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IT Competencies And The Conditions For Training Effectiveness

A Study On Malaysian University Clerical Workers

Rasli, Amran M.

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IT Competencies And The Conditions For Training Effectiveness: A Study On Malaysian University Clerical Workers

Amran Rasli, Ph. D. Thesis

April, 2005

Main supervisor: Professor Dr. Jon Sundbo

Department of Social Science,
Roskilde University, Denmark

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ABSTRACT

This thesis investigates the levels of IT competencies and the conditions for training effectiveness among Malaysian university clerical workers using both quantitative and qualitative research methods. Seven conditions that affect the transfer of IT training to the workplace according to the order of importance were identified based on an Expert of Opinion Analysis: organisational management, trainee characteristics, IT facilities, trainer competency, training methodology, organisational system and work culture. These conditions or constructs were formulated into semi-structured interview and survey questionnaire, which was answered by 21 interviewees and 554 respondents respectively. Qualitative data were transcribed and categorised to identify themes and patterns while quantitative data underwent traditional reliability and validity tests using Cronbach alpha and factor analyses. A major finding is that clerical workers acquire IT competence through informal training process particularly mentoring, self and experiential learning. However, informal training mode functions as a complement to formal training. A clerical worker normally acquires basic skills through formal training and will try to master advanced IT skills through informal training. Analysis of data indicated that most of the interviewees have high levels of competence in word processing, spreadsheet and communication and Internet. Findings from the Pearson correlation analysis is consistent with the Expert Opinion Assessment whereby the highest Pearson correlation value is for organisational management, while the lowest Pearson correlation value is for work culture. Differences of mean ranking for items measuring IT competence are attributed to age, work unit and academic qualification. Finally, all seven constructs are equally important but have varying impact on IT competence. Therefore, all seven constructs should be viewed in an integrated manner in accordance to the conceptual model proposed in this study.

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LIST OF ABBREVIATIONS

ASTD	American Society for Training and Development
BIC	Bureau of Innovations and Consultancy
BPR	business process reengineering
CAD	computer aided design
CEPP	Chemical Engineering Pilot Plant
C&I	Communication and Internet
DB	database
e-mail	electronic mail
EOA	Expert Opinion Assessment
FEGIS	Faculty of Engineering and Geo-Information Sciences
GCO	General Computer Operation
Gr	Graphic
GTA	General Technology Application
FMHRD	Faculty of Management and Human Resource Development
FSCIS	Faculty of Science Computer and Information System
HRD	human resource development
ICT	Information, Communication and Technology
IT	Information Technology
ITTEF	IT competence
KMO	Kaiser-Meyer-Olkin
LCD	liquid crystal display
MS	Microsoft
OHP	overhead projector
OJT	on the job training

OSHA	occupational safety and health act
Overall	Overall IT Competency
PC	personal computer
PDA	personal digital assistant
PPIPS	Islamic and Social Studies Centre
SAS	Statistical Analysis System
SPM	Sijil Pelajaran Malaysia
SPSS	Statistical Processing for Social Scientists
SRP	Sijil Rendah Pelajaran
SS	Spreadsheet
WP	Word processing
UIUC	University of Illinois at Urbana Champaign
UTM	Universiti Teknologi Malaysia

CHAPTER I

BACKGROUND OF THE RESEARCH

In today's new economy, organisations are continuously facing a number of global developments such as increasing complexity of technologies, high economic uncertainty and increasing speed within which innovations take place. The rapid development of the Internet, coupled with the improved capacity and capability of computers, has hastened the business process, thus forcing most organisations to restructure and reorganise themselves accordingly.

Such phenomenon also occurs in higher educational institutions. Acquiring large-scale information technology (IT) is seen as a strategic decision for some universities, even though the utilisation of computer technology may not be maximised. IT competence among university staff needs to be aligned to the changes within the organisation so that operational function is optimised in the age of the smart machine¹.

The problem is further compounded at the clerical level. University clerical workers provide support, so that many IT related transaction processing and office automation systems can function effectively within their departmental unit. The transaction processing system is defined as a type of information system that processes data related to routine business activities and serves the operational level of an organisation. In the higher educational environment, transaction processing systems at the operational level may include (a) administrative tasks involving students, such as admissions, enrolment and registration; (b) tasks related to accounting such as budgeting, procurement and inventory; (c) personnel tasks such as employment forms and payroll; (d) physical plant operational tasks such as room assignment, planning and maintenance; and (e) a variety of record keeping tasks (Abdul Karim, 1999). Whereas, the office automation systems can include functions such as report writing and electronic and/or paper correspondence to various internal and external clients.

Generally, IT system is restricted to the use of word processing, spreadsheet, database and mainframe application (Jerich, 2000). People who are associated with IT have only limited understanding of the tools they use, and believe that they are under-utilising them. Mostly, the

¹ In 1988 Zuboff wrote *In the Age of the Smart Machine: The Future of Work and Power* whereby pitfalls and promises of computerised technology are presented. Today, Zuboff's prophecy that advanced IT could present us with a fateful choice to continue automation or to "informatize" and empower ordinary working people could become a reality.

employees do not feel comfortable when working with the computers. There have been impressive claims for the potential benefits of IT that need to be proven so.

In Malaysian universities, the corporatisation² exercise has caused an abrupt decrease in the employment of support staff. As such, many support staff has to be retrained and expected to become multi-skilled as well as develop abilities to conduct multiple tasks concurrently. IT is seen as a vehicle to implement downsizing and right sizing exercises, as IT systems are seen as powerful tools that could become the panacea of all problems. Support staff has to be trained to become IT competent, so as to be able to fit into the continuously expanding digital environment within the university.

1.1 CONCEPT OF COMPETENCE

How did one get to be so competent? Was it the training programs one attended? These seemingly simple questions may provoke some deep soul searching to find the real answers. In many ways, competence is an illusive topic to understand. Certainly, everybody wants to become competent as our jobs depend on our level of competency. The importance of developing competence transcends from individual to the national level. For instance, by 1980, it was evident in the United Kingdom that there was a significant shortcoming of the general competencies necessary to meet the projected challenges of the next decade. In response to this national need, the British government overhauled its system of vocational education and established a new nationwide unified system aimed at improving vocational competences (Winterton and Winterton, 1999).

It is well established that competence is a prerequisite for a good performance at any job. The real challenge is how to develop competence and what factors really affect it? We know that the results of our work reflect the level of our competency. We develop our competencies through a series of experiences (i.e., undergo training, peer learning, etc). The end result is that we are able to perform competently. Thus, we conclude that competency building is a process rather than an event.

There are two schools of competency theory. One school deals with subject of individual competence whereas the other deals with organisational competence. At the organisational level, it is well

² In 1998, five public Malaysian universities including University Teknologi Malaysia (UTM) underwent an "initial corporatisation exercise" with respect to their management and system of governance. Once fully corporatised, all public universities are expected to generate their own income with the government financing only a fraction of the total expenditure.

documented that the pace and intensity of competition and stress within organisations is increasing rapidly, creating both failures and unprecedented opportunities (Drucker, 1995; Merry, 1995; Nonaka, 1998; Stacey, 1995).

The pressure of competition creates the need to develop competence because it forces organisations to constantly strive for improved performance by shedding old ways and looking for new possibilities to improve performance and bring innovative products to the market place (Stacey, 1995). Although at the macro level the issue of developing organisational competence is critical, the challenge of developing competence affects every individual employee throughout the organisation.

In addition to creating many opportunities for new products and services, marketplace forces have also created the need to develop new skilled employees within the organisations that are needed to meet the competitive conditions. The rapid changes in the character of the workplace have fundamentally changed the nature of jobs and have also demanded a different level of performance from employees. At one time, being able to perform one's own job was sufficient. Tasks were fixed and changes were few. Whereas, in today's globalised economy, there is mounting evidence that technical competence must be complemented with other non-technical competencies to meet the demands of the future (Evers, Rush and Berdrow, 1998). Organisations may have no choice but to undertake concerted efforts to develop their employees' individual competence.

In this thesis, individual competence will be viewed from the perspective of an individual's ability to apply personalised IT competencies within the workplace. According to Perry (1990), IT competence is a cluster of related IT knowledge, know-how and attitudes that affects a major part of an individual's job, role or responsibility that correlates with performance on the job. IT competence can be measured against well-accepted standards and can be improved through training and development. Throughout this thesis, the adjective 'competent', and the nouns 'competence' and 'competency' will be used interchangeably to denote a state of being able to perform a task or area of responsibility in a capable and qualified manner.

Another related issue is the classical problem of qualification versus competence. Does better qualification imply higher level of competence, or not? A study to assess attitudes towards computers by Steffen (1998) showed that the least educated groups of technicians showed a higher level of perceived ease of computer usage than their more educated colleagues. The same least educated group also had higher efficacy scores than the more educated groups. Does this imply that people who are competent need not be qualified? Qualification is an external acknowledgement that the

individual level of competence meets a given standard. It is some sort of an objective guarantee that a person has proven to have at least the minimal requirements to do a good job. Thus, in an ideal situation, a qualified person is always competent. However, according to Ellström (1998), "[qualification is] the competence that is actually required by the work task, or is implicitly or explicitly prescribed by the employer." (p. 41). Here, qualification is a sub-area of competence.

Though this study does not discuss whether qualification is a sub-area of competence or visa versa, however, it does look into whether IT competency could be attained through formal training or informal training or both. The closest this study would be to address the classical qualification-competency argument would be if one were to view formal training as a means for achieving a qualification while informal training as a mechanism to become competent!

1.2 WHY CLERICAL WORKERS?

Interestingly, there are limited studies on clerical workers - a group of employees that plays a big role in supporting top management. In some organisations, they are the "invisible majority" that gets little credit for any achievement, but will be the first to be blamed for mistakes made. Like the professional bureaucracies (Mintzberg and Quinn, 1988), universities place faculty in their most prestigious roles. In many respects, professional bureaucracy discounts the role of middle management and the supporting staff. College and university midlevel administrators and clerical staff are not faculty and are typically a non-contract group (Mintzberg and Quinn, 1988).

Within the context of IT utilisation, the bulk of problems in end-user computing are mainly in the clerical and administrative areas (Panko, 1984). In addition, the administrative section is also the first to be computerised and, according to Raymont (1989), is where half of end-user computing is done. Lowe (1992) also indicated that 55 percent of computer use in the workplace is done by clerical and administrative staff. These statistics highlight the importance of training to upgrade the IT competencies of clerical workers so that this group is not neglected and will move forward as the organisation progresses into the digital world of information super highways and parallel processing.

The Adventure of Getting to Know a Computer, originally conducted in 1983 (Carroll, 1987), is one important research project on how temporary office workers learn computing. The research was able to identify critical problems faced by new computer users. Most of these problems indicate the lack of a broad perspective on learning and effective facilitation. It's rather ironic that findings by Carroll are

still relevant even today. Since changes in administrators training programme have occurred only recently, many current administrators have not been exposed to the training necessary for mastering the technology competencies they need (Sianjina, 1997). Staff development programs, therefore, must be implemented to address the technological competence level of all administrators (Kearsley and Lynch, 1994; Mims, 1998).

1.3 OBJECTIVES

This research has the following objectives:

1. To explore the process of acquiring IT competencies among Malaysian university clerical workers;
2. To identify conditions for training effectiveness in order to enhance IT competencies among Malaysian university clerical workers;
3. To develop a model for IT competencies which links conditions for training effectiveness with clerical workers' demographic background;
4. To develop an instrument for measuring IT competence among clerical workers; and
5. To recommend policies which Malaysian universities might adopt to improve IT competence among clerical workers.

1.4 STATEMENT OF THE PROBLEM

An extensive examination of the literature produces numerous studies on the topic of competencies. However, there are very few studies related to IT competence and training effectiveness among university clerical workers. Based on my personal observation, many university clerical workers had undergone IT training but have shown minimal improvement in terms of improved IT skills. There are also numerous researchers and practitioners alike speaking of wasted training resources (Baldwin and Ford, 1988, Broad and Newstrom, 1992) and provide many possible reasons for the waste. Yet very few studies have attempted to assess how clerical workers acquire IT competence. Crucial to the success of any office computerisation is the need to look carefully at how clerical workers learn or master computer software because clerical workers are an integral part of the administrative system.

Many studies showed that there is a strong need to evaluate the competency level (Spencer and Spencer, 1993). Is the level of IT competence satisfactory after the clerical workers had undergone training? What conditions affect the transfer of IT training? How do these conditions relate to IT competence? Although there had been other researches on the aforementioned issues, there is a need to analyse these issues in an integrated manner so as to better understand the process of acquiring IT competence among university clerical workers.

