CHAPTER 2

LITERATURE REVIEW

"Research is to see what everybody else has seen, and to think what nobody else has thought."

- Albert Szent-Gyorgyi (Grossman, 2007)

2.1 Introduction

The purpose of this literature review is to examine and learn more about the related research efforts done on the subject. This was particularly important as it helped the study to analyze the extent of the availability of research and documents on the topic. Furthermore, the review exercise assisted the researcher in that it was relatively easier to define the research problem clearly. The review process also yielded new concepts and search terms which were related to the topic of study. The collected information was assessed on relevancy as the first priority. Some information, though they are not current, are presented here because they brought important thoughts for this research. It further examines a conceptual framework based on Work System Theory (WST) that is used for the support of a curriculum review process using KM approach.

2.2 The concept of competency

Under the Malaysian National Higher Education Strategic Plan Beyond 2020, a strategy to create an excellent international hub of higher education in Malaysia has been identified, and targets at least 10 % overall international students enrolment in Malaysian Higher educational Institutions. The enrolment of international students in Malaysian HEIs has risen significantly from about 18,240 in 2001 to almost 72,000 in 2009 (MOHE, 2012).

HEIs are faced with a growing international education market that is increasingly being commercialized. HEIs are also facing increasing demands from stakeholders such as politicians, the government, partners, local society and others. Lately, the employers demand that the graduate's education match the employer's competency needs (Azevedo, Apfelthaler & Hurst, 2012). In other words, the curriculum at HEIs should be developed to stimulate graduates' abilities to perform in the labour market.

Besides that, HEIs also continue to face growing demands for accountability, transparency and comparability, due in part to external factors such as tougher global competition and changing customer needs; and internal factors such as the quality management initiatives and internationalization efforts. Over the past two decades, these pressures force a major paradigm shift in quality assessment efforts in many OECD countries putting more emphasis on outputs and learning outcomes, such as knowledge and competencies (Moskal, Taylor & Keon, 2008).

Sanchez & Edward (2010) defined competencies as a cluster of related knowledge, characteristics, attitudes and skills which have a great impact on individual's job, have correlation with individual's performance at work, can be evaluated by the accepted standards and are improved through training and development. Woollacot (2009) defined competency as the knowledge, skills, abilities, attitudes, and other characteristics that enable a person to perform skillfully in complex and uncertain situations such as professional work. Marco (2011) describes competencies as the dispositions which individuals need in this environment for acting and self-organization in various complex contexts and situations. Richards & Rodgers (2001) defined competencies as the knowledge, skills, and behaviors students should possess at the end of a course of study.

There are many benefits by producing competent graduates. Some of the benefits are the employers can recruit graduates with competencies and knowledge of a high level, which they can benefit from quickly, thus achieving a high rate of profitability in short time. In addition, the graduate faces less difficulty in finding their first job. Besides that, the fresh graduates will also be able to integrate in the labour market easily. By producing competent graduates, the HEIs also could improve their reputation in the HEIs market. This will attract new students, employees, employers, and other stakeholders. By having a good reputation in the job market, it will encourage the employers to recruit graduates from this institution rather than from others.

2.3 Overview on Higher Education Institution Curriculum

Curriculum is a vision that interprets societal needs and a structure that interpret those values into learning experiences for learner (Gupta & Govindarajan, 2000). A curriculum defines the contents that need to be acquired; the structure on the course of teaching and the conditions that are essential for successful learning (Bereiter & Scardamalia, 1989). The curriculum generally concentrates on different contents; include instances of special skill training and other provisions that contribute to the development of the competency. Curriculum consists of everything that promotes learners' intellectual, personal, social and physical development. It also includes lessons, extracurricular activities, approaches to teaching, learning and assessment, the quality of relationships within institute, and the values embodied in the way the Institute operates. Curriculum is important because it discusses rationale, aims and objectives, assessment, content, learning activities, teacher role, materials & resources, grouping, location, and time. Changing one component will affect the others to some extent (Bennett, 2006).

Higher education Institution (HEI) in Malaysia is delivered through both public and private systems under the jurisdiction of the Ministry of Higher Education. In this study, HEI refers to the system that incorporates post-secondary education, namely colleges and universities. The quality assurance divisions under the Ministry of Higher Education (MoHE) supervise the quality of public universities, polytechnics and community colleges. A HEI policy related to quality assurance is implemented for high-quality education, university accountability and transparency in the use of public funding and meeting the needs of the diverse stakeholders.

In the national higher education action plan 2007-2010, Malaysian Prime Minister claimed that the success of the human capital development agenda rests in large part on the quality of the national education system. So, the Government aims to organize an effort to transform the national education system at all levels. Since year 2009, all academic programmes offered by all public and private universities in Malaysia need to adhere to the Malaysian Qualification Framework (MQF) standards and procedures and accredited by Malaysian Qualifications Agency (MQA), which replaced those issued by the previous Lembaga Akreditasi Negara (LAN). LAN was established under the Parliament Act in 1996 is the quality assurance agencies for private HEIs in Malaysia. MQA integrates the quality assurance system for public HEIs that is QA Agency under the MoHE and private HEIs that are LAN, in Malaysia as well as training or skill-based providers. So, the proposed academic programmes are prepared in accordance to the guidelines provided by MQA that is Code of Practice for Institutional Accreditation (COPIA) as well as Code of Practice for Programme Accreditation (COPPA). The Ministry's long-term Strategic Plan encompasses four phases as shown in Figure 2.1.

