questions' sequence.

11.1.1 Employers are dissatisfied with graduates' employability skills

Employers claim that graduates are responsible for their own employability and should have the responsibility for initiating their own development. This can be seen through data analysis where employers relate to graduates when deliberating the high unemployment issue in Malaysia with 55.1 % mentioning graduates as the cause. They mentioned graduates being choosy and picky, not flexible and being unrealistic in their employment expectations. The word "choosy", "picky" and graduates' inflexibility in employment are spread fairly well in employers' answers especially for questions 4 and 5 where there is 35% of such connotation. Some employers stress the importance of English, and say that graduates are not proficient in speaking and writing English. In answers to questions 1, 3, 4 and 5, English is said to hamper communication skills and confidence in graduates numerously by employers.

In the data, there is bias from employers when choosing employees such as overseas graduates over local ones and graduates from specific universities. This can be seen in employers' responses throughout answers for all questions 1-5, where they segregated the graduates by using terms such as "the local graduates", "Malaysian graduates" or directly wrote overseas graduates are better. Employers also

acknowledge the changing world of work, where work is highly competitive and graduates without global skills will be left behind. Because of these rapid changes, employers strongly encourage closer links between industry and universities and feel that HEIs should be made most responsible for unemployment of graduates. HEIs role is seen as still traditional, where universities impart knowledge but not opportunities for practice. In Malaysian universities, there is greater emphasis on theory and the curriculum is overly exam-oriented. Employers claim that such institutions produce graduates who lack soft skills when they want well rounded employees who have soft skills, good attitudes, moral and ethical values as well as job skills. The notion that HEIs should be responsible in the ways mentioned above is portrayed in answer to question 1 where 72.5% gave negative responses on their view of how the education and training in Malaysia prepare graduates for employment. In question 4, when asked to comment on high graduates' unemployment, 16.3% commented on universities, particularly on how universities have failed to prepare graduates holistically.

An implication to responses from employers is that graduates have to make an effort on their own to equip themselves with relevant employability skills, in other words become proactive in meeting job market demands. Other implications are mentioned after this discussion on findings.

11.1.2 Reasons for graduates' unemployment according to future graduates

It is quite alarming to discover that there are a high percentage of future graduates who are unsure of their career paths (48%) as compared to the expected high

percentage of respondents who wanted course-related jobs (39%). Only a small percentage turns to entrepreneurial and teaching opportunities. In addition to this, future graduates show immaturity and inflexibility when 93% wanted to enter workforce into higher entry level posts. This is very ambitious of them when these future graduates declare they are weak with regard to employment. They say they do not have enough skills, attitude, confidence, experience, qualifications and language in descending order of weakness. Weakness in skills has the highest total percentage, which is 34% as compared to the others. The respondents talk of weaknesses in communication skills, soft skills, job-related skills, thinking skills, and interview skills. Consequently, respondents support the need for good attitudes in employment. The attitudes to employability mentioned as crucial are hardworking, willingness to learn, positive attitude towards work and adaptability. Respondents think graduates with better grades (29.46%), rather than experience (27.59%) will be more sought after by employers.

Although with the least percentage, future graduates see themselves as not having a high level of confidence and relate confidence to the ability to communicate effectively. They also relate lower English proficiency to confidence and thus the inability to obtain jobs.

A clear implication to the above summary would be the absence or lack of career guidance to graduates which makes them unsure of job opportunities related to their field of studies. This directly points to the failure of the universities in providing

career guidance throughout students' tenure at the campus. Again other implications are mentioned at the end of findings.