1.5 STATEMENT OF PURPOSE

With the advent of IT, office environment and organisational structures at institutions of higher education are now more 'IT oriented' in order to provide better services to the university population. Accordingly, administrators realise that they have to equip their support staff with IT skills in order to ensure that the university operation would be efficient and effective at all levels. At the same time, conditions that affect the upgrading of IT competence of university clerical workers need to be properly researched to identify problematic areas in the transfer of IT training to the workplace. If university clerical workers are to succeed in a changing environment, it is vital that they become competent in the use of IT in their workplace.

The purpose of this study is to empirically and systematically investigate how IT competencies can be acquired and what factors are important to facilitate the transfer of IT training in order to enhance IT competencies. The study also aims to assess the level of competence among university clerical workers. In addition, the study will seek to discover possible relationship between factors that affect the transfer of IT training and IT competence as well as possible differences in IT competence based on demographic background of the clerical workers.

1.6 RESEARCH QUESTIONS

To address the aforementioned objectives and provide solutions to the research problem, five research questions were identified and formulated as follows:

1. How do clerical workers of a Malaysian university acquire IT competence?
2. What is the existing level of IT competence of clerical workers in the Malaysian university?

3. What are the conditions for effective training in order to enhance IT competencies among Malaysian university clerical workers and how are the conditions ranked?
4. What is the relationship between conditions for effective training and IT competence, and are there differences in IT competence and the conditions for effective training based on the background of clerical workers?
5. How do the conditions for effective training affect IT competence of clerical workers of the Malaysian university?

1.7 SIGNIFICANCE OF THE STUDY

To date, the study of IT competency development of staff personnel in higher education has received limited investigation. Cuthbert (1996) states that universities conduct numerous investigations to explore human resource management and professional development of staff personnel in a range of public and private sector contexts but neglect to study, utilise or adopt human resource development practices to the management of their most important resource within their institutions - their staff. Peterson and Spenser (1991) state that only studies obtaining perceptions of students, faculty and administrators regarding student, faculty and administrator work climates have been conducted within the higher education environment. Visscher (1988) clearly indicates that research on clerical and administrative staff lack empirical studies and does not receive attention in educational literature.

This study is significant because it attempts to utilise more than one research method or data collection technique, as each method refers to a different dimension of the research problem. A combination of qualitative and quantitative methods is used in the study. Data sources from the content analysis, structured interviews and observations will be followed by survey questionnaire conducted on clerical workers and will be supported by an assessment of opinions by experts.

The second important factor of this study is that it identifies conditions that contribute towards clerical workers' ability to enhance IT competence. What causes the effectiveness (enablers) and ineffectiveness (barriers) of IT competence need to be studied and understood. A tested and tried conceptual model derived from the study would be beneficial for universities in planning their training and development activities for their clerical workers.

Findings from this research could also provide the input for the development of cohesive long term training programs, professional development activities and organisational restructuring that could

provide methods to upgrade their existing proficiencies and acquire new skills as well as redefine job specifications. Additionally, the findings will provide input for the following areas:

1. The contribution towards the body of knowledge on IT competence among university clerical workers;
2. The preparation of guidelines for human resource development (HRD) administrators and policy makers in the reduction of barriers and/or enhancement of enablers that will enhance IT competence for university clerical workers.

Finally, the study will provide opportunity for university clerical workers to provide valuable feedback and present ideas to meet their job-related requirements. The findings from the study will provide insights into the extent to which perceptions of university clerical workers vary by the influence of education, job classification, length of administrative experience, years of experience in the current job classification and work unit employed. The study also provides information regarding the extent to which administrative job duties and responsibilities may have changed due to changes in technology and the re-engineering of business operations and procedures. This information can be used to compare the extent to which current knowledge and skill requirements are perceived as important by private sector as compared with current civil service administrative job classification guidelines.

1.8 RESEARCH STRATEGY

This is an inductive and exploratory research using the factor approach in building a model for assessing the effectiveness of transfer of IT training among Malaysian universities clerical workers. A combination of both qualitative and quantitative methods, i.e., triangulation, will be used for this study. At the first level, the problem is of an unstructured nature and therefore, the qualitative methods would work. At the second level, quantitative methods would be useful as hypotheses need to be tested out. It is generally accepted by proponents of complementarity that, for inductive and exploratory research, qualitative methods are more useful as they can lead to hypothesis building in the quantitative methods (Raduan, 1999). Yin (1994) recommends that for all significant issues, triangulation should be used so that data collected could not only provide multiple perspectives but also give multiple types of information that could provide convergent evidence on an issue.

Greene et al. (1989) listed another four purposes for the use of mixed methods, including (1) complementary (examining overlapping and different facets of a phenomenon), (2) initiation (discovering paradoxes, contradiction and fresh perspectives), (3) development (using the methods sequentially, such that results from the first methods inform the use of the second method), and (4) expansion (mixed methods adding breadth and scope to a project). The research strategy formulated for this study is presented in Figure 1.1.

1.9 DEFINITION OF KEY TERMS

The following definitions were consistently used in this thesis:

IT skills training programme: training programme developed by the Computer Centre of the university that equips trainees with a comprehensive set of IT skills on the software and hardware application.

Trainees: clerical workers who had completed at least one IT related skills training programme since 1996.

Transfer of training: the effective and continuing application, by the trainees to their jobs, of the knowledge and skills gained in training - both on and off the job (Broad and Newstrom, 1992).

University clerical workers: this term encompasses all persons who support the executives and managers within the administrative setting. As such, this study focused on the following categories of workers at Malaysian universities: personal assistants (senior stenographers), stenographers, chief clerks and clerks.

IT competence: a cluster of related IT knowledge, know-how and attitudes that affects a major part of one's job (a role or responsibility), that correlates with performance on the job, that can be measured against well-accepted standards, and that can be improved via training and development (Perry, 1990).

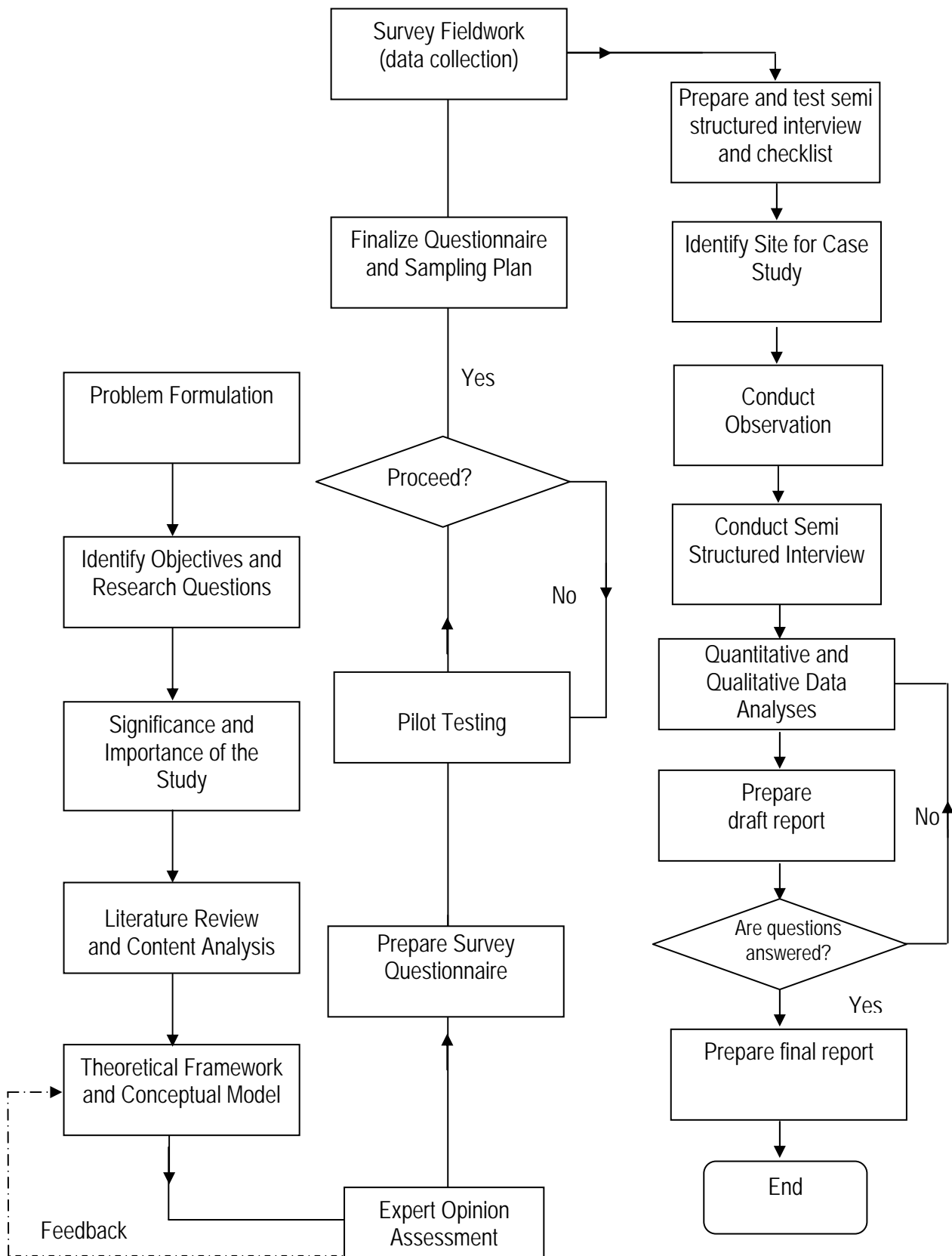


Figure 1.1: Research Strategy

1.10 PLAN OF THE THESIS

The introductory chapter of this thesis presents the background of the research and a basic concept of competence. It also outlines the objectives, statement of research problem, statement of the purpose, research questions and significance of the study. In addition, it provides important definitions of key terms of the study. Chapter II is devoted to a review of concepts of competence, training transfer mechanisms and IT training and development models. The review of literature starts by discussing issues related to IT, work and change. Subsequently the Durand's model on the dynamics of competency building will be elaborated. More emphasis is given towards the Baldwin and Ford model for transfer of training. Chapter III discusses the theoretical framework and conceptual models and research hypotheses for the study. Chapter IV provides an overview of the methods for the study and the research design as well as the sampling frame for the study. The chapter commences with a discussion on the triangulation method used for the study. Rationales for using case study as a qualitative method by utilising semi-structured interviews, observations and document reviews are provided throughout the chapter. The chapter concludes by discussing the expert opinion assessment and survey questionnaire for the quantitative methods. Chapter V provides the findings of the qualitative and quantitative methods based on the Miles and Huberman (1984) technique as well as descriptive and inferential analysis respectively. Chapter VI discusses the conclusions of the study with a discussion on the findings and contributions of the study as well as the direction for further research.

CHAPTER II

REVIEW OF LITERATURE

This section started with a brief discussion on the higher educational institutions in Malaysia including Universiti Teknologi Malaysia (UTM) as this study was conducted using questionnaires at 24 higher education institutions as well as interviews and checklist at UTM. Following this, a discussion on IT, work and change and an examination on the Durand's (1998) model on the dynamics of competency building will be detailed. Subsequently, the Baldwin and Ford model for transfer of training and Bostrom et al. (1988) Learning/Using Software Model was elaborated to develop the theoretical framework and conceptual models as well as the formulation of research hypotheses and propositions for the study.

There is a general agreement among university staff that attitudes toward the acceptance of computer technologies, the capability to use computer technologies, the level of administrative support and the availability of structured training modules have positive impact on the process of implementation of computer technologies at work (Hignite and Echternacht, 1992, Shifflett et al., 1993). Uncooperative or resistant users have proven the downfall of even the most well managed computer system implementation.

2.1 HIGHER EDUCATION INSTITUTIONS IN MALAYSIA

Higher education in Malaysia during the colonial era was based on the objectives of the British in strengthening the roots of colonial intellectualism that had been grounded in the earlier phase of education. English was used as the medium of instruction, as a result of which not many natives benefited from the system, as many attended Malay medium of education in their pre-university education. The main purpose of colonial higher education in Malaysia was to provide education and training for the native bourgeoisie and other elite groups. In this way, the ex-colonizer could maintain the Western style of administration, legislation, banking, judiciary and education even after the decolonisation of the land.

Although Malaysia obtained political independence in 1957, nevertheless the British continued to capture and control the Malaysian minds through the neo-colonisation process. In the early phase of

neo-colonisation, the establishment of higher education was modeled after the British in its governance, structure, curriculum, teaching faculty and use of English as the medium of instruction. In addition, periodic evaluations, such of university programs or the teaching faculty, was done by the ex-colonizer.

It was only in 1949 (i.e., after nearly a century of British colonisation) that the first university in the form of University Malaya was established. Between the years 1969-1972, four more public universities were established to provide equity and access to higher education. The expansion of higher education was partly fueled by social demand and the belief in the intrinsic values of higher education. It was during this time that (Universiti Kebangsaan Malaysia) UKM was established, which provided an opportunity for the Malay population to pursue higher education in the Malay language. Thus, English is no longer the only means to acquire knowledge and to engage in intellectual discourse, as UKM emphasized the indigenization of knowledge, which was a breakthrough in the knowledge industry.