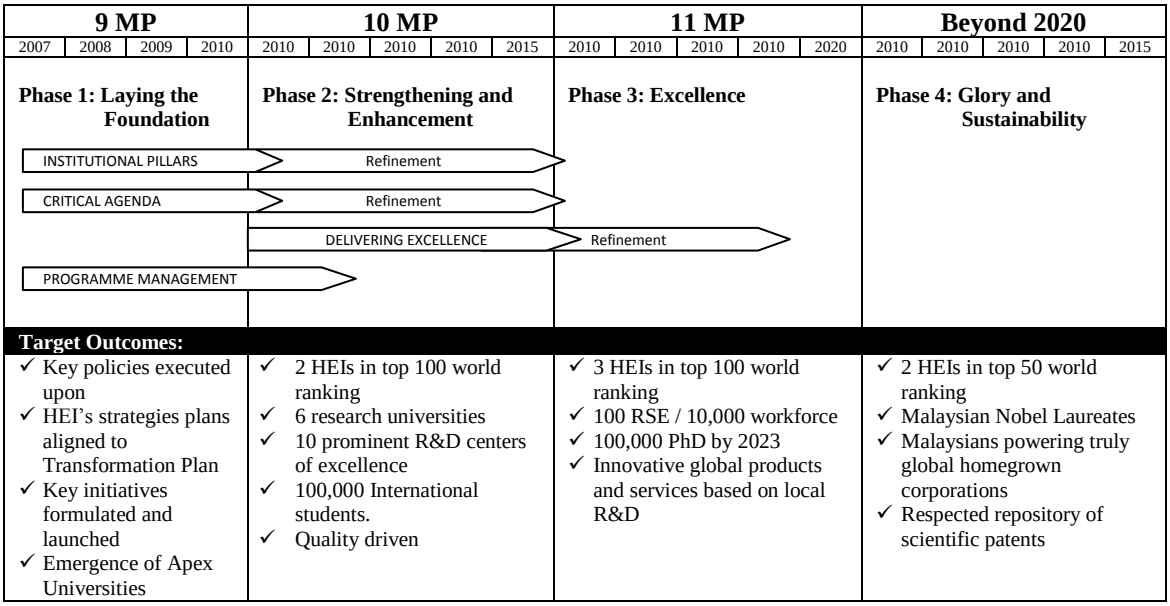

Figure 2.1: Transformation Roadmap for HEI
(Adopted from National Higher Education Action Plan 2007-2010)

In the Malaysian context, Computing degrees are always referred to as ICT degrees. In Malaysian, computing is categorized into four (4) major disciplines viz Computer Science, Information Systems, Information Technology and Software Engineering (COPPA, 2008). These follow the classification of the Association for Computing Machinery (ACM) and they are:

- ✓ Computer Science: Graduates of this Discipline, called Computer Scientists, should be prepared to work in a broad range of positions involving tasks from theoretical work to software development and can adapt to innovations in ICT;
- ✓ Information Systems: Graduates of this Discipline, called Information Systems Specialists, should be able to analyze information requirements and business processes and be able to specify and design systems that are aligned with Organizational goals;
- ✓ Information Technology: Graduates of this Discipline, called Information Technology Professionals, should be able to work effectively at planning,

implementation, configuration and maintenance of an Organization's computing infrastructure; and

- ✓ Software Engineering: Graduates of this Discipline, called Software Engineers, should be able to perform and manage activities at every stage of the life cycle of large-scale Software systems.

The four (4) disciplines provide the basic platform for placement of computing programmes. The quality of programme is evaluated by the learner's ability to produce their expected roles and responsibilities in society. This expects the programme to have clear learning outcomes for the learner (COPPA, 2008). These learning outcomes should cumulatively reflect the eight domains of learning outcomes, which are significant for Malaysia (MQF, 2007).

The learning outcomes for the Bachelor's Degree Programme graduates are such as able to apply skills and principles of lifelong learning in academic and career development; able to communicate effectively with peers, clients, superiors and society at large; able to demonstrate teamwork, leadership, interpersonal and social skills; able to utilize relevant techniques and demonstrate analytical and critical thinking skills in problem solving; demonstrate professionalism, social and ethical considerations in accordance with ethical and legal principles; apply broad business and real world view and express entrepreneurial skills (MQF, 2007).

Subject to the specialization, major or minor in a particular Bachelor's Degree and its nomenclature, the specific learning outcomes for the four (4) disciplines identified in this Programme Standards are as shown in Table 2.1.

Table 2.1: Specific Learning Outcomes
(Adopted from MOHE, 2011)

A. Computer Science: At the end of the Programme, graduates should be able to: i. demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to Computer Science; ii. apply theoretical principles of Computer Science in relevant areas; and iii. demonstrate theoretical computing knowledge in analyzing, modeling, designing, developing and evaluating computing solutions.
B. Information Systems: At the end of the Programme, graduates should be able to: i. demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to Information Systems; ii. apply theoretical principles of Information Systems in relevant areas; and iii. able to plan, design and manage business Information Systems, with the relevant technology and knowledge to support organizational performance.
C. Information Technology: At the end of the Programme, graduates should be able to: i. demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to Information Technology; ii. apply theoretical principles of Information Technology in relevant areas; iii. design, implement and manage Information Technology solutions and resources, and recognize the impact of technology on individuals, organization and society; and integrate various technology.
D. Software Engineering: At the end of the Programme, graduates should be able to: i. demonstrate knowledge and understanding of essential facts, concepts, principles, and theories. ii. apply theoretical principles of Software Engineering in relevant areas; and iii. apply appropriate methodologies, models and techniques that provide a basis for analysis, design, development, test and implementation, evaluation, maintenance and documentation.

2.3.1 Curriculum Design and Delivery by MQA

For the purpose of this Programme Standards, reference is made to the Code of Practice for Accreditation of Programmes (COPPA) and in particular, the section on 'Curriculum Design and Delivery'. The term 'curriculum design and delivery' is used interchangeably with the term 'programme design and delivery'. 'Programme' means an arrangement of Courses that are structured for a specified duration and learning volume to achieve the stated learning outcomes and usually leading to an award of a qualification" (COPPA, 2008).

The matrices below represent the benchmark requirements for all levels of qualifications and they include the requirements for the various classifications of modules (e.g. core, concentration and electives). Specific requirement for degree programme is shown in Table 2.2.