11.1.3 Graduates have low critical thinking abilities

When it comes to critical thinking, respondents rate their ability lower than what is expected of them. It can be inferred they are dissatisfied with their current abilities compared to employers' expectations. This is clearly seen from the lower rating in almost all the strategies (except Strategy 32) which makes 97%. However, respondents do have some critical thinking skills and this is evident of something in the courses which enhances these high level skills. Higher ratings on the nine affective strategies show respondents are better in these compared to cognitive ones. Higher ratings on the importance of critical thinking strategies in employment show that the respondents acknowledge the importance of soft skills in employment. The lower rated strategies are mostly the macro critical thinking strategies; this shows that these future employees are weak in micro strategies needed to perform macro ones. This is because as explained earlier in Chapter 8, macro-skills are when one uses a combination of elementary skills or the micro-skills to perform a "real action". This is not surprising as macro skills generally are more difficult, complex and holistic as one needs to use certain combination of interdependent and integrated micro-ability skills in concert with one another to perform an action. Data collected shows respondents as not having intellectual courage, not reading critically and being unable to recognize contradictions.

As respondents rated lower for their ability as opposed to what is expected of them in employment, it implies that future graduates themselves are not confident they can withstand employment challenges hence the need to equip them with both skills and attitudes in line with current market demand. It should be a concerted effort from all stake holders of employment. Again, other implications are mentioned next.

Before laying down the implications and recommendations derived from the findings, it is vital to discuss Malaysia's education system in relation to the teaching of critical thinking skills.

11. 2 Discussion of findings to Malaysia education system and critical thinking

Malaysia reached independence more than 5 decades ago and with its diverse culture strives to reach the status of a fully developed country by 2020 through improvement of education; this can be seen through the annual increment in allocation of budget. Education in Malaysia is impressive, compared to many other Asian countries, yet there is room for improvement. The education system has an exam oriented nature where the end products are graduates who can be described as regurgigators of theories passed down in passive classroom environments. In such classrooms no critical thinking opportunities are available in contrast to what is sought by the National Education Policy (NEP). The NEP envisioned graduates who are harmoniously balanced in physical, spiritual, mental and emotional aspects.

This vision is supported by spending a huge portion of the education budget in sending students overseas in the hope that they gain wider and different perspectives, and bring back new technologies and experiences to contribute towards nation building. Another focus is through the privatization and corporatization of universities where the country hopes that the higher educational institutions (HEIs) have more freedom to administer and steer their institutions the way they think best, including networking and bilateral cooperation with other HEIs, either locally or internationally.

The introduction of critical thinking into the education system almost 20 years ago has yet to show its benefits. When the lack of critical thinking is said to be a major reason for unemployment, it raises the question if the introduction has been effective or otherwise. Even being infused into the education system, there are many dilemmas relating to the teaching and learning of critical thinking. Firstly, the Malaysian education system still practices pedagogies where students are passive learners in teacher centred classrooms. In such classrooms there are no opportunities for students to be expressive, critical or to voice their opinions. They are suppressed in their critical and creative development.

The Malaysian education system is still attached to a behaviourist view of teaching and learning which does not favour connection to real life situations. This is inappropriate as one of the major objectives of education is to prepare students for a future where there is clear connection to real life. The education system should move away from the traditional method of teaching and learning such as lecturing,

memorization, recognition and reproduction of facts towards a more interactive pedagogy reflective of a changing world. Educators should practice constructivist methods of teaching and learning, where learners are responsible for their own learning in the construction of their understandings and relationships in contexts. Although it is seen as a complex pedagogy it is not impossible to engage in a constructivist practice such as problem based learning. Such effort is seen as worthy and beneficial as it produces students who are autonomous, innovative, and independent.

The importance of having a common, mutually accepted and shared definition of critical thinking before it is embedded and taught in any educational organization is vital. Although Bloom's taxonomy has evolved and been revised many times, the Malaysian education system still uses and stresses the basic six levels of cognitive domains in learning in the original taxonomy. This original taxonomy gives little emphasis on the affective and behavioural domains which are crucially important in the development of social skills in a new workforce. This study suggests using Paul's critical thinking model as being embedded and taught integrated in subject matter; the model is more comprehensive and highlights the affective domain which is relevant to the findings in this research relating to skills and employability. Using the 35 critical thinking strategies, respondents rated the strategies on their perceived ability and importance of the strategies to future employment. These ratings revealed not only what strategies respondents are good or weak at, but also the fact that they are dissatisfied with their existing critical thinking level which they consider does not match what is expected of them by employers.