The expansion of public universities from 1973 to the turn of the century has emphasised Malaysian government's efforts to continuously produce an educated and knowledgeable workforce by using human capital theory as a proxy for manpower planning. Now, Malaysia has altogether seventeen universities which include: (1) Kolej Universiti Islam Malaysia, (2) Kolej Universiti Kejuruteraan & Teknologi Malaysia, (3) Kolej Universiti Kejuruteraan Utara Malaysia, (4) Kolej Universiti Sains & Teknologi Malaysia, (5) Kolej Universiti Teknikal Kebangsaan Malaysia, (6) Kolej Universiti Teknologi Tun Hussein Onn, (7) Universiti Islam Antarabangsa, (8) Universiti Kebangsaan Malaysia, (9) Universiti Malaysia Sabah, (10) Universiti Malaysia Sarawak, (11) Universiti Pendidikan Sultan Idris, (12) Universiti Putra Malaysia, (13) Universiti Sains Malaysia, (14) Universiti Teknologi Malaysia, (15) Universiti Teknologi MARA, (16) Universiti Utara Malaysia, and (17) Universiti Malaya.

2.1.1 Case Study: Universiti Teknologi Malaysia

Universiti Teknologi Malaysia³ (UTM) is often described as Malaysia's flagship technical institution. Of the 17 public universities established by the Ministry of Education, UTM is the oldest technical university with an enrolment of almost 30,000 students taking diploma, degree and postgraduate studies. Among the existing universities, UTM is considered to be the most IT-oriented institution by

³ A more detailed 'history' and current activities of UTM is presented in Annexure 1.

being the first to have a one-staff-one-PC policy to ensure all staff has access to IT. Further to this, UTM is currently embarking on a very ambitious project to be the first Malaysian university to be accorded world-class status by 2010. In Malaysia, UTM is the first university to be awarded the prestigious Prime Minister Quality Award. It is interesting to note that one of the major criteria to win this award is related to the application of information technology to the organisation. Due to the aforementioned achievements, the uniqueness of UTM makes it an interesting subject for research, thus providing sufficient justification to conduct a case study research at UTM accordingly (Yin, 1986).

2.1.1.1 UTM's Strategic Plans

In the year 2020, Malaysia, would have achieved the status of a scientific and progressive nation and evolve from a consumer of technology to a contributor to the scientific and technological civilisation of the future. This is clearly stated in Vision 2020. In playing its role to support the country's Vision, UTM will seek to maintain its position as the main contributor in developing technical expertise in the country and has taken steps to improve its programs and facilities in order to be more focused on and supportive of the key sectors identified as targets in the Vision. To achieve this objective, UTM has already taken several strategic steps by adjusting its structure and practices to be more flexible and responsive to the needs of industry, introducing mechanisms to increase industrial experience of staff and developing an entrepreneurial and outward-looking approach in both staff and students. As such, UTM has reviewed its vision statement as follows: "To be a World Class centre of academic and technological excellence through creativity."

Other steps taken include developing an integrated database of industrial contacts and increasing opportunities for participation and collaboration between the private sector and the University. A mechanism to support the industries already exists, and it guarantees efficient and speedy response. Postgraduate, "post-experience" and part-time study programs have been enhanced in order to be relevant to the industries besides creating a critical mass for research and development (R&D) between the different focus groups with the objective of producing products or technology which could be applied and commercialised.

2.1.1.2 UTM in the IT Era

As an institution of higher education, UTM has been using IT in its administrative activities since 1975. Development and utilisation of IT continued to expand until today whereby most of the administrative activities are incorporated with some form of IT. As of now, UTM has an enrolment of almost 30,000 students which has to be administered efficiently and effectively in activities related to teaching and learning. With intense competition for quality staff coupled with the directive to reduce the number of supporting staff, a comprehensive application of IT in all possible activities is inevitable. A comprehensive IT master plan was prepared in 1996 with a vision for UTM to become a Cyber Campus. The Cyber Campus Project aims to apply information and communication technology in the teaching and learning processes throughout the campus as well as in the students' activities, management and administration of academic affairs and the general institutional administration. The project was officially launched by the Education Minister on 16 June, 1997. The project is to provide programmes in the following areas:

1. The development and enhancement of application systems
2. The enhancement of communication infrastructures
3. The enhancement of computer facilities and equipments.

The development and enhancement of application system involve designing application systems for e-learning and academic related management to facilitate the use of IT and teaching and learning process. The application systems developed are categorised into three: (i) application system for teaching and learning; (ii) application system for academic management; and (iii) application system for general management. The application of system for teaching and learning process includes video-conferencing-based teaching, learning on demand, electronic library and smart classrooms as well as multimedia and courseware aided learning. For the academic management application system, programmes developed include on-line student admission and records, on-line course and subject registrations, student information systems, academic schedule system and student examination system. Office automation, financial information system and student affairs system are among the general management application systems developed and used at UTM.

Programmes for the enhancement of communication infrastructure focused on the installation of IT infrastructures to create a "networked university". This includes the upgrading of bandwidth in the university networking, broadening the fibre optic backbone and installing networking facilities to

lecturers' rooms, lecture halls and laboratories. In addition, students' colleges and rooms are now connected to application systems related to teaching and academic management.

In order to support the third application, students and staff of UTM must be equipped with computer hardware and software facilities and equipments to enhance and facilitate the use of IT in teaching and administration processes. Therefore, programme for enhancement of computer facilities and equipments involves the allocation of personal computer to each academic staff, the installation of application server to faculties and departments, the installation of audio-visual material, video terminal and teaching courseware that is linked to video-on-demand, real audio and servers.

The Cyber Campus Model is presented in Figure 2.1. The Cyber Campus envisioned by UTM is a concept that incorporates integration and exploitation of IT potential in all activities and functions. From the physical concept, the Cyber Campus development would implicate the following: (1) comprehensive infrastructure upgrading for multimedia communication, (2) development of systems application including smart cards, (3) preparation of teaching and learning material based on IT, (4) upgrading of IT equipment and facilities for smart labs and lecture halls. As of now, any UTM student (including off-campus) will be able to conduct the following activities on-line:

- Registration, checking add/drop subjects
- Attend courses through video conferencing and interactive on-line communication
- On-line reference to materials from library
- Review academic progress (exam results, CGPA etc)
- E-mail and internet access
- Campus wide information systems access

Even though the Cyber Campus Project is now in its ninth year, its blueprint is still referred to by UTM. In the modern age of privatisation and outsourcing of non-core business activities, IT support is still considered as an important function at UTM.

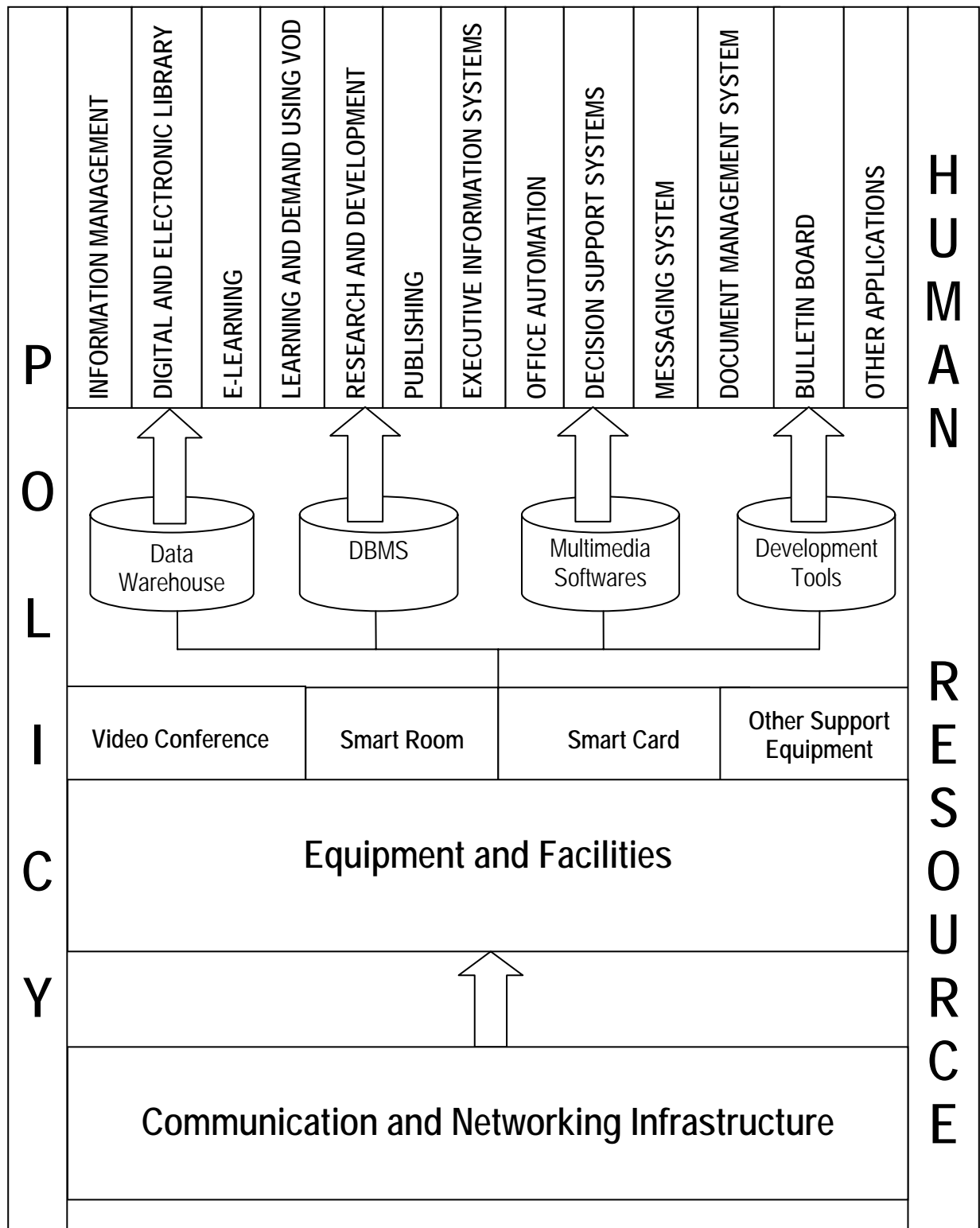


Figure 2.1: UTM Cyber Campus Model

With the development and implementation of IT based teaching and learning processes and various application systems under the Cyber Campus project, it is important that staff of UTM should be

sufficiently skilled and competent in utilising the systems. Though academic staff and administrators may be IT competent, the supporting staff especially clerical workers need to be equipped with relevant IT competencies to be able to adapt within the changing working environment. With regard to IT competencies, the staff, in this case, clerical workers would need to be equipped with the appropriate knowledge of IT and IT skills suited to their job specifications. More importantly, the staff would need to be able to harmonise complex stream of technology and work activities in order to perform their tasks competently.

2.1.1.3 Repercussions on the Staff

UTM had introduced several changes in the areas of administration, management and human resource development as part of its preparations for the future. The implementation of the New Remuneration Scheme (SSB) in 1991 as a replacement for the Cabinet Committee System had brought a totally new approach towards the staff's performance appraisal within the university system. Perhaps the most critical change was the introduction of Modular Work Process System in 1993 that was a step towards decentralisation based on the capacity and needs of a particular unit. Accordingly, management and human resource development related activities under the registrar's office were offloaded to departments and faculties. The role of the registrar's office was limited to coordination activities only (Berita Unitek: Nov, 1994). Finally, the corporatisation policy, imposed on all public higher educational institutions in 1996, was aimed at promoting efficiency within the institutions. The policy was introduced to inculcate corporate governance within public universities. The policy resulted in setting new trends in running universities in Malaysia. Universities were urged to be efficient, transparent and most importantly, financially able (if not independent). The first step taken by most universities was to limit the intake of non-professional employees. Subsequently, several non-academic employees were reassigned to different duties and selected units were privatised with the intention of making public universities more flexible, commercial and autonomous especially from the aspect of human resource development. Accordingly, public universities were given more freedom to determine their future. UTM took the initiative of the newly found freedom to develop several important projects such as the Technovation Park and Cyber Campus.

The Cyber Campus project will have different effects on staff based on their different job specifications. An academic staff will effectively be able to prepare teaching materials, consult and advise students, input examination results, conduct lectures via video conferencing, gain access to

campus wide information system, develop and maintain personal homepage, utilise messaging system, conduct collaborative publication activities, utilise electronic library and conduct research activities. The academic staff is expected to be able to process data at a faster rate using supercomputers, refer to scientific data electronically and utilise various softwares for analytical activities effectively.