Table 2.2: Specific Requirements for Degree Programme
(Adopted from MQA: Programme Standard: Computing, 2010)

MINIMUM GRADUATING CREDIT – 120		
	Percentage	Credits*
Compulsory Modules (Bahasa Kebagsaan, Pengajian Malaysia, Pengajian Islam / Pendidikan Moral, etc.)	8-25	9-30
Core Modules / Common Core and Concentration / Specialization including a Project Paper	**46-73**	**55-88**
Core Modules / Common Core Concentration / Specialization (Discipline Core)	18-29 17-55	22-35 20-66
Elective Modules	9-24	11-29
Industrial Training	5-10	6-12

* Credits calculated are based on the Minimum Grading Credits given above.

2.3.1.1 Malaysian Qualifications Framework: Qualifications and Levels

Figure 2.2 shows the Malaysian Qualifications Framework which focus on qualifications and levels.

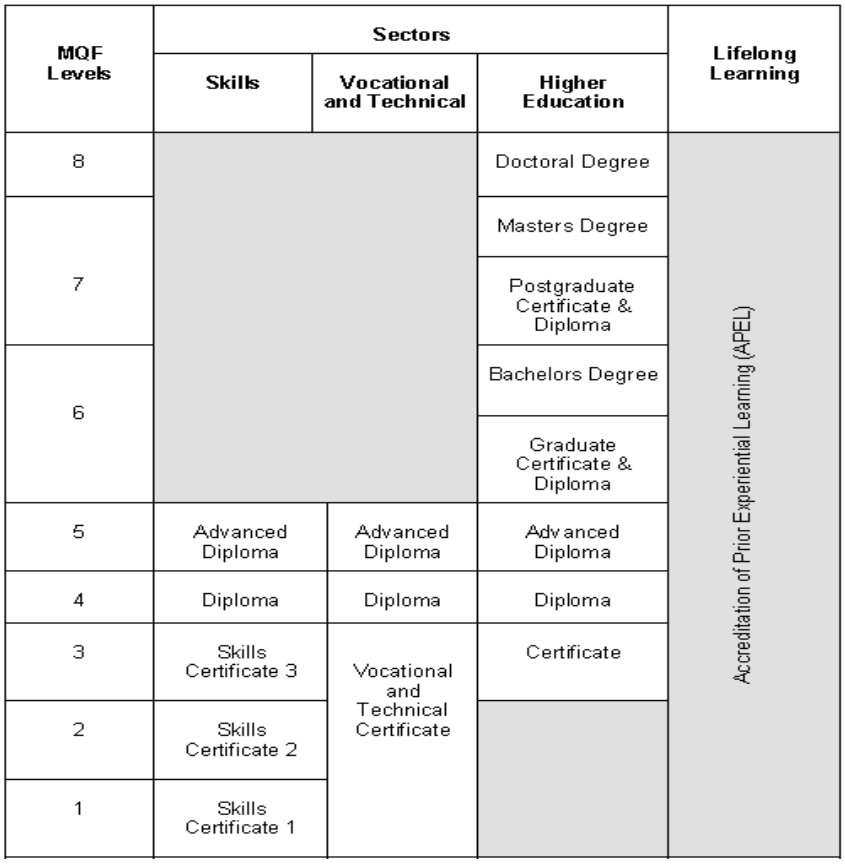

Figure 2.2: Malaysian Qualifications Framework: Qualifications and Levels
(Adopted from Malaysian Qualifications Agency, 2007, pp. 13)

2.3.2 Curricular Design and Teaching Learning

There are many ways of achieving the goals and learning outcomes or programme objectives that have been set by each HEIs. The basis for education requires a combination of knowledge, skills and attitudes. The curriculum review process is a significant component of HEIs which seriously affects the quality of education. If it is handled appropriately through KM approach, the study is certain that the HEIs should be able to produce competent graduates to the job market through accurate curriculum review process. In spite of growing concern from employers around the world regarding graduates' ability to meet current and future workplace demands, there has been little research addressing competency development within the curriculum (e.g., Jackson, 2009; McQuaid & Lindsay, 2005). In this study, KM approach is introduced for the curriculum review process in HEIs to produce competent graduates. All of these new challenges, which the HEIs have been facing in recent years, make it particularly interesting to study the role of KM approach in HEIs curriculum review process.

2.4 Knowledge Management

The concept of knowledge management (KM) represents an increasingly important area of consideration particularly for public sector organizations such as HEIs which act as a service provider (Elaine, Fenio & Ibrahim, 2011). Davenport (1997) states that many companies now believe knowledge are one of their organization's most valuable assets in 21st Century. So, if knowledge is viewed as a resource that is critical to an organization's survival and success in the global market, then like any other resource it demands good management (Holsapple & Joshi, 2000). There is no single, absolute definition of the term knowledge. Knowledge is commonly described in terms of information and data. Nonaka (1994) defines information as "the flow of messages or meanings which might add to or restructure or change knowledge…" Converting data

into information requires knowledge, and knowledge is information with meaning. Researchers such as Von Krogh & Roos (1996) and Nonaka (1994) have stressed the importance of understanding the knowledge concept before doing any knowledge-related work. Knowledge may appear both as an input (competence) and output (innovation) in the production process. Realizing knowledge is a heart resource; organizations are putting the maximum effort to manage knowledge in a more systematic and more effective way. The relationship between data, information and knowledge is shown in Figure 2.3.