Employability should be seen in a more holistic way which means it comprises not only an individual's skills but also takes into consideration personal circumstances and labour market conditions. This questions whether the HEIs are providing education which compliments all three aspects of employability: teaching the soft and hard skills needed in employment, considering the personal circumstances of an employee such as the welfare of family, and offering courses which meet the job demands in the world outside of university. Any employability framework should also include career management skills to make sure employees maintain and have the ability to progress in their employment.

11.3 The implications from findings of this research

The most essential implication of this study may be the importance of recognizing the need for explicit and intense training for critical thinking. This study serves as a powerful incentive to look more closely at the possible consequences of integrating critical thinking using Paul's model into the educational curricula in Malaysia. Improving students' abilities to think critically holds important implications in making sure graduates are employable as well as implications to future graduates, educators, HEIs, industry leaders, and society in general. From the viewpoints of educators, employers, future employees, and society in general, training students to think critically is among the principal tasks of the educational system. Critical thinking abilities such as thinking intellectually, reasoning dialectically and clarifying issues, conclusions and beliefs are among the strategies in Paul's model which are important to ensure future graduates are adequately equipped for employment.

Paul's model is theoretically rich and structurally complex, much like critical thinking itself. This is not a "quick-fix" instructional model that can be superficially applied in a few course activities, nor is it a simple list of elements, standards, and traits to be memorized. Rather, it is an approach to instruction that requires, for most of its practitioners, a readiness to reflect deeply on a course and to rebuild it from its curricular and pedagogic foundations up. Redesigning courses to promote continual thoughtfulness about course content is probably essential for this model to provide the kind of benefits found in this study. Whatever the chosen format, successful integration of Paul's model into course content requires an effective training program and ongoing support.

If employers from related industries truly want their employees to have high level thinking abilities and if society really needs its citizens to be able to think critically, they must influence faculty and higher educational institutions to integrate explicit instruction in critical thinking into all levels of faculty in all academic areas. It then becomes a lecturers' responsibility to provide this training. Understanding both the nature of learning to think critically and methods of instruction through which this can be done are essential.

One further implication of this study is the need to teach critical thinking across the curriculum, not just in isolated courses. Integrating the model at all educational levels and across the curriculum should make Paul's model familiar after a few introductory instructions. Whether or not Paul's model is applicable in enhancing employability is a question that can only be resolved by further research. But the

need for taking critical thinking seriously is not questionable. Assisting undergraduates in maximizing their learning opportunities and to relate what is taught in the lecture halls to real life situations is vital for meeting many of the main goals of our educational system: an educated citizen, a competent workforce, academic excellence, and lifelong learning.

11.4 Recommendations on critical thinking and employability from this research

Based on the findings as explained in sections 11.1.1, 11.1.2, 11.1.3 in this chapter and the above discussion, this study suggests some developments and changes appropriate to both employability and critical thinking.

Firstly, higher education institutions can:

- Renew their focus on employability; see employability holistically in producing graduates with life-long learning skills necessary for careers through critical thinking development.

- Upgrade the teaching of critical thinking through introduction of other critical thinking models such as Paul et al. (1990).

- Apart from the cognitive domain of critical thinking, the affective domain should be given emphasis because this will enhance graduates' social skills such as communicative competence and teamwork which are important and essential to employability.

- The psychomotor aspect of critical thinking is also crucial as it exposes undergraduates to real life or hands on experiences and it gives them the

chance to put into practice the other two initial domains (the use of theory and social skills).

- As critical thinking is best taught integrated into subject matter, HEIs should make sure that proper and adequate training is given to educators.

- HEIs could tailor-make courses according to prevalent market demands.

- Changes curricula so that it reflects theory and practice.

- Programmes should include some form of work experience such as industrial training, internships or job attachments.

- Help determine successful transition from education to work by providing adequate career guidance; reinforce career guidance functions with an emphasis on job seeking skills. Future graduates should be exposed to job opportunities relevant to their degrees and alternatives or other opportunities in the case of unemployment.

Secondly, there is a lack of knowledge of what specific knowledge and skills are needed for jobs even if this research has highlighted skills. Employers too should initiate research and not be dependent on HEIs. Employers can:

- Articulate their needs by having multilateral cooperation with both HEIs and Government.