Finally for the non-academic staff, he or she will effectively be able to conduct electronic based discussions and meetings, conduct projects using groupware (virtual teams), carry out on-line administrative activities, communicate via video conferencing, conduct integrated financial management and e-commerce and have campus-wide information systems access. Various academic and administration systems have been developed to ensure quality of services for the campus population.

2.2 IT, WORK AND CHANGE

IT needs to be fully utilised to enhance or upgrade the quality of working life for clerical workers and administrative staff. Work life demands a lot of attention for two reasons. Firstly, computerisation has touched the lives of people more visibly in their work than in any other kind of setting -- homes, schools, churches, banks and so on. Workplaces are good places to examine how the dreams and dilemmas of computerisation really work out for large number of people under an immense variety of social and technical conditions. Secondly, the way that people work influences their dealing with IT systems and the practical forms of computerisation. For example, Baily and Attewell (from Kling, 1996) argued that computerisation has had less influence on the productivity of organisations because people integrate computers into their work so as to provide other benefits to themselves, such as producing more professional-looking documents and enhancing their esteem with others, or managers becoming counterproductive control-freaks with computerised reports.

2.2.1 The Transformation of Office Work

Office work has always involved keeping records. However, not many detailed accounts of the earliest offices are available. Today, offices with dozens of clerks conducting similar tasks are very common. Before the twentieth century, the majority of offices were small and were often the

workplace of a single businessman or professional who kept informal records (Delgado, 1979). The shape of offices, the way work is organised, the role of women in their operation, the career lines, and office technologies have been radically transformed in the last 100 years.

In the early twentieth century, the technologies and organisation of office work underwent substantial change. Firms began to adopt telephones and typewriters, both of which had been invented recently. By the 1940s, many manufacturers devised electromechanical machines to help manipulate, sort and tally specialised paper records automatically (Kling, 1996). Some of the more expensive pieces of equipment, such as specialised card-accounting machines, were much more affordable and justifiable in organisations that centralised their key office activities. While new equipment was often adopted to enhance the efficiency of offices, its use was tied to more widespread changes in the shape of organisations: the shifts in control to central administrators, and an increase in the number of jobs that were mostly being filled by women. Women in their early to mid-twenties, began to work in offices as typewriter operators and clerks, and were typically viewed as short-term job-holders working between school and marriage.

In the 1960s, selected businesses such as insurance companies and banks as well as public agencies adopted computer-based information systems on a large scale (Kling, 1996). Many of the early digital computer systems replaced electromechanical paper-card systems. The earliest systems were designed for batch operation. Clerks filled in paper forms with information about a firm's clients, and the forms were then periodically sent to a special group of keypunchers to translate the data onto cardboard cards known as Hollerith cards (Senn, 1998). The punched cards were then taken to a data-processing department for a weekly or monthly "run", during which time records were updated and reports were produced. Errors often took a few cycles -- sometimes weeks or months -- to be identified and corrected. Computerised systems during this period required immense precision and care, since inaccuracies were detected and corrected very slowly. In addition, the data from one information system were usually formatted in a way that did not make them accessible to other systems. Professionals and managers often waited several months for a new report, and reports that required data to be merged from several separate systems were often viewed as prohibitively complex, time-consuming, and expensive to create. The earliest computer systems were speedier in processing large volumes of highly specialised transactions. But they were also very rigid and cumbersome for many people who used them (Senn, 1998).

Furthermore, specialised programmers, who were organised into specialised data-processing departments, usually wrote the transaction-processing and report-generating programs. Often, the

large specialised computer systems, their operators, and their programmers were all located in basement offices--isolating them from organisational life. During the last 25 years, most organisations have reorganised their computer-based information systems to be more responsive and flexible, and to support a richer array of organisational activities. Terminals connected to shared databases or microcomputers are commonplace in today's organisations (Kling, 1996).

During the 1980s and early 1990s, virtually every organisation bought personal computers or PCs and workstations (Senn, 1998). But the "PC revolution" did not just changed the nature of office equipment -- it expanded the range of people who use computers routinely to include a much larger fraction of professionals (who are often men) -- managers of all kinds, architects, accountants, lawyers, and so on. Many larger organisations are beginning to use computerised communication systems -- like electronic mail -- to help managers and professionals keep in contact when they are out of the office. And a few organisations are experimenting with pushing some of their staff out of regular offices and creating "virtual offices" in locations closer to their clients, their homes, and other more convenient (and less costly) locations.

Since the last decade many larger organisations have been restructuring work methods (Kling, 1996). Decentralisation of administration became the trend of the 1990s. Some analysts touted these restructurings as by-products of computerisation. But many of these changes were often unrelated to computerisation. For example, in the early 1990s, many top managers restructured their organisations so as to eliminate layers of managers below them ("delayering"). Some analysts argued that the use of electronic mail and computerised reporting systems enabled this flattening of corporate hierarchies. Similarly, in the United States recession of the late 1990s, many organisations laid off numerous workers, and the remaining staff often worked much harder and much longer hours (Kling, 1996). It's not clear whether computerisation had any significant influence on this pattern. Still, many organisations restructured their employment contracts so that they could have a much larger fraction of readily dispensable part-time and/or temporary employees than before the recession. This approach created fewer full-time jobs with good career opportunities in specific organisations, and is probably unrelated to computerisation.

Today, a typical clerk is more likely to use a variety of powerful computer systems than his/her counterpart ten and certainly fifteen years ago. The computer has capabilities to merge data from various sources and perform multiple processing simultaneously. But have jobs improved in a way that is commensurate with the technical improvement in computer systems? This is a key question that will be examined from several vantage points in this section.

2.2.2 IT and New Ways of Organising Work

An important aspect of work life is the issue of who controls the way work is organised, the way people communicate, and the workers' levels of skills. In the 1980s, many professionals became enamoured with microcomputers (Kling, 1996). The microcomputers became the new electronic typewriter for writers of all kinds. Engineers set aside their slide rules and electronic calculators for softwares that mechanised their calculations and produced graphical data displays. Accountants helped to drive the demand for microcomputers with their passion for computerised spreadsheets. Many professionals became hooked on the relative ease and speed of their computer tools, and dreaded any return to manual ways of working. They often adopted and adapted computers to their work in ways that enhanced their control over their work products. Work still remained labour intensive but work has become more fun, or at least less tedious.

Some authors argue that the industrialisation of clerical work sets the stage for the industrialisation of professional work as well. In The Social Dimensions of Office Automation, Abbe Mowshowitz summarises his sharp vision in these concise terms:

Our principal point is that the lessons of the factory are the guiding principles of office automation. In large offices, clerical work has already been transformed into factory-like production systems. The latest technology--office automation--is simply being used to consolidate and further a well-established trend. For most clerical workers, this spells an intensification of factory discipline. For many professionals and managers, it signals a gradual loss of autonomy, task fragmentation and closer supervision--courtesy of computerized monitoring. Communication and interaction will increasingly be mediated by computer. Work will become more abstract . . . and opportunities for direct social interaction will diminish (Mowshowitz, 1986).

Some analysts have hoped that new computer communication technologies, such as electronic mail, would enable workers to bypass rigid bureaucratic procedures (Hiltz and Turoff, 1978). Some analysts have found that electronic mail can give groups more ability to develop their own culture (Finholt and Sproull, 1990). And some have hoped that electronic mail would reduce the barriers for communication between people at different levels of hierarchy in an organisation. But the evidence is mixed. Zuboff (1988) reports an interesting case that can dim these unbridled enthusiasms and lead us to ask under what conditions they are most likely to occur. In a large drug company she studied, managers claimed that their communications to electronic groups were often treated as policy statements, even when they wanted to make an informal observations or ad-hoc decisions.

2.2.3 The Integration of Computing into Work

The vast majority of articles and books about computerisation and work are written as if computer systems are highly reliable and graceful instruments. There are relatively few published studies⁴ of the ways that people actually use software systems in their work -- which features they use, to what extent they encounter problems with systems or gaps in their own skills, how they resolve problems when difficulties arise, how the use of computerised systems alter the coherence and complexity of work and the likes.

There does not seem to be simple answers to these questions. Some organisations computerise some jobs so as to make them as simple as possible. An extreme example is the way that fast food chains have computerised cash registers with special buttons for menu items like cheeseburgers and malts so that they can hire clerks with little math skill. Kraut, Dumais, and Koch (1989) reported a case study of customer service representatives in which simplifying work was a major consequence of computerisation.

As such, it is common for images of simplification to dominate issues about computerisation, regardless of the complexity of systems. Clement (1990) reports a case of computerisation for secretaries in which managers characterised new systems as "super typewriters" which did not require special training; they were very mistaken. Many of the popular "full featured" PC software packages for text processing, spreadsheets, and databases include hundreds of features. Narratives, which focus on the capabilities of systems usually, suggest that people can readily have all the advantages that all the features offer; actual behaviour often differs from these expectations. Most people who use these powerful programs seem to learn only a small fraction of the available capabilities--enough to do their most immediate work. Moreover, it is increasingly common for many workers to use multiple computer systems, often with conflicting conventions, further complicating people's ability to "use computer systems to their fullest advantage". Some of these dilemmas can be resolved when organisations adopt relatively uncomplicated systems and train their staff to improve their IT competence.

⁴ Napier et al. (1992) conducted a study on Lotus software and found out that only 27 Lotus commands were frequently used.

2.3 THE DYNAMICS OF COMPETENCY-BUILDING: DURAND'S MODEL

The pressing need created by dynamic market turbulence has lead many researchers to the conclusion that organisations must adopt a competence-based approach in order to survive impending changes (Durand, 2000). According to Stacey (1995), experts have projected that a majority of companies currently rated as "excellent" will significantly slip in their standings over a five year period, largely due to their inability to develop the competencies needed to perform in the rapidly changing marketplace. Developing competencies is truly a significant problem, even for the largest of organisations.

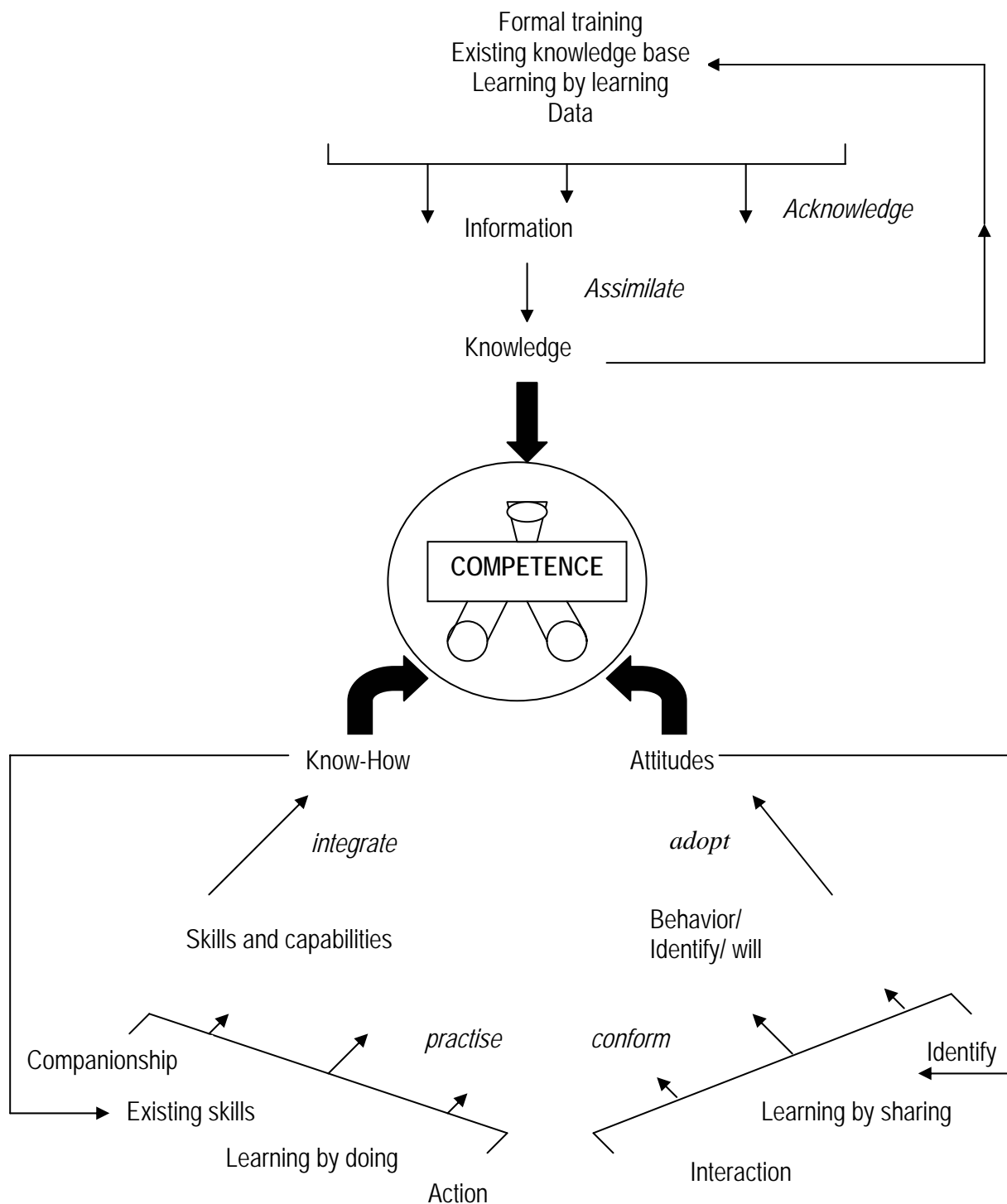
Organisational competency, however, cannot be understood in the absence of individual competence as Winterton and Winterton (1999) showed that individual competency impacts the competency level of the broader organisation⁵. As such, Durand developed a simple integrated model that could be applied to both individual and organisational competency.