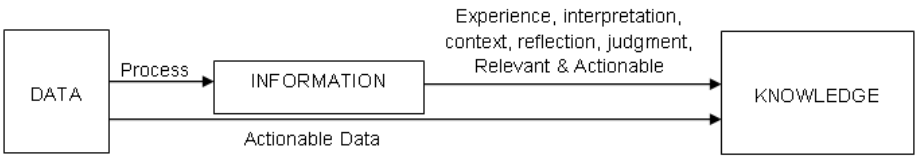

Figure 2.3: The relationship between data, information and knowledge

The term Knowledge Management (KM) is just as difficult to define as knowledge (Bhatt, 2001). KM, an integrated approach used universally can maintain the competitive advantage for an organization in today's fast changing environment. KM is not only about managing knowledge but managing the processes that act upon the knowledge. These processes include developing knowledge; preserving knowledge; using knowledge and sharing knowledge (Faxiang & Frada, 2006). KM is the systematic management of all activities and processes referred to generation and development, codification and storage, transferring and sharing, and utilization of knowledge for an organization's competitive edge. Li & Qin (2011) defined KM as the acquisition, arrangement, saving, updating, application, evaluation, transfer, sharing and innovation of knowledge, and exerts comprehensive influence on different fields through knowledge generation, accumulation, exchange and application, thus improving

innovation, responsiveness, productivity and quality skills for individuals and organizations. Jennex, Smolnik, & Croasdell (2009) argued that, KM performance can be examined in terms of processes and outcomes. In particular, process outcomes can be assessed in terms of productivity, satisfaction, and increases in knowledge sharing. Conley & Zheng (2009) said that KM helps to establish constructs and variables, and assists those who manage and perform knowledge work.

KM connects people with the knowledge that they need to take action, when they need it. Jashapara (2004) defines KM as the effective learning processes associated with exploration, exploitation and sharing of human knowledge (tacit and explicit) that use appropriate technology and cultural environments to support an organization's intellectual capital and performance. Newell et al. (2002) suggested that KM can ensure an organization's continuous creation via leverage of its knowledge assets in a highly turbulent environment. Tiwana (2002) believes that KM enables the creation, distribution, and exploitation of knowledge in order to create and retain great value for core business competencies. According to Holsapple & Joshi (2000), an operational objective of KM is to ensure that the right knowledge is available to the right processors, in the right representations and at the right times, for performing their knowledge activities (and to accomplish this for the right cost).

KM can create and deliver innovative products or services; manage and support relationships with customers, partners, and suppliers; or improve work processes effectively for organizational business processes. There are many reasons why knowledge should be managed properly especially using the collaborative technology. Among these are information overload, technology advancement, increased professional specialization, competition, workforce mobility and turnover, and capitalization of organizational knowledge.

2.4.1 Knowledge Management Processes

The four basic processes of KM are creating, storing/retrieving, transferring, and applying knowledge (Pentland, 1995; Teece, 1998). According to Rusli (2008), KM processes consists of creation, storage, distribution and application. In this study, KM consist of creation, manage, storage, distribution and application process. The processes are discussed below.

2.4.1.1 Knowledge Creation

Knowledge creation relates to knowledge addition or the edition of existing creation. Knowledge creation involve a constant interaction between the tacit and explicit dimensions of knowledge and a growing spiral flow as knowledge moves through individual, group, and organizational levels (Nonaka, 1991). In this study, the employer will create information on the skills and knowledge required in the job market. Besides that, the employer also will post the job vacancies available on the KM tool. Once the employer creates that information, the KM tool administrator will manage the information on the KM tool. This is done by editing the information in the KM tool such as adding, deleting and updating the necessary information on the KM tool.

2.4.1.2 Knowledge Storage and Retrieval

Knowledge storage relates to individual and organizational memory (Darr, Argote & Epple, 1995). Organizational memory includes knowledge stored in various components such as written documentation, structured information stored in electronic databases, codified human knowledge stored in expert systems, documented organizational procedures and processes and tacit knowledge gain by individuals and

networks of individuals. In this study, the information placed in the KM tool will be saved in the KM tool storage for future reference.

2.4.1.3 Knowledge Transfer and Distribution

Knowledge distribution is the dynamic exchange of knowledge between the source and the receiver (Capozzi, 2007). In knowledge transfer, transfer occurs at various levels such as knowledge transfer between individuals, from individuals to explicit sources, from individuals to groups, between groups, across groups, and from the group to the organization. In this study, the information will be distributed among the HEIs, students and employers when the information is required.

2.4.1.4 Knowledge Application

Knowledge application refers to using the knowledge. In the process of use, knowledge of how to use the KM in a collaboration environment will be increased by the community for their specific purposes such as for problem solving, decision making and learning. Milton et al. (1999) argued that KM consists of managerial processes that focus on creating knowledge resources at the beginning, followed by sharing of knowledge, as well as achieving the desired outcomes at the end, based on the organization's objectives. In this study, knowledge application process occurs when the KM tool is implemented in the HEIs and used by the HEIs members, employers and students.

2.4.2 KM Tools

Ruggles (1998) defined KM tools as tools or technologies, which support the performance of application, activities or actions such as knowledge generation, knowledge storage and knowledge codification or transfer. Prusak (2001) stated that,

KM could be used as a tool to promote knowledge sharing and also as an enabler in the KM process in order to improve management in decision-making. As a management tool and research discipline, KM has increased in popularity within the past decade (Cranfield & Taylor, 2008). KM is a tool that goes beyond traditional boundaries to integrate all available knowledge and information, certainly something managers in most disciplines could appreciate. According to Meso & Smith (2000), KM tools support the KM system that consists of knowledge use, knowledge finding, knowledge creation and knowledge packaging. KM tool could involve more than one feature, but the more features it has, the better its functionality (Abdullah, et al., 2005).

In this study, the KM tool should match to the role of an IT-based KM application which acts as a mechanism to integrate communications technology rather than only as a static repository of information (Agustin et, al., 2007). The proposed KM tool support communication, collaboration, sharing and searching activities related to relevant information and knowledge.

2.5 Knowledge Management Systems

Knowledge Management System (KMS) which has its origins in a number of related business improvement areas, such as TQM, business process re-engineering, information systems and human resource management is the latest techniques capturing the attention of managers in business sector (Metaxiotis, Ergazakis & Psarras, 2005).