- Provide training

Thirdly, there are opportunities for Government action as government can:

- Continue with training programmes for the unemployed but include the introduction and integrated teaching of critical thinking.

- Revise educational policy as it should stress the importance of critical thinking. Since the teaching of critical and creative thinking skills in the primary and secondary school is integrated into almost all subjects, this should be adapted to include tertiary levels.

- See that the Manpower Planning Unit plays a more active role in updating future employment needs. This is crucial as it is best to avoid the oversupply of graduates in certain sectors.

With reference to the above recommendations, this research concludes this chapter by suggesting a model of graduate employability through critical thinking.

11.5 Model of graduate employability development through critical thinking

Figure AA depicts a dynamic model of graduate employability through critical thinking based on findings, implications and recommendations in this thesis. The importance of critical thinking providing one potential solution to the present unemployment problem has been explained in detail in earlier chapters of this thesis. This dynamic model stresses the importance of close cooperation from all employment stakeholders, namely the higher education institutions (HEIs), the Government, employers and the new graduates themselves.

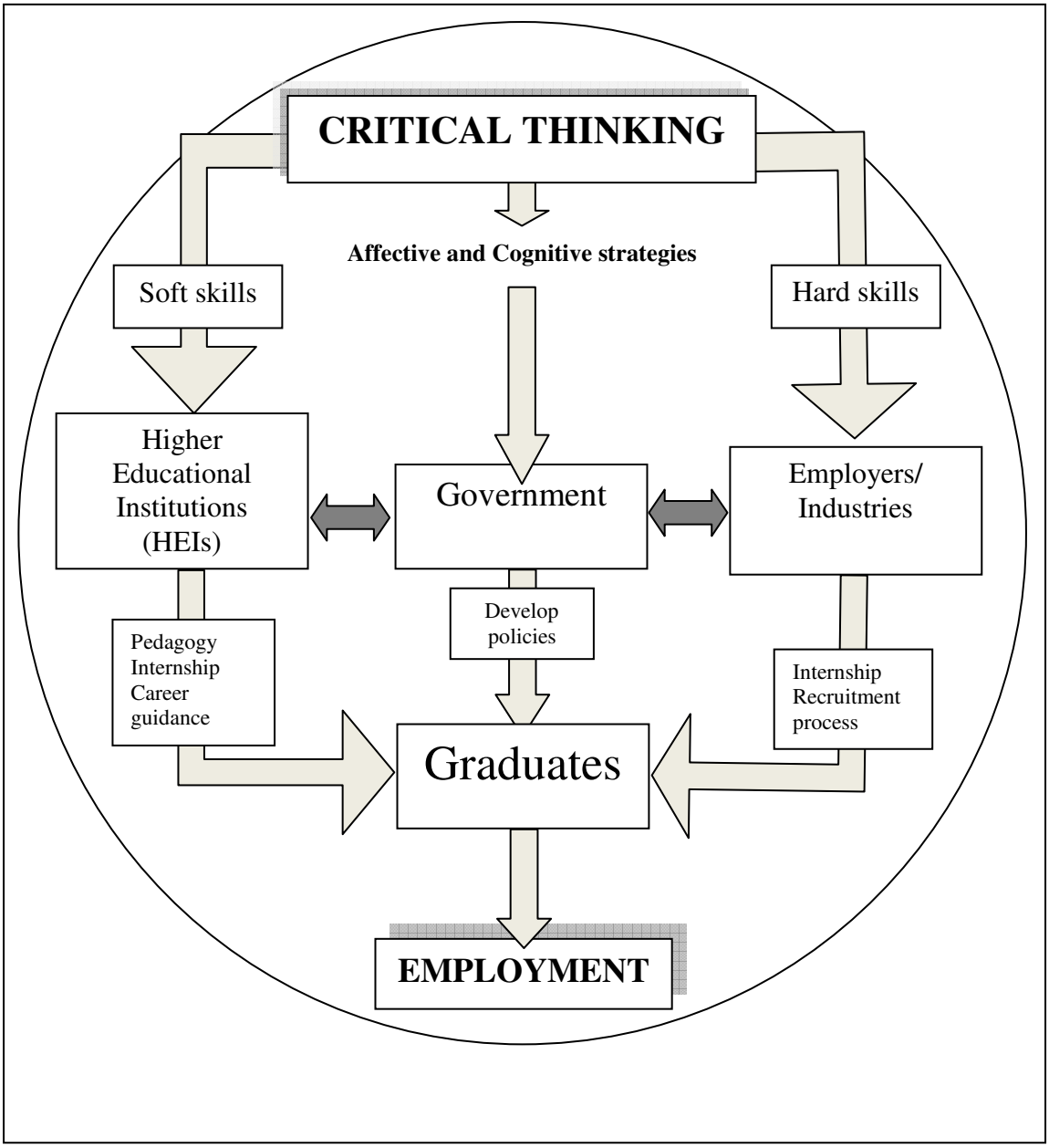
Figure AA suggests:

The Government should formulate educational policies with an emphasis on critical thinking in the curriculum. A structured programme should be designed for educators especially in the methodology of teaching/integrating critical thinking in subjects taught. Currently, educators in HEIs do not go through a formal or structured training in teaching of CT.

Employers and HEIs should collaborate in designing internship programmes/ on job training which stress critical thinking skills. This will provide realistic exposure to the undergraduates of employers' expectation in a real working environment. A feedback system between HEIs and employers should be in place so that HEIs' curriculum stays relevant in meeting employers' needs.

From these suggestions it is hoped that graduates would be adequately equipped with all the necessary skills and are job ready when they step out of their universities. As such, findings in this study challenge current critical thinking practices in relation to employability in Malaysia.

Figure AA: Dynamic model of graduate employability development through critical thinking



11.7 Limitations

1. The sample for this research is restricted to final year students in Malaysia public universities, which means that the result cannot be generalized to private universities. The sample also comprises students of computer-related degrees, so that the data collected cannot be generalized to other disciplines. Additionally, an alternative diversity mix might create different results from those collected here. Replication with other group of respondents would help strengthen these findings.

2. As the sample for this research is confined to final year undergraduates, the data collected do not represent similar respondents in their first, second, or third year of study. Yet, there is a possibility of using the assessment tool to measure changes in the perception of respondents from similar courses throughout their three or four year period of study to see if there is an increase or decline in respondent perception of critical thinking ability.

3. A further limitation of this study was the assessment instrument in testing critical thinking strategies in respondents. Related to this is also the issue of construction of items in the formal survey questionnaire. This survey intends to seek final year students' perceptions on their critical thinking strategies and the importance of these strategies to their future employment. Since there is no standardised list of critical thinking strategies relating to higher education in Malaysia, it is being compensated by using the list in Richard Paul's model, the thirty-five critical thinking strategies. While the model selected was carefully chosen and seemed most appropriate for the

study, there is still much work to be done to refine and to improve existing instruments as well as to develop additional instruments that adequately measure students' gains in critical thinking skills.

4. Teaching critical thinking using the thirty-five strategies embedded into subject matter is not an easy task. The level of instructor training required to successfully integrate Paul's model into course content may be another limitation of this study.

11.9 Further Research opportunity

Since this is the first study connecting critical thinking and employability and conducted using Paul's model for critical thinking, further in-depth research and replication of this study is clearly needed. Research needs to be done to see if the same model has the potential for use at other different levels or disciplines at tertiary level, and whether the impact might be equally effective. This means repeating the same research in a different discipline, such as engineering or the natural sciences which hopefully will offer a comparative perspective on the perception levels of critical thinking elements and attributes.

Finally, it is crucial that after the initial training in teaching critical thinking, educators and instructors will need ongoing support as they learn to think more critically about the content of their courses and methods of delivery. Revisions to course materials and methods, so that students are challenged to think critically is a monumental task which requires much time and effort. The challenges are inevitable

and huge, but the benefits will be worthwhile and rewarding for educators, students, and society as a whole.

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