2.3.1 Three Generic Dimensions of Competence

At the heart of the Durand model are three dimensions of competence: knowledge, know-how and attitude (Figure 2.2). There is a simple elegance in these three dimensions of Durand's model. Interestingly, Durand suggests no particular priority or preferred order of dimensions. It seems intuitive, however, to start with the dimension of knowledge that Durand (1998) defines as:

. . .structured sets of assimilated information which make it possible to understand the world, obviously with partial and somewhat contradictory interpretations. Knowledge thus encompasses the access of data, and the ability to enact them into acceptable information and integrate them into pre-existing schemes, which obviously evolve along the way. (p. 318)

⁵ Though this study focuses primarily on individual clerical worker's IT competence, it has a tendency to discuss the overall university competence from time to time.

Figure 2.2: The Dynamics of Competency-Building⁶

The next dimension is know-how. Durand views this as action oriented in contrast to knowledge, which is viewed in a more passive context. Durand (1998) defines know-how by stating that it:

⁶ Source: Thomas Durand's (1998) "The Alchemy of Competence" in G. Hamel, C. K. Prahalad, H. Thomas and D. O'Neal (Eds.), *Strategic Flexibility: Managing in a Turbulent Environment* (p. 325).

. . .relates to the ability to act in a concrete way according to predefined objectives or processes. Know-how does not exclude knowledge but does not necessitate a full understanding of why the skills and capabilities, when put to operations, actually work. Know-how thus relates in part to empiricism and tacitness. (p. 318)

In this sense, the know-how dimension is concerned with the ability to apply knowledge to a given situation or task. But more than just the application of pure knowledge, it presupposes learning of the skilful application through such activities as observing others perform a job, or by personally doing the work over a period of time. It also implies the use of technique (Durand, 2000) and by its nature is active and requires the individual to be engaged physically as well as mentally. In this dimension, Durand places special emphasis on the transfer of tacit knowledge. Polanyi (1983) indicates that tacit knowledge may be defined in different ways. Tacit knowledge, as used by Durand, implies the transfer of skills through observation of someone else performing the work at hand.

The last dimension is what Durand calls "attitudes". At first glance, this dimension may be difficult to comprehend as a unified conceptual model because the dimension is composed of a variety of somewhat diverse social, cultural and self-image factors that act upon the individual's ability to develop his/her competence. Although the essence of this dimension is potentially quite broad, Durand (2000, p. 79) simply describes the dimension as one that "reflects behaviours, commitment and culture".

Durand (2000) challenges that these attitudinal factors are often overlooked in the study of competence. He attributes this lack of attention to the possibility that many researchers on the subject are more interested in economic factors such as those that may be involved in the study of organisational competence (Durand, 2000). In defining attitudinal factors, he states (Durand, 1998):

We believe that behaviour but even more so identity and will (determination) are essential parts of the capability of an individual or an organization to achieve anything. We argue that a dedicated organization, eager to succeed, is more competent than a demoralized, passive one with exactly the same knowledge and know-how. (p. 318-319)

Though Durand's model would suffice to elaborate on the dimensions of knowledge, know-how and attitude within the context of IT, further review within the context of computer literacy and technophobia (an attitudinal factor) needs to be discussed accordingly.

2.3.2 Acquisition of IT Knowledge and Know-how

How do university clerical workers acquire knowledge and know-how in IT? The answer to this question is important, as it will reveal whether clerical workers are equipped to apply IT to the work place. Jacobsen and Weller (1987) sought to answer this question in a survey of business faculty at the University of Illinois at Urbana Champaign (UIUC). The survey on 144 faculty members of UIUC School of Humanities showed that staff acquired IT knowledge and know-how in a variety of ways. The most frequently cited way was self-training (79 percent), followed by assistance from colleagues (47 percent), courses and workshops (13.2 percent) and sessions with IT consultants (12.5 percent). A similar study by Barger (1987) found that almost half of the respondents indicated that they learnt how to use the personal computer by means of self-paced tutorial. The balance was split among classes, co-workers and trial and error methods.

2.3.3 Components of IT Knowledge and Know-how

Another question related to knowledge and skills in IT that has received much attention is: What are the components of knowledge and know-how? How do we know if an individual has knowledge and know-how in IT? How do we differentiate computer literacy from computer?

Arnold (1997, p. 36) defined computer literacy as "knowing what a computer is concretely and abstractly . . . an understanding of how the hardware works . . . understanding of what a programme (is) and experience with some techniques for constructing programs . . . understanding how complex systems are constructed out of simpler ones, both in the hardware and software media". On the other hand, Marsh stressed that all computer users today should know "basic information about operating a computer and should master an integrated package composed of word processor, database and spreadsheet"(1997, p. 14).

The terms "technology literacy" and "technology competence" were used on numerous occasions in the literature when dealing with the issue of educational administrator responsibilities with regards to technology. Kearsley (1990) addressed the concept of technology literacy within schools:

If you are involved in educational administration at any level, you need to develop a sophisticated understanding of what computers can do and how they can be applied to education. If you are going to be responsible for administering schools full of computer literate teachers and students, then it follows that you better be computer

literate yourself. Furthermore, everyone agrees that we need to increase the productivity of our school system. Computers can help do this in a big way, but only if their potential is properly understood. To make your school or school system more productive, you need knowledge to make good decisions about computer use. (p. 45)

Computer literacy is closely related to IT knowledge and know-how. According to Simonson et al. (1987), an individual is said to be computer literate if he/she has (1) a positive attitude including an anxiety free willingness or desire to use the computer, and a sense of computer responsibility; (2) the ability to responsibly evaluate, select and implement a variety of practical computer applications to do meaningful and efficient work based on understanding of general types of applications, capabilities and limitations of types of applications and societal impact of specific applications; (3) the appropriate knowledgeable use of hardware and software necessary for computer applications; and (4) the ability to direct the operation of the computer through the skilful use of programming languages.

Specific computer skills should likely be referred to as competencies. However, the question arises as to whether the understanding and knowledge of computers (literacy) should be separated from computer skills (competencies). Blomeyer and Clemente (1997) proposed recasting "the existing idea of computer literacy as a technological competency process" (p. 1). This idea was supported by Bluhm's (1987) statement: "In a practical sense, computer literacy can be defined in terms of the competencies administrators, lecturers, and students should acquire about computers and their applications" (p. 2). For the purpose of this study, I have assumed Bluhm's (1987) definition, yet has used the term IT competence due to the specific computer skills which were investigated. Regardless of the terminology used, the literature indicated a tremendous need for technology competence by university administrators. Tanner and Holmes (1985) stressed the importance of this need when they stated:

We perceive the microcomputer and technology to be servants of the persons who are involved in planning, research, and decision-making - not their masters. Hence, the microcomputer is a sophisticated hireling, where the sophistication is dependent upon the master as well as the servant. (p. 8)

From the above definitions, it can be seen that there are generally three elements to the term computer literacy: (1) computer structure and operation; (2) computer applications and limitations; and (3) computer programming. The first two elements are not a problem. There seems to be a clear consensus in all of the definitions that these two elements are a necessary part of any computer

literacy programme. The third, computer programming is a more controversial element. Within this context, understanding the workforce requirement becomes a critical issue, as programming requirements will vary by workforce. For example a clerical worker does not need to master programming skills as compared to his/her superior or the academic staff and management.

As such, for the purpose of this study, Marsh's (1993) definition is deemed to be more relevant for clerical workers as compared to the first two, as the element of programming is ignored in it. However, the importance of Internet should not be neglected as it is seen as a power element to be considered.

Furthermore, knowledge or skills of any tool are meaningful if they are acquired in the context of learning how to effectively use that tool. Jonassen (1996) summarises this point in the following statement:

. . . . learning about computers should be situated in the act of using the computer to do something that is useful, meaningful and intellectually engaging. If the task consists of something that is relevant to the learners or important to their educational lives, students will learn and comprehend more about the computer than they will from memorizing definitions. (p. 9)

Unfortunately, little attention has been given to providing the training necessary to help administrators become computer literate (Kearsley, 1990; Mims, 1998). Therefore, more emphasis should be given to provide meaningful computing skills to administrators (Sianjina, 1997).

2.3.4 Attitudes Towards IT

The study of attitudes, as they are related to the adoption of computer technologies, is an area that has received a lot of attention in the literature. Studies began to emerge in the 1970s and are still continuing today. The reason for such an interest is that it is widely believed that staff must have positive attitude towards IT if they are to embrace these technologies (Delcourt and Kinzie, 1993; Hignite and Echternacht, 1992), i.e., a positive attitude towards IT will result in learning more about these technologies or developing better abilities to use them effectively.

Bannon, Marshall and Fluegal (1985) developed a scale to determine attitudes towards computers among students, teachers, administrators and educators using 2,525 participants. Findings of the

study indicated that the respondents had generally positive cognitive and affective attitude towards computers. This finding supports an earlier study by Jackson, Clements and Jones (1984) to assess the levels of awareness and use of IT among the faculty at University of Georgia. The results indicated that attitude towards and awareness of IT at the university was positive. Eighty five percent of the respondents indicated that they had engaged in computer awareness activities such as workshops, seminars and independent study. Eighty six percent displayed an interest in learning more about the use of IT.

In his study of how the Brown University community used and viewed computers, Shields (1986) reported that over 80 percent of the respondents had some computing experience. Almost 75 percent of these users described their experience as positive and over 69 percent said that they would like to use computers more frequently.

The aforementioned studies thus confirm the existence of positive attitudes towards IT among university staff. In relation to university clerical workers, Agabiti (1997) and Jerich (2000) reported similar findings that show positive attitude of clerical workers towards IT in the digital environment of most universities. Regardless of the type of training opportunities administrators receive, the most important component is the attitude with which the training is approached. The administrator's ability to handle change and his or her interest in learning (self-motivation) are critical factors in determining the success of the training experience (Coll, Coll and Rein, 1989). Some general guidelines for teaching adults were proposed by Brody (1995). For the most part, lecturers, administrators and support staff are goal oriented, look towards staff development activities to improve their job performance, and want to achieve success in as brief a time as possible. Consequently, a programme designed to prepare staff to improve their use of technology must be built around these characteristics (Brody, 1995).

Within the context of this research and attempting to apply Durand's assertion, an assumption is made that a clerical worker must have knowledge, know-how and attitude with respect to computer software in an office environment. Only then is the clerical worker is said to be IT competent.

2.3.5 Technophobia

Fifty-five percent of all Americans are technophobic to some degree (Hanna et al., 1994). Furthermore, one quarter of the adults surveyed had never used a computer, set the timer on their

VCRs or programmed stations on their car radios. The frightening fact is that these statistics were gathered in 1994. Even for those who do occasionally use computers, their technology comfort level is narrow indeed. Many know how to use one or two items of technology, but go blank when it comes to learning others or to advancing skills, as in learning a new piece of software. So, if technophobia affects the majority of adults, why should university administrators be any different? The only difference may be that many university administrators are very uncomfortable admitting their mystification at technology. Further, too many education business managers have not yet become proficient in using word processing programs, databases, spreadsheet applications, or their own accounting software. Following are reasons provided by university administrators for not being proficient in computer use:

1. My assistant is a computer whiz. I rely on her/him to take care of all computer-related issues. I am an administrator, not a data input clerk.
2. I have intended to learn to use computers for years, but you have no idea how pressured my schedule is. With the demands of my job, I cannot find the time.
3. The technology keeps changing so fast. Once it settles down, I'll learn it. But I don't want to have to re-learn it in six months.
4. When is someone going to write software that meets all my complex needs but is easy for my staff and me to learn?
5. I am planning to take a course on computers . . . next year. That is soon enough (Hanna et al., 1994, p. 6).