KMS and associated technologies are one aspect of KM. Advances in information and communication technologies (ICT) allow knowledge-based systems to utilize the tacit and explicit knowledge in an organization and provide greater possibilities for individuals and organizations to create and to share that knowledge (Schwen et al., 1998; Alavi & Leidner, 2001). Organizations around the world are using KMS with variety of goals, such as increased innovation within the organization,

knowledge and people retention, and strategic alignment. Marwick (2001) stated that the strongest contribution to KMS solutions are made by technologies that deal largely with explicit knowledge. Markus (2001) presented reuse of knowledge in terms of organizational memory systems. Ackerman, Pipek & Wulf (2003) discussed a combination of repositories and networks. Table 2.3 shows knowledge perspectives and its implications for KM and KMS. This study focuses on the implications for KM.

2.5.1 Tacit Knowledge and Explicit Knowledge

In the learning economy, tacit knowledge is as important as, or even more important than, formal, codified, structured and explicit knowledge. The Difference between tactic knowledge and explicit knowledge is shown in Table 2.4.

Table 2.3: Knowledge Perspectives and Their Implications
(Adopted from Davenport & Prusak, 1998)

Perspectives		Implications for KM	Implications forKMS
Knowledge, data and information	Data is facts, raw numbers. Information is processed / interpreted data. Knowledge is personalized information.	KM focuses on exposing individuals to potentially useful information and facilitating assimilation of information	KMS will not appear radically different from existing IS, but will be extended toward helping in user assimilation of Information
State of mind	Knowledge is the state of knowing and understanding.	KM involves enhancing Individual's learning and understanding through provision of information	Role of IT is to provide access to sources of knowledge rather than knowledge itself
Object	Knowledge is an object to be stored and manipulated.	Key KM issue is building and managing knowledge stocks	Role of IT involves gathering, storing, and transferring knowledge
Process	Knowledge is a process of applying expertise.	KM focus is on knowledge flows and the process of creation, sharing, and distributing knowledge	Role of IT is to provide link among sources of knowledge to create wider breadth and depth of knowledge flows

Table 2.4: The Difference between tactic knowledge and explicit knowledge

Tacit Knowledge	Explicit Knowledge
• Tacit Knowledge is subjective • Knowledge of experiences is the body • Simultaneous knowledge (here and now) • Analog Knowledge (practice) (Nonaka and Taekuchi, 1995) • *Knowledge is personal in nature* and very difficult to extract from people. • Knowledge must be transferred by *moving people* within or between organizations. • Tacit knowledge is obtained by internal individual processes and stored in human beings. (Nonaka and Takeouchi, 1995) • Tacit knowledge is know-how and learning embedded within the minds of the people in an organization. It involves perceptions, insights, experiences, and craftsmanship. • Tacit knowledge is personal, context-specific, difficult to formalize, difficult to communicate and more difficult to transfer	• Explicit knowledge is objective • Knowledge of rationality is the mind • Sequential Knowledge (There and then) • Digital Knowledge (theory) (Nonaka and Taekuchi, 1995) • *Knowledge can be articulated and codified* to create explicit knowledge assets. • Knowledge can be *disseminated* in the form of documents, drawings, best practices, etc. • Explicit knowledge is documented information that can facilitate action. • Explicit knowledge is packaged, easily codified, communicable and transferable • Stored in a mechanical / technological device, such as documents or databases. This knowledge is more useful if it could be shared and used among the community that works together using collaborative technology at anytime, anyplace and anywhere (Abdullah et al., 2005)

2.6 Practice of KM in Higher Education Institution

Kidwell, Vander & Johnson (2000) observed that HEIs could use KM to improve their organizations' mission. Martin (1999) argued that KM could support the preservation of organizational assets by optimizing the knowledge within the organization, encouraging a knowledge-creation process and utilizing that knowledge for teaching and learning. Tajuddin (2008) stated that, the first act of KM is to overhaul the educational curriculum towards a more human and humane oriented strategies that would benefit the greater masses. Sallis and Jones (2002) insisted that there is as much need for KM in HEIs. Kidwell, Vander & Johnson (2000) supported that HEIs are suitable places to apply KM practices to support their functional and operational processes. Although there were many studies done to propose the implementation of KM processes in corporate sectors and even some in HEIs, very few have attempted to test them empirically (Sharimllah, Chong & Lin, 2008).

According to Brown & Duguid (2000), profound changes in competition have made HEIs to think like other industries. The educational markets are becoming global as HEIs attempt to internationalize their curricula and offer high quality programs to students regardless of location. HEIs also have to adjust them and develop strategies to respond rapidly to the changes in technologies and increasing demands of stakeholders. Hawkins (2006) argued that KM allows an efficient collection and organization of explicit knowledge. HEIs do not solely provide knowledge to students, but are also engaged in managing and collaborating the existing knowledge for future reference (Goud, Venugopal & Anitha, 2006; Maizatul & Chua, 2005; Yusof & Suhaimi, 2006). Applying KM to HEIs is complex because each university is unique in its scope, size, and priorities, and is a complex institution that balances both providing quality education and research opportunities, while simultaneously operating as an efficient and effective business in a competitive market (Cranfield & Taylor, 2008). Steyn's (2004) mentioned that, KM applications in HEIs explain substantial benefits gained as presented in Table 2.5.

Table 2.5: KM applied in a faculty in a HEI
(Adopted from Steyn, 2004)

KM applications	Benefits
✓ Repository of curriculum revision efforts that includes research conducted best practices, lesson learnt, etc. ✓ Repository of content arranged to facilitate curriculum design and development ✓ Access to information related to teaching and learning with technology, outcomes tracking, lessons learnt, best practices, etc. ✓ Hubs of information in each disciplinary area, including updated materials, recent publications, applicable research, etc. ✓ Repository of instructional and assessment techniques.	✓ Improved quality of curriculum and programmes and leveraging best practices and monitoring outcomes ✓ Improved speed of curriculum revision and Updating ✓ Improved faculty development efforts, especially for new faculty members ✓ Improved administrative services related to teaching and learning with technology ✓ Improved responsiveness by monitoring and including lessons learnt from the experiences of colleagues, students' evaluation or other role players' inputs ✓ Interdisciplinary curriculum design and development facilitated by moving across boundaries.