While there is some kernel of truth in each of these reasons, all can be seen as statements by professionals in denial about their technophobia. It can be unnerving for professionals to admit their techno-ignorance to their staff, their computer and software vendors, and their superintendents and boards. It is even hard to admit it to themselves. When administrators limit themselves to what they already know about their needs, they are limiting themselves to increasing productivity only by doing more of the same. Once administrators accept that using computers confidently, efficiently, and creatively is not a one-shot deal, but an ongoing, lifelong, learning process, they will have taken the first step towards overcoming technophobia and integrating technology with their way of life.

Finally, Jordan and Follman (1993) reflected on the effects of computer and technology on society and education. In discussing this effect, the authors stated that " . . . computers have become a tool of choice and information has become a valuable resource. Technology, the catalyst of this transition, is affecting every facet of society that deals with the generation, storage or transmission of information. Technology increasingly affects our work, politics and entertainment. Ironically,

computers and associated technology had only a limited impact on society's most information rich institution: education" (Jordan and Follman, 1993, p. 9).

2.4 IT COMPETENCE AS A VARIABLE

Taking into consideration the issues raised in the previous sections, this research treats IT competence as the central focus of this study. As such, Barrett and O'Connell (2001), Hill, Smith and Mann (1987), Jerich (2000), Lertwongsatien (2000) and Scigliano (1997) identified the following attributes as important to represent the variable IT competence: improved IT knowledge, improved IT skills, positive attitude, self productivity, successful transfer and team work effectiveness. A summary of the items or attributes, related measurements and researchers are provided in Table 2.1.

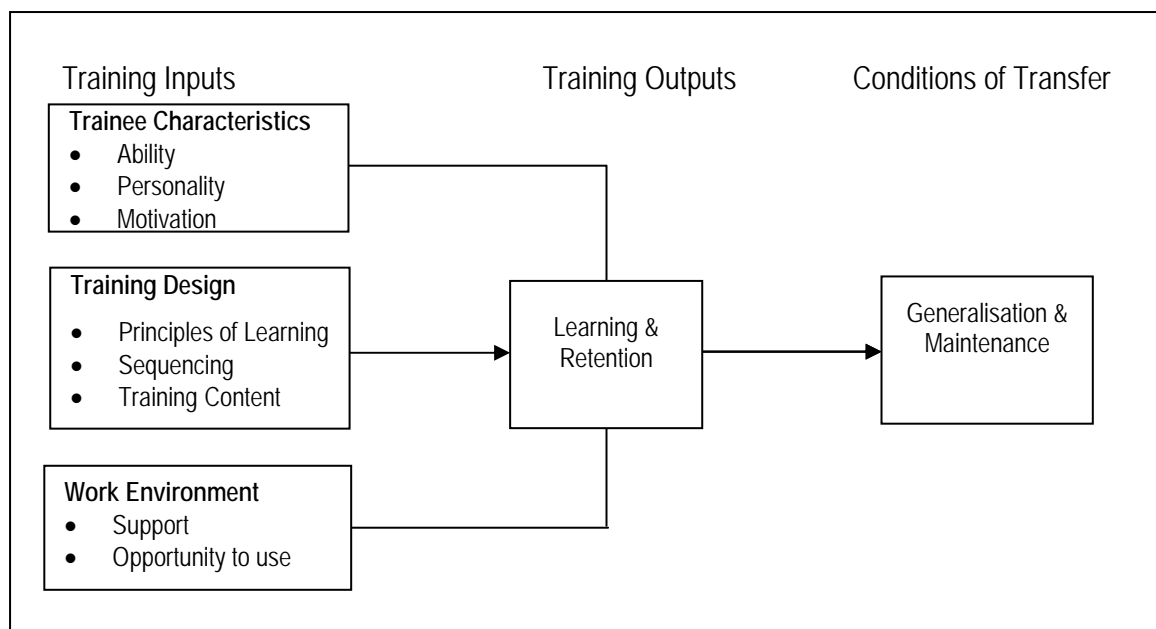
Table 2.1: Summary of Items, Related Measurements and Researchers For IT Competence

Item Coding	Item/Attribute	Related Measurement	Researcher(s)	Remark(s)
ITTEF1	improved IT knowledge	I can feel there is an increase in IT skill after training	Jerich (2000)	Employees have a high dependency on computer technology to perform their jobs and report more knowledge and skills in this area would be needed for career advancement.
ITTEF2	improved IT skills	I can feel there is an increase in IT knowledge after training	Jerich (2000)	Employees have a high dependency on computer technology to perform their jobs and report more knowledge and skills in this area would be needed for career advancement.
ITTEF3	positive attitude	I have acquired positive attitude after IT training	Hill, Smith and Mann (1987)	Individuals who have a high self-efficacy level are more likely to seek opportunities to improve computer skills and are more likely to attempt more difficult and complex tasks on the job
ITTEF4	self productivity	Self productivity has increased after IT training	Barrett and O'Connell (2001)	General training Improves productivity of workers
ITTEF5	successful transfer	IT training has been successfully transferred to the work place	Lertwongsatien (2000)	Success in using IT to support core competencies is influenced by IS functional capabilities, including planning, systems delivery, systems support and operation
ITTEF6	Team work effectiveness	IT training has improved team work effectiveness	Scigliano (1997)	IT training has improved teamwork among teachers.

2.5 TRANSFER OF TRAINING - THE BALDWIN AND FORD MODEL

Broad and Newstrom (1992), in the book Transfer of Training, described the Human Resource Development (HRD) model of transfer as lacking a research base and conceptually restricted, i.e., it has one extremely important characteristic that has been missing from the more academic instructional model of transfer. In contrast to HRD model of transfer, virtually nonexistent in either academic instruction or research, is the recognition of the organisational or social support systems for facilitating or sustaining transfer - if and when it should occur (Haskell, 1998). Baldwin and Ford (1988) conceptualised the HRD transfer model, shown in Figure 2.3, as they examined the factors that affect the extent that knowledge and skills are transferred to the work environment.

Figure 2.3: Baldwin and Ford's Model of the Transfer Process



Source: Baldwin and Ford (1988). Transfer of training: A review and direction for future research. Personnel Psychology, 43, 63-105.

Based upon research in the behavioural sciences, adult education and personnel administration, Baldwin and Ford (1988) developed a model to illustrate the factors that influence the transfer of learning from the training site to the work environment. This model is important because it highlights the close relationship of the major characteristics of the trainee, the training programme and the work environment to the design and delivery of training programs and, in turn, the effectiveness of the transfer of learning to the work environment. In addition, the model also provides insights into the factors that could be potential supports or barriers to individual knowledge and skill development programs. The Baldwin and Ford model, describes the transfer process in terms of training inputs, training outputs or outcomes and conditions of transfer. The trainee input factor includes various

characteristics of the (a) trainee, (b) training design of the instructional programme, and (c) the work environment. The conditions of transfer include (a) the ability of the trainee to generalise skills or behaviours learned in training to the job context and (b) the ability to maintain the learned skills or behaviours over a period of time on the job. According to the model, regardless of the initial training during the programme, both the characteristics of the trainee and the factors within the work environment have a direct effect on professional development and the trainee's ability to take generalised learning and to apply as well to maintain it within the job context of learning provides additional insight into professional development of employees.

Therefore, it is important for HRD professionals to gain an understanding of the employees and their work environment. The model also illustrates that the design of the training programme has a direct effect on competency development. Factors such as the techniques of instruction and training content have an effect on competency development. In turn, competency development has a direct effect on the ability to take generalised learning and apply it to "real life" work situations and maintain the philosophy of learning organisation. The Baldwin and Ford model provides a framework for this research by adopting one of its salient points - conditions of transfer. However, other competence-related variables and socio-demographic variables need to be included accordingly.

2.5.1 Trainee Characteristics

A great deal of literature is available regarding the trainee's ability or skill, attitudes and motivation in relationship to the degree of success of training programs. In terms of ability and skill, Flavell's (1977) research is sometimes referred to in adult education literature since it deals with the growth of adult cognition. According to Flavell (1977), the growth of adult cognition is dependent upon the specifics of the problems adults face and address on a daily basis both within and outside the work environment. For many adults, real problems are those situations that confront adults in their areas of expertise and the resolution of these problems is dependent upon the ways in which adults use their cognitive skills. More recent literature often refers to the types of ability or skills that the future work environment will require. Howell and Cooke's (1989) research indicate that the computerised workplace has moved individuals from performing simple and procedural tasks to more complex tasks requiring them to be able to make inferences, diagnoses, judgments and be involved in decision making processes more oftenly when under pressure. Fleischmann and Mumford (1989) reported that it would be increasingly important to know how individuals build on previously learned

material in order to understand how the transfer of learning affects performance of new and more complex tasks.

Trainees are usually employees whose training, education, and development are sponsored by the organisation to improve organisational functioning and productivity (Broad and Newstrom, 1992). Early studies on transfer identified three main conditions necessary for transfer to occur: the content must be applicable to the job, the trainee must learn the content, and the trainee must be motivated to change job behaviour in order to apply what was learned (Mosel, 1957). Baldwin and Ford (1988) also identified two individual characteristics that can affect the transfer process: the ability of trainees and self-efficacy. Self-efficacy is defined as the individual's expectations or confidence that tasks can be successfully performed, and that an individual's self-efficacy will have an impact on his/her motivation to transfer (Noe and Schmitt, 1986). (Noe and Schmitt, 1986) pointed out that the importance of self-efficacy should not be underestimated and when people believe that they are not able to do a particular task, they may not even try to do it. Additional research has identified meaningful relationships that exist between self-efficacy and measures of training performance assessments (see Gist, 1989; Gist, Schwoerer, and Rosen, 1989; Mathieu, Martineau, and Tannenbaum, 1993).

With regard to transfer of training, it would appear that studies (Baldwin and Magjuka, 1991; Goldstein, 1986; Mathieu Martineau, and Tannenbaum, 1993; Noe, 1986) have found evidence that a positive relationship exists between trainee characteristics relative to motivation and self-efficacy and training outcomes. In the studies above, motivation levels prior to training impacted performance in training.

Hicks and Klimoski (1987) observed that little attention had been given to the point of view of employees and how it relates to expectations, attitudes, or decisions to select training programs. The focus of their study was to examine the type of announcement or information individuals received prior to the start of the training programme. Hicks and Klimoski (1987) felt that employees would attend training programme because they would like to benefit more from the training than those who do not. Hicks and Klimoski (1987) found that those individuals with a low degree of choice felt significantly less freedom and more pressure to attend than those with a high degree of choice. In addition, managers who received the realistic preview of the training programme or had a high degree of choice were more motivated to learn than the other trainees.

Studies were also done to investigate the effects of trainee motivation. Noe (1986) developed a model that incorporated pre-training motivation to learn and post training motivation to transfer as its motivational components. These variables have been proven to be related to training outcomes and individual influences such as career planning.

Research regarding personality factors such as self-efficacy, career aspirations and attitudes towards learning and towards change often reflects the effects these factors have upon an individual's motivation to learn. In a study of improvement of computer skills in the workplace, Hill, Smith and Mann (1987) suggested that individuals who have a high self-efficacy level are more likely to seek opportunities to improve computer skills and are more likely to attempt more difficult and complex tasks on the job. Other researchers suggest that the relevance of training programs to an individual's job and career aspirations can affect their motivation to learn (see for example Knowles, 1980; Perry, 1990; Thibodeau, 1980). According to Knowles (1980), the adult learner in today's changing work environment needs to view learning as a life long endeavour. The old belief that learning is primarily a function of youth and that the purpose of education is to supply all the knowledge and skills required to live adequately for life is no longer valid. The rapidly accelerating pace of information processing change means that the facts learned in one's youth have become insufficient and skills outmoded by new technologies. How an individual deals with these changes is a factor in human resource development. Some individuals are eager for change while others may view change as a threat to their current positions. Fuller (1969) and Hall, Wallace and Dossett, (1973) state that changes over time can produce various perceptions, feelings and frustrations within individuals thus affecting their learning processes. In addition to the characteristics of the trainee, the design and delivery of training programs also influence the success of the transfer of learning to the job context.

2.5.2 Training Design

Early research on training focused on the incorporation of learning principles in order to improve training programs. This includes research in the areas of (a) identical stimulus-response elements both in training and the work environment (Ellis, 1965), (b) principles underlying training content (McGee and Thayer, 1961), (c) stimulus variability, that is, presenting relevant training stimuli in multiple ways (Ellis, 1965), and (d) conditions of practice such as distributed sessions and various feedback mechanisms (McGee and Thayer, 1961; Naylor and Briggs, 1963; Wexley and Thorton, 1972). Later research explored the facilitation of training transfer through self-management and goal setting (Wexley and Baldwin, 1986). These approaches focus on how to maintain and generalise

learning with the promotion of self-directed behaviour on the part of the learner to facilitate the transfer of learning. Sterns and Doverspike (1989) studied these learning theories as well as Knowles' (1980) andragogical paradigm for adult learning and identified common factors within the design and delivery of training that they believe to have a positive impact on the transfer of learning.

First, training programs should be relevant to the trainees' job. Second, there needs to be ample feedback within learning sessions that encourages self-confidence. Third, training should build on elements that are familiar to the trainees' past learning and job experiences. Fourth, instructional strategies should be developed to limit memory requirements. Sterns and Doverspike (1989) believed that these factors could be particularly important for older employees who have motivation to learn but lack self-confidence or fear failure due to competition with younger or more recently educated workers. Recent research has examined instructional strategies such as demonstration; discussions, case studies and role-play in the classroom (Bentley, 1994; Craig, 1996; Knowles, Holton and Swanson, 1998). These strategies attempt to generalise learning and provide opportunities to apply knowledge, skills and attitudes to various work situations and tasks. Current research interest is growing in examining the merits of non-classroom delivery techniques through the use of technology. Factors within the work environment can also influence the success of the transfer of learning.

In many of the early studies investigating training outcomes, the emphasis has been on examining training programme design or characteristics. Baldwin and Ford (1988) found that identifying ways to approach the effects of training design fall into four basic principles: Identical elements, general principles, stimulus variability, and various conditions of practice. The principle of identical elements predicts that transfer will be maximised to the degree that there are identical stimulus and response elements in the training and transfer settings (Baldwin and Ford, 1988).

A second approach to training design is known by teaching of general principles. Teaching through general principles maintains that transfer is facilitated when trainees are taught, not just applicable skills, but also the general rules and theoretical principles that underlie the training content (McGee and Thayer, 1961).

Stimulus variability states that positive transfer is maximised when a variety of stimuli are employed. Moreover, several examples of a concept to be learned strengthen the trainee's understanding so that he/she is more likely to see the applicability of a concept in a new situation (Ellis, 1965).

Finally, conditions of practice include a number of specific design issues including massed or distributed training (Naylor and Briggs, 1963), whole or part training (Naylor and Briggs, 1963),

feedback (Wexley and Thorton, 1972), and over learning (McGee and Thayer, 1961). While researchers have also stressed the importance of design issues such as sequencing and the relevance of training content, empirical evidence is lacking (Baldwin and Ford, 1988).

As such, Gustafson (1985) recommended a combination of pre-service and in-service training appropriate to the administrator. Beyond university courses, in-service workshops, and other types of training sessions, administrators can improve their technology competence by taking distance education courses or tutorials, accessing educational research, or attending vendor-supplied training (Kosakowski, 1998).

2.5.3 Work Environment

The extent to which an organisational climate provides an environment that facilitates continuous learning is another factor that research indicates affects individual development and transfer of learning from a training programme to the work environment. According to Ford (1994), when trainees return to the work environment from a training activity, a broad range of problems can occur as they interact with new learning, other people and their job environments. Factors such as time and distance from the educational experience, the risks perceived by trainees in adopting new behaviour and the lack of readily available resources within the work environment can hamper the transfer of learning process. Perry (1990) suggests that it is important for individuals to have ample opportunities to practice, experiment with and perform their newly acquired knowledge and skills in order to facilitate learning transfer in their work environments. In terms of learning environments, Diamond and Allcorn (1986) state that work environments designed to support inquiry fosters unlimited opportunities for individuals to acquire new meanings and insights into their jobs. They add that a supportive environment in which ample opportunities are given to share experiences and consolidate new learning promotes higher levels of intellectual thought. Their research indicates that the success of this type of environment depends upon the willingness of individuals to share their experiences. Besides that, it is necessary for management to support and interact with their staff regarding organisational goals and objectives.

The research on the characteristics of the trainee, training design and the work environment, suggests that the transfer of learning process needs to be a concern for those who design, implement, assess and support professional development programs. Although, the ultimate decision to learn lies with the learner, the involvement of the learner, educator and supervisor can facilitate the

transfer of learning process. Furthermore, the Baldwin and Ford framework can be used before developing, expanding or changing professional development activities to identify job-relevant training needs, supports, barriers and incentives that may affect employee participation and utilisation of programs. Moreover, the model can be used after training to assess the extent to which the transfer of newly acquired knowledge and skills are being utilised on the job and maintained over time.

2.5.3.1 Organisational Support

McLagan and McCulloch conducted early research on transfer of training in 1981, uncovered that the emphasis of the studies was on examining the characteristics of both training programme content and trainee characteristics (Dixon and Henkelman, 1991). It became apparent to subsequent researchers that focus on these two areas resulted in ignoring a critical factor that impacts transfer of training - organisational climate. Baldwin and Ford (1988) and Tannenbaum and Yukl (1992) found that there had been limited research examining the affects of post-training environment on the transfer process.

Training programme effectiveness can be influenced by the events that occur after the trainee returns to the workplace. Trainees leave the training environment enthusiastically seeking to apply the newly learned skills and knowledge but meet limitations that interfere with that application. One of the earliest studies done by Mosel (1957) suggested that a supportive climate is a factor in the transfer process onto the job. Other researchers (Goldstein, 1986; McGee and Thayer, 1961; Marx, 1982; Michalak, 1981) suggested that a supportive organisational climate is required for transfer of training. Huezyski and Lewis (1980) found that the single most important factor influencing the trainee's intent to transfer was the supervisor's management style and attitude.

The Huezyski and Lewis' (1980) study examined the Network Analysis, a training programme targeted towards the construction and engineering industries. Using a questionnaire and semi-structured interviews before and after the course, the researchers examined trainees' motivation to transfer of training, their intent to transfer the training, and organisational factors inhibiting or encouraging transfer. The results of their study indicated that 35 percent of the trainees attempted to transfer what they had learned back on the job. Of the 35 percent, the majority indicated that supervisor's support was a significant factor in transferring the skills they learned to their job. Supervisor's support was defined as "the boss's attitude and management style" (Huezyski and Lewis, 1980).

Trainees begin to learn about the intricacies of training early in their careers, especially during the socialisation process (Feldman, 1989). Some actions signal to trainees whether training is important (e.g., supervisory and peer support, resource availability, and post training follow-up) and other actions reveal to trainees the amount of control, participation, or input they have in training process (Tannenbaum and Yukl, 1992).

Baldwin and Magjuka (1991) investigated the effects of three retraining signals - course information provided to trainees, accountability to supervisor and programme status (voluntary or mandatory) - on subsequent intentions to transfer programme learning. They found that the amount of variance in transfer intentions explained was modest, variance in pre-training conditions was also limited, and no consideration was given for the type or degree of variables. Although this research was limited to retraining signals, the knowledge that trainee characteristics and training design affect transfer of training is useful for future research.

Ford et al. (1992) study added to the idea that elements in the work environment can affect the transfer of post-training behaviours. The study examined Air Force graduates who had completed a technical training programme and were required to perform tasks on the job over a period of four months following training. Ford et al. (1992) found that in the four months following training, the airmen obtained differential opportunities to perform trained tasks. The differences were related to the supervisory attitudes; airmen who were perceived by their supervisor to be more competent received more tasks and work group support, while airmen who were assigned to a highly supportive work group performed more complex tasks.

Goldstein (1986) suggested that organisational transfer climate should be examined as part of the needs assessment process. Rouiller and Goldstein (1993) examined the relationship between organisational transfer climate and positive transfer of training. Their study was conducted in a large franchise that owns and operates over one hundred fast-food restaurants in a large metropolitan area. The training programme that they examined was a nine-week mandatory management training programme that included both classroom knowledge and hands-on performance. One hundred and two assistant managers completed the programme, each class contained approximately ten assistant managers, and all were included in the study. The researchers examined the following measures - organisational climate, learning, transfer behaviour, job performance, and unit performance. Rouiller and Goldstein (1993) concluded that, in addition to how much trainees learn in training, the organisational transfer climate of the work situation affects the degree to which learned behaviour would be transferred onto the actual job. Rouiller and Goldstein (1993) established a measure for

transfer climate. In addition, the study showed that the climate by learning interaction was not significant, but the degree of learning in training and the positive transfer climate directly affect the degree of transfer behaviour to the job situation.

Tracey, Tannenbaum, and Kavanaugh (1995) extended Rouiller and Goldstein's (1993) work by exploring two specific components of organisational climate and culture, i.e., the transfer of training climate and continuous learning culture, and examined their influences on the transfer of supervisory skills and behaviours learned in a formal training programme. The study used items from Rouiller and Goldstein's (1993) instrument and added an additional dimension to the context of work termed as "continuous learning culture". It was found that the transfer of training context, defined as transfer climate and continuous learning culture, is an important factor in the application of newly acquired skills and behaviour. In addition, Tracey, Tannenbaum, and Kavanaugh (1995) found that the relationship between climate and culture perceptions and post-training behaviour supported the theoretical importance of the conditions of transfer. This study supported and added to the growing knowledge base relative to the elements that exist in the work environment that affect the transfer of post-training behaviours.

2.5.3.2 Management Support

Supervisory support has been identified as an important work-environment variable that affects the transfer process (Broad, 1982; Fleishman and Mumford, 1989; Huezynski and Lewis, 1980; Nadler, 1982). Bates, Holton and Seyler (1996) defined supervisor support as the extent to which supervisors reinforce and support the use of learning on the job. Short (1997) defined supervisor support as the degree to which the trainee's supervisor helped set performance goals, provided opportunities to use newly learned skills, and recognised and rewarded the use of the skills on the job.

Nadler (1982) proposed a model of support systems for training. This early research recognised the development of systems within an organisation to support training. In Nadler's model, five systems were identified: organisational involvement, pre-training preparation, training activity, job linkage, and follow up. In the study, Nadler (1982) attempted to take one training programme through the five elements and found it to be impossible due to the fact that trainer's participation in the study indicated that even though they agreed on the system and its elements, each trainer's situation was unique and outsiders would have difficulty understanding the system. Despite the fact that Nadler's (1982) model was useful to identify support systems, he indicated that:

. . .many people find this model of support system extremely useful, but then have difficulty in identifying specific actions. Even those who can specify actions are hard-pressed to identify who in their organization would have responsibility for initiating or approving a specific action. In other words, the good intentions are apparent on all sides, but the trainer still needs to know much more about how to influence the organization in order to bring forth specific actions which support a particular training activity. (p. 6)

Broad (1982) completed a research study that asked a selected group of HRD leaders to review a list of seventy four actions management can take to support the transfer of training. The leaders were asked to identify and rate the importance of each action they had actually observed in organisations, as well as add any additional actions that were not on the list. Broad (1982) based the five categories on Nadler's (1982) research and measured these using a questionnaire focusing on the following variables: Upper Management Involvement, Pre-training Preparation, Support During Training, Job Linkage and Follow-up. The questionnaire had a high response rate of 80 percent. Broad (1982) reported that of the 74 listed actions, 71 (96 percent) were rated important while only 36 (49 percent) had been observed by most of the leaders. Broad found that actions observed by leaders differed among the categories and that eight actions rated most important by HRD leaders showed the lowest levels of observation. This study revealed an important gap in the actions management could take to improve transfer of training.

Ford et al. (1992) studied the effects of individual and transfer environment characteristics on the opportunity to perform trained tasks. The study examined the experiences of graduates of an Air Force technical training course. Data were collected from 118 graduates and their respective supervisors. Surveys were completed by trainees of the training programme immediately following their graduation and four months after the graduation. Supervisors received a survey to complete during the four-month time period. The survey measured individual characteristics (locus of control, career motivation, and learning), transfer environment (supervisor's attitude and work group support), and opportunity to perform. Results of the study found that supervisor's attitude and work group support were found to have a direct impact on the opportunity to perform trained tasks.

Facteau et al. (1992) examined the extent to which the favourability of the training environment influenced pre-training motivation and perceptions of training transfer. Four forms of social support (peers, subordinates, supervisors, and top management support) were studied. Only subordinate, supervisor, and top management support appeared to be related to pre-training motivation. The

results indicated that managers who perceived a greater degree of support from their immediate supervisors reported a greater motivation to attend and learn from training. In addition, managers who believed their subordinates and peers were supportive of their training efforts were more likely to perceive greater transfer of their training skills.

Effective management behaviours, including supportive actions such as offering guidance during the training programme, are important in the transfer of training. Managers' perceptions of their own effectiveness and others' perception of their effectiveness may differ. Kolb (1995) explored the similarities and differences in how team leaders and team members view leader's performance. The study compared self and other assessments of leader's performance. Results of the study indicated that self-assessment of leader's performance was more favourable than were assessments by team members for 12 of 13 measured dimensions of leader's behaviour. Leaders and members agreed, for the most part, on leader's strengths and weaknesses (Kolb, 1995). In considering management support and its effects on transfer of training, the results of the similarities and differences found in leader/member assessment are important so as to know how trainees and managers may assess the supportive actions they take to ensure the transfer of training.