The need to increase productivity, quality and access to knowledge while meeting the challenges of competition with other universities has led administrations to consider various management programs (Reid, 2000; Bates, 2000). Stewart & Carpenter (2001) categorize productive KM in terms of the leadership's ability to direct faculty toward the university's vision for adaptive change.

Bernbom (2001) suggested that operating a KM program in a HEI should serve the objectives of the academic strategy plan developed by the leadership where a clear vision, goals and objectives are articulated for a sustainable KM program. Kaplan & Norton (2001) suggested that the operational procedures aimed at supporting the organization's capacity to learn, solve problems, innovate and adapt appropriate internal procedures. Hayes (2003) suggestion of an advisory group could be used to recommend and establish some KM policies and procedures. The author indicated that the advisory group participates in the development of KM standards, guidelines and procedures related to KM functions and helps facilitate communication across the campus on all KM-related matters (Hayes, 2003). Petrides and Nodine (2003) looked at specific KM educational processes for KM as a means of reviewing, revising, and effecting stronger curriculum development processes, interdepartmental assessments, department portfolios or program reviews.

2.7 Advantages of KM in HEI

There are many benefits of a well-designed KM in the organization. These include saving time and effort to get knowledge. Knowledge is able to be used wherever and whenever it is needed, eliminating time wasting random distribution just-in-case people are interested. In order to be more beneficial to the HEI, the knowledge, as an organizational asset should be managed carefully.

Knowledge in organizations may be created by human sharing activities from a competitor's paradigms that relate to life and experience (Fireston, 2003). Fireston (2003) supported that KM is useful for the arrangement processes (capture, codification, sharing, and distribution of knowledge) and managing the knowledge production processes (knowledge making, knowledge creation, and knowledge discovery). According to Petrides and Nodine (2003) the use of KM method in education enables the encouragement of the greater intelligence, practical know-how, and effectiveness of HEIs. KM in education also offers the superiority of practical assessment framework that depends on the effectiveness of information management (Petrides & Nodine, 2003).

2.7.1 Increase HEI productivity, quality and innovation

There is high need for KM in education. KM is very powerful which could lead to transformative change (Sallis, & Jones, 2002). KM for academy, focusing on KM framework to achieve to incorporate management processes through the leadership's vision and strategy, implement internal processes demonstrating clear policies, simple procedures and efficient work processes of the KM program, and encourage a KM processing for a HEIs that ensures continued vitality of KM processes within the institution which reflects understanding and involvement from the faculty and staff, in turn supporting the learning and growth of the HEIs.

KM is a method that could increase institutional innovation as it is the source of new ideas (Malaysian Ministry of Higher Education, 2010). The basic principles of KM used to support its usage in HEIs should be based on a KM program that addresses beliefs, norms and behaviors unique to HEIs. KM has made it possible for people to share enormous amounts of information unconstrained by the boundaries of geography and time (Bukowitz, & Williams, 2000).

2.7.2 Support Functional and Operational Processes

KM could support functional and operational processes in HEIs. HEIs are suitable places to apply KM practices to support their functional and operational processes (Hawkins, 2006). This is because HEIs are posited to profit greatly from the development and application of certain KM mechanisms that assist in identifying not only what is known, but also what must be known, similar to business organizations (Tippins, 2003). Since knowledge play important role in HEIs, KM has significant potential to improve academic effectiveness and accountability (Cronin & Davenport, 2000). KM helps lecturers or instructors to develop their teaching ability, skill and experience. In other word, KM helps HEIs to improve their internal functional and operational processes.

2.7.3 Support HEIS vision, mission and decision making

HEIs have significant opportunities to apply knowledge management practices to support every part of their mission (Hawkins, 2006). KM is not a new idea for HEIs, but the problem is that the area of study is very broad. This makes the learners difficult to understand the implications of KM for an educational setting. KM can be categorized in terms of the leadership's ability to direct the staff and faculty toward the university's vision for adaptive change (Stewart & Carpenters (2001); Townley (2003). HEIs could use KM to improve their organizations' mission (Hawkins, 2006). Martin (1999) had identified several common goals in his discovery of a strategy for KM in a university such as utilizing the best practices and lesson across the HEIs (Martin, 1999). KM can be relevant to educational decision making within the school as an organization (Petrides & Guiney, 2002). Decision-making within any type of organization starts with data. The first act of KM is to overhaul our educational curriculum towards a more human and humane oriented strategies that would benefit the greater masses (Tajuddin, 2008). By applying KM process in HEIs, it could help them to improve decision

making, improve efficiency of people and operations, improve responsiveness to customers, improved product or services and also to improve the innovation (Tiwana, 2002). KM could also lead to better decision-making capabilities, reduce curriculum development and research, improve academic and administrative services, and decrease cost (Hawkins, 2006).

2.7.4 Gain Competitive advantage

KM is very important in today's market because it helps organizations to gain competitive advantage and effective working through sharing and re-using knowledge. KM also could increase their competitiveness as they safe their time and money. Chan & Chau (2005) tied KM and HEIs together and gave the HEIs a competitive advantage by providing a foundation of storing and using information (Chan & Chau 2005). Unlike the corporate motivation for competitive achievement, much of the focus on KM for academe is described as a continuous sharing of activities. The emphasis on activity sharing and achieving knowledge is the essence of an educational system (Achava, 2001; Cronin & Davenport, 2001).

With globalization, KM has allowed organizations to become more competitive (Hawkins, 2006). The knowledge-based activities of developing products and processes are becoming the primary internal functions for organization and the ones with the greatest potential for providing competitive advantages (Davenport & Prusak, 2000). KM is also very useful for the research processes because it helps to encourage the competitiveness condition and openness for exciting research grants. KM development in HEIs could keep the research direction in the right path. In other word, it could help in the interdisciplinary in the research process which improves the internal and external services of HEIs. This will help to reduce the cost and save their time (Kidwell, Vander & Johnson, 2004).

2.7.5 Support teaching and learning approaches

Learning and KM fit naturally with the utilization of today's information and communications technology (Learnscope, 2003). The pedagogy in KM can be used for executing ideological learning to realize the practical aims. Cronin and Davenport offered KM activities by using practical knowledge which produces alternative teaching and learning approaches (Cronin & Davenport, 2001). KM activities allow the community of professors and students to manage and share information and knowledge with regard to curriculum, course management and learning activities (Bourner, 1998).

KM could advance the teaching and learning approaches in HEIs which could add the graduates' quality. KM is formalized pedagogically when there is an access to knowledge. Rao (2002) further argued that proficiency and expertise which create new capabilities enable superior academic performance and encourage innovative ideas and real-world applications. KM can be described as knowledge patches for students' adaptive learning (Naeve, 2001). KM method in HEIs enables the encouragement of the greater brainpower, practical know-how, and effectiveness of HEIs. KM in HEIs also offers the superiority of practical assessment framework that depends on the effectiveness of information management (Petrides & Nodine, 2003).

2.7.6 Support the KM environment.

KM method in HEIs improves the strategy planning, such as strategy planning decentralization, sharing internal and external information, market-focus strategy plans, and sharing knowledge from a variety of resources. The integration of KM concepts in the academic field could lead to the supported effectiveness of external association partnerships and increased productivity of organizational operations (Rowley, 2000). The activities associated with the creation and maintenance of knowledge and with implementing a knowledge process in the organization could support the KM environment.

KM could improve the services of HEIs for students (Kidwell, Vander & Johnson, 2004). Some of the areas that could be improved by KM are such as library, academic measurement, general information, and information technology support services. This improvement will indirectly improve the efficiency of HEIs services. The study also argued that KM implementation in HEIs could improve the administrative services by focusing on the type administrative services, efforts of development, administrative decentralization, administrative policies, and responsiveness and communication capabilities.

2.8 Information Systems Vs Knowledge Management Systems

Data, information and knowledge play an essential role in both Information Systems (IS) and KM. IS help to improve the organization's operation and management. IS serve as a platform that provides functionality for a KM. IS is defined as a group of components working together. These components include equipment (or hardware), instructions (or software), data stored in the system, the people to operate the system, and procedures for the people to follow.

An IS supports one or more work systems using information technology to capture, transmit, store, retrieve, manipulate or display information (Alter, 1999). IS is also a business process consisting of steps related in time and place, having a beginning and an end, inputs and outputs. IS not only store and process data, they also produce information, which is the basis for good decision-making. (Alter 1999). IS make the work more productive in a shorter period of time. It also supports the KM initiatives by helping the organization to achieve its goals. IS that support information flow are an essential component in a knowledge management system. The goal of KM is to increase the efficiency of activities related to knowledge as well as the benefits acquired from it. KM should particularly help to overcome the shortcomings of current practices

of business engineering in regard to organizational performance (Maier, 2002). KM operated on the basis of an (organization-wide) information and communication infrastructure.

Technologies by themselves do not constitute a knowledge management system, they rather facilitate one, and they are very important and useful as enablers for the implementation of knowledge management approaches. The KM focuses on discovering knowledge that responds to the changing environment and takes into account an implicit knowledge that plays an essential role in an organization's competitive advantage. KM is also a large networked collection of contextualized data and documents linked to directories of people and skills and providing intelligence to analyze these documents, links, employees' interests and behaviour, as well as advanced functions for knowledge sharing and collaboration (Maier, 2002).

2.9 Review of Research Related to KM in HEI

Reviewing recent literature on the research related to the use of KM in HEIs offers insight into methodologies used among researchers in this area. Research methodology reviewed in the design, integration and evaluation of KM in HEIs indicated that the use of multiple methods to gather data is a feasible approach.

Patrocinio, Enrique & Diego (2009) used a qualitative research work based on a multiple case study has served to achieve the goal on Knowledge Management. Petrides & Nodine (2003) looked at specific KM educational processes for KM as a means of reviewing, revising, and effecting stronger curriculum development processes, interdepartmental assessments, department portfolios or program reviews. Capozzi (2007) argued that the KM curriculum design methodology, providing a course framework which links existing units and employability skills through activity-based learning and teaching. Joseph. (2001) insisted how KM could improve the educational

environment by providing new styles of teaching and by increasing the relationships between faculty, students and staff. Dev (2010) used conceptual and descriptive method. Sharimllah, Siong & Hishamuddin (2009) used questionnaire to conduct a study on "The practice of knowledge management processes: A comparative study of public and private higher education institutions in Malaysia".

Table 2.6 shows the summary of the research methodology used HEIs field on KM. The table is divided into twenty-two columns. The first column is the author list Q1 and Q2 shows the type of research methodology used in their study. Q1 represent Qualitative research and Q2 represent Quantitative research. T1 represent the study was conducted in Higher Learning Institution. S1 until S18 represent the area of study in the papers. S7 represents the curriculum. From these studies, it concludes that, there were very few studies have done on the role of KM in Higher Education focusing on curriculum.

2.10 Discussion on employability

Early definitions of graduate employability in the academic literature focused on employment outcomes, i.e., getting a job after the completion of higher education, but also maintaining or obtaining new employment (Aamodt & Havnes, 2008). While this is no longer the dominant view of employability, graduates' first-destination statistics (i.e., employment status a few months after graduation) are still used as the 'performance indicators' of graduate employability (Bridgstock, 2009).