2.5.3.3 Peer Support

It has been suggested by Baldwin and Ford (1988) and found that limited research is available indicating that supervisory support promotes transfer of training, yet few empirical researches have been done on peer support influencing transfer of training.

Ford and Fisher (1994) studied the transfer of safety training in work organisations. They noted the importance of the immediate job context that surrounds the employee as critical to transfer of training. This context can either support or inhibit the transfer of training. The job context includes factors such as managerial and co-worker support, workplace climate and the constraints or opportunities to transfer trained knowledge, skills and attitudes to the job.

Huezyński and Lewis (1980) presented one of the first studies in this regards, suggesting that the support of a trainee's "role set" was influential in the transfer process. Huezyński and Lewis (1980) described the trainee's role set as one that included the supervisor, peers and subordinates. The study included two groups who attended a management course on Network Analysis. One group consisted of 17 participants, and the course was offered at a university. The second group was run as

an in-house company course and consisted of 33 participants. Data were collected using questionnaires completed by all participants before and after the training courses. The first part of the questionnaires focused on the trainee's level of motivation prior to training. The second part, administered after training, focused on the trainee's perception of their ability to use newly learned techniques back on the job. Seventeen of the 48 respondents attempted to transfer what they had learned in the course, despite the suggestion that the support of the trainee's role set was influential in the transfer process.

Yelon (1992) introduced a model known as M.A.S.S. for producing transfer, which emphasised four principles: motivation, awareness, skills and support. Yelon (1992) presented hypothetical examples using the M.A.S.S. model. The example used for support recognised that one obstacle to transfer training was the support the trainees would receive after the training ends. In the example, Yelon (1992) described that if a police recruit returns from training, he or she may be discouraged from using his/her new skills by the experienced police officers who have developed their own ideas and viewpoints about how to control a situation on the job.

Ford et al. (1992) studied the factors affecting the opportunity to perform trained tasks on the job. Graduates from an Air Force technical training programme and their supervisors (n=180) were given questionnaires that measured three dimensions (breadth, activity level and type of tasks performed) related to the opportunity to perform tasks. The researchers measured three work context factors that were identified to be relevant in affecting the opportunity to perform: supervisory attitudes, work group support, and the pace of the workflow in the work group. The results indicated that work context variables were related to task type $(p<0.01)$ and that work group is a significant predictor of performance. Ford et al. (1992) reported that supportive work groups were associated with performance of more complex and difficult tasks.

Bates, Holton and Seyler (1996) attempted to validate Rouiller and Goldstein's (1993) study regarding a proposed structure for a transfer climate instrument. This study was conducted as part of the larger study of computer based training programs targeted towards plant operator training mandated by occupational safety and health act (OSHA). Bates et al. (1996) used a transfer climate instrument containing 48 items developed by Rouiller and Goldstein (1993). The sample included the 189 operating technicians from four production units at a petrochemical manufacturing facility. The instrument used a Likert type scale, and fifteen of the original items contained in Rouiller and Goldstein's (1993) instrument were not utilised as they were inappropriate for the organisation. Six factors were identified including peer/task support. Bates, Holton and Seyler (1996) found that

transfer climate perceptions are structured by the group (supervisor peer/task self) and that trainees perceive transfer climate by referent group.

2.6 TRAINING OUTPUTS

According to Michalak (1981), successful training involves two phases: knowledge or skill acquisition and the maintenance of behaviour once on the job. Furthermore, based on an extensive literature review, Baldwin and Ford (1988) made the basic point that skills must be learned and retained prior to being transferred to the work place. In addition, how effective the competencies can be transferred is dependent upon the relationship between trainee's characteristics, training design and the work environment.

Whatever that is learned must be retained or the transfer process ends. Broad and Newstrom (1992) listed a variety of recommended activities that may assist in competency retention. Opportunities for additional practice and feedback can be provided by the manager. The trainer can provide, with the support of the manager, follow-up refreshers and problem solving sessions. The trainee can review the training contents and maintain contact with others who completed the training programme in order to generally improve competencies attained from training.

2.7 CONDITIONS OF TRANSFER: GENERALISATION AND MAINTENANCE

Generalisation refers to the extent to which what was learned in a training programme is used in different situations on the job. Royer (1979) uses the term stimulus generalisation to define generalisation as in the aforementioned definition. Appropriate measures of generalisation require a linking of needs assessment information, a clear understanding of the content to be learned in the training programme and how the learning is to be used on the job (Baldwin and Ford, 1988).

In a study of maintenance of behaviour, Michalak (1981) found an almost perfect correlation between the amount and quality of behaviour maintenance activities and the transfer results obtained by departments in a manufacturing setting. Maintenance activities that might be conducted outside the classroom include positive reinforcement, feedback, removal of obstacles, changes in work systems, performance appraisals and an accountability system (Michalak, 1981).

Ungsrithong (1991), in a study on the impact on transfer, states that the training professionals cannot afford to leave the transfer issue to chance. Because transfer issues have not been consistently considered in the past, variables related to during training and its applicability back on the job, have long been ignored. These variables, which get in the way of a successful transfer of training, could be referred to as barriers. Broad and Newstrom (1992) wisely made the point that barriers are more easily resolved when they are well defined and classified.

2.7.1 Transfer Barriers

Trainees learn what they are supposed to know, but when they return to the workplace, some barriers may delay their using newly learned skills, knowledge, and attitude. Such barriers include management and/or supervision (Broad and Newstrom 1992). Trainees also face other barriers, such as peers who do not accept new ideas and the fear of new changes (Broad and Newstrom 1992).

People resist change or try to maintain the status quo due to lack of interest in new ideas, knowledge and skills as well as fear of change itself and lack of incentive reward. This may result in an employee trying to delay the intervention or avoiding it totally (Brinkerhoff and Montesino, 1995). Too many employees attend training sessions and find the skills and knowledge valuable but do not transfer that education to the workplace. The lack of transfer of skills to the job causes the organisation to lose those resources (Robinson and Robinson, 1985).

Brinkerhoff and Montesino (1995) suggested that the adverse culture might stop the new vision and future plan of an organisation. Also, it may cause obstruction in new learning and stop the implementation of new technology. Brinkerhoff and Montesino (1995) also suggested that off-site training frequently fails because the trainees return to an organisational culture that does not support the new skills, knowledge, and values.

Brinkerhoff and Montesino (1995) gave an example of two trainees who went to the same training programme. They both gained new knowledge and skills, but the level of transfer of knowledge differed when they returned to their work environment. It appeared that the two trainees went to two different programs, but, in fact, they attended the same training programme. The problem was they returned to two different cultures, because the level of support offered by the management in the two separate workplaces was different. Whereas one organisational culture may be supportive of the new

skills and knowledge, another organisation's may not be. Thus, one important factor of organisation's culture is the management of that organisation.

2.8 IT TRAINING AND DEVELOPMENT

Data on expenditures for educational technology indicated that far more resources had been allocated to hardware and software than to training and technical support. The necessity of technology training is illustrated by Stolz Massachusetts Software Council, which stated: ". . . technology minus training equals junk" (1994, p. 3). As such, the increasing competition and IT labour shortage have required management to consider human resources as a strategic necessity for IT departments (Bailey, 1998). In an attempt to hire and retain key IT professionals, managers need to provide training that allows their staff to maintain high competency levels continuously.

IT managers need to determine when their IT personnel require training and what the content of the training should be. However, assessing IT staff's needs for training can be difficult. It requires a thorough understanding of organisational needs and careful measurement of IT personnel's knowledge and skills, making training needs assessment a critical step in training and development process. It has long been recognised that training should fit the needs of both the organisation and individual employees (McGee and Thayer, 1961). This requires assessment of the need for training at an organisational level as well as on an individual employee level.

Training, or ". . . the systematic acquisition of skills, rules, concepts or attitudes that result in improved performance in the work situation" (Goldstein and Gessner, 1988) has the potential to improve the IT staff's professional contribution to the workplace. It is also a crucial method for systematically acquiring the new competencies an IT personnel must have in the rapidly changing environment. As such, the ability to manage, efficiently and effectively, the training of IT personnel to master relevant software programs is critical now more than ever.

In the domain of computer software training, Gist, Schwoerer and Rosen (1989) examined the impact of different training methods on self-efficacy to master a computer software programme. In their experiment to train novice users in using a popular microcomputer software package, they found that:

1. trainees in a behavioural modelling training programme exhibit better performance when compared with trainees in a computer aided training programme;

2. trainees with high levels of computer self-efficacy perform better than trainees with low computer efficacy; and
3. trainees in a behavioural modelling condition exhibit higher self-efficacy in using the software, as the training progresses, than trainees in a computer aided situation.

Beyond IT training and its relationship with self-efficacy and other management variables, most studies on IT training for staff of higher education institutions typically provide information on the type of training and the type of infrastructures needed. For instance, a study by Agabiti (1997) showed that job-related needs include advanced computer skills, proficiencies in office technology systems, specifically, database, Internet and World Wide Web, computer software of Lotus, Excel, Microsoft Word, Desktop Publishing and Windows. Agabiti (1997) also recommended that courses and professional development services should be programmatically sequential, cohesive, and provide for a continuum of skill development and articulation of curriculum. The delivery methodology would comprise of semester length courses and workshops.

Jerich's (2000) study on secretarial employees in a university indicated that the respondents viewed the freedom to try new ways of completing job tasks, ample opportunities to practice and experiment, supervisory support, employee and supervisor communication, and peer support as important organisational factors. The important supports included the university's encouragement and top management's involvement in emphasising the importance of training as well as work unit supervisors that provide encouragement, guidance and feedback for skill improvement and professional development. The study indicated that the lack of time was the strongest barrier in the programme attendance and development of knowledge and skills in the workplace. Strong incentives included increased eligibility for promotion and being able to attend programs without upsetting the work time. Jerich's (2000) recommendations for curricular and professional development included the exploration of (a) current curriculum in conjunction with job performance needs, (b) instructional strategies to facilitate learning transfer, (c) course schedules in conjunction with peak work loads, (d) civil service's job classification guidelines in conjunction with employee's job responsibilities, (e) content validity and reliability of secretarial civil service exams, (f) the employee's career counselling, and (g) further supervisory and administrative perspectives on the employee's professional development needs.

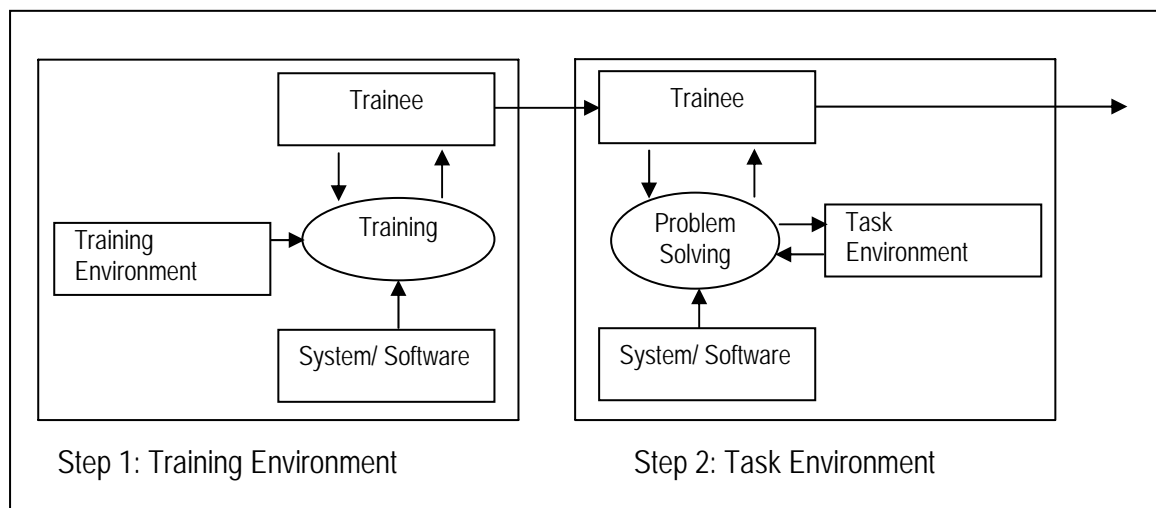
According to Bozeman, Raucher, and Spuck (1991), the user's sophistication and training are critical factors in any successful system implementation. Simply placing a computer on the desk of an administrator is not enough. First, the administrators must realise that the computer can assist them

in solving administrative problems with which they deal on daily basis; then, they must be trained in using the system.

2.8.1 IT Training Model

Learning to use a software is not easy. The training programs must be carefully designed to integrate cognitive and educational psychology with IT. Bostrom et al. (1988) managed to consider the aforementioned factors by introducing the Learning/Using Software Model (Figure 2.4).

Figure 2.4: Bostrom et al. (1988) Learning/Using Software Model