According to Lee (2000), having good grades did not guarantee employment for Malaysian graduates. Recent HEIs graduates from both developed and developing countries have experienced a great deal of difficulty in finding jobs. This phenomenon is also seen in Malaysia (Salas, 2007, Bai, 2006; Kim & Lee, 2006). In the global market, students have become customers, and HEI are the providers. Some of the causes

Table 2.6: A Review of Knowledge Management Frameworks and Research Methodology

Author	Research Method		Type	Area of Study																
	Q1	Q2	T1	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18
Abdullah, Selamat, Sahibuddin,S. (2005)	X	X	X	X	X	X	X	X			X			X		X		X		X	
Achava (2001)	X	X	X	X		X			X		X	X				X					X
Bates (2000)		X	X	X	X			X			X	X			X			X	X		X
Bernbom (2001)		X	X	X	X	X					X		X	X			X	X		X	X
Brown and Duguid (2000)	X		X	X	X	X	X	X			X	X		X		X	X	X		X	X
Chan and Chau (2005)	X		X	X			X														X
Cranfield et al. (2008)	X	X	X	X	X				X		X		X		X				X	X	X
Cronin and Davenport (2001)	X	X	X	X	X				X		X	X	X	X		X	X	X			X
Diptendu, Sourav, Piyal (1996)	X	X	X	X	X	X	X	X	X		X	X		X		X	X		X		X
Hawkins (2000)	X		X	X		X	X				X	X		X		X	X		X		X
Ho et al., (2008)	X	X	X	X	X	X			X			X		X	X		X		X		X
Jillinda, Karen and Sandra (2000)	X	X	X	X	X	X	X	X			X	X		X	X	X		X	X		
Jing, Yoshiteru, Nakamori, Andrzej (2009)	X		X	X	X						X	X		X	X	X	X			X	X
Joseph (2001).	X		X	X	X	X	X		X		X	X	X		X	X	X		X		X
Kidwell et al. (2000)	X	X	X	X	X	X	X				X		X						X		X
Martin (1999)	X		X	X	X				X		X		X	X		X		X		X	X
Mohd G.M., Nor A., Man N.K, and Mar I.M. (2007)	X	X	X	X	X	X	X				X		X			X			X		X
Petrides and Nodine (2003)	X	X	X	X	X	X	X	X		X											
Prayong T.,& Tasapong, K. (2007)	X	X	X	X					X		X								X	X	X
Reid, 2000	X	X	X	X	X	X		X				X	X		X	X		X		X	
Rowley (2000)	X	X	X	X	X	X			X				X	X			X	X	X		X
Sallis and Jones (2002)	X	X	X	X	X	X	X	X			X		X			X		X			X
Sharimllah Devi et al., 2008	X	X	X	X							X			X		X	X		X		X
Stewart and Carpenter, H. (2001)	X	X	X	X	X		X	X	X		X	X		X		X		X	X		
Steyn's (2004)	X	X	X	X	X	X	X			X	X	X		X		X			X		X
Sung, H.,Y., G. &Min,Y.K. (2007)	X		X	X	X	X			X				X			X			X		X
Tippins, 2003	X	X	X	X			X		X			X	X		X		X	X			X
Townley (2003)		X	X	X									X	X				X	X		X
Yaying Mary C. Y. (2005)	X	X	X	X	X	X	X	X				X		X		X	X		X		X
Marinah, Ramlee, Peter & Adrienne (2011)		X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X
Elaine, Fenio & Ibrahim (2011)	X		X	X	X	X			X				X		X		X	X		X	X
Sharimllah, Siong & Hishamuddin (2009)		X	X		X	X					X	X			X	X	X	X	X		

Note:

Ql	Qualitative	S4	Knowledge Storage	S9	Better decision making	S15	Reduced costs
Q2	Quantitative	S5	Security	S10	Better employee / student handling	S16	Support product or service quality
T1	University	S6	Environment	S11	Faster response to key business (educational) issues	S17	Improved innovation and creativity
S1	Improve Communication	S7	Curriculum	S12	Improve skills	S18	Support collaboration within / outside
S2	Knowledge Creation	S8	Teaching and Learning	S13	Improved productivity		organisation (university)
S3	Knowledge Transfer			S14	Sharing best practices		

of unemployment among graduates are mismatch of qualifications with employers' needs, lack of demand and supply information on labour market, lack of exposure of students to the real job market, lack of soft skills, the pace of technological change, skill deficiencies, no relevant work experience, students own attitude, lack of communication and social skills, not challenging course syllabus, teacher-centred and not student-centred. Malaysian Prime Minister said the move was part of the long-term goal to raise the quality and marketability of local graduates. He also added that, a continuous dialogue between the universities and industry is being held to raise the quality of the graduates, an approach which is expected to reduce the mismatch between supply and demand for skilled manpower. The details are discussed in Chapter 5.

2.11 Work System Theory

The work system theory (WST) is a broadly applicable set of ideas that use the concept of "work system" as the focal point for understanding, analyzing, and improving systems in organizations, whether or not Information Technology (IT) is involved (Alter, 2002). Sumner & Ryan (1994) used WST to explain problems in the adoption of computer-aided software engineering. Ramiller (2002) stressed that, a version of the work system framework within a method for animating the idea of business process within an undergraduate class. Petrie (2004) used the work system framework as a basic analytical tool in examining thirteen ecommerce web sites. Petkov and Petkova (2006) demonstrated the usefulness of the work system framework by comparing grades of students who did and did not learn about the framework before trying to interpret the same ERP case study. The work system approach defines work system carefully and uses it as a basic analytical concept. In this study, the researcher developed the KM tool to support the curriculum

review process in HEIs with the guide of work system theory. According to Alter (2006), a WST is a system in which human participants and/or machines perform work using information, technology, and other resources to produce products and/or services for internal or external customers. This method is more broadly applicable than techniques designed to specify detailed software requirements and is designed to be more prescriptive and more powerful than domain-independent systems analysis methods such as soft system methodology (Alter, 2002).

The WST includes both static view of a current system in operation and a dynamic view of how a system evolves over time through planned change and unplanned adaptations. The static view is based on the "work system framework," which identifies the basic elements for understanding and evaluating a work system. This framework is useful in describing the system being studied, identifying problems and opportunities, describing possible changes, and tracing the likely impacts as those changes propagate to other parts of the system.

2.12 Summary

This chapter has provided an understanding on Higher Education Institutions' curriculum design and delivery. It also discusses the overview on Knowledge Management, practices of Knowledge Management in Higher Education Institutions and advantages of Knowledge Management in Higher Education Institutions. It further discusses on employability and Work System Theory (WST). Chapter 3 describes the research methodology used in this study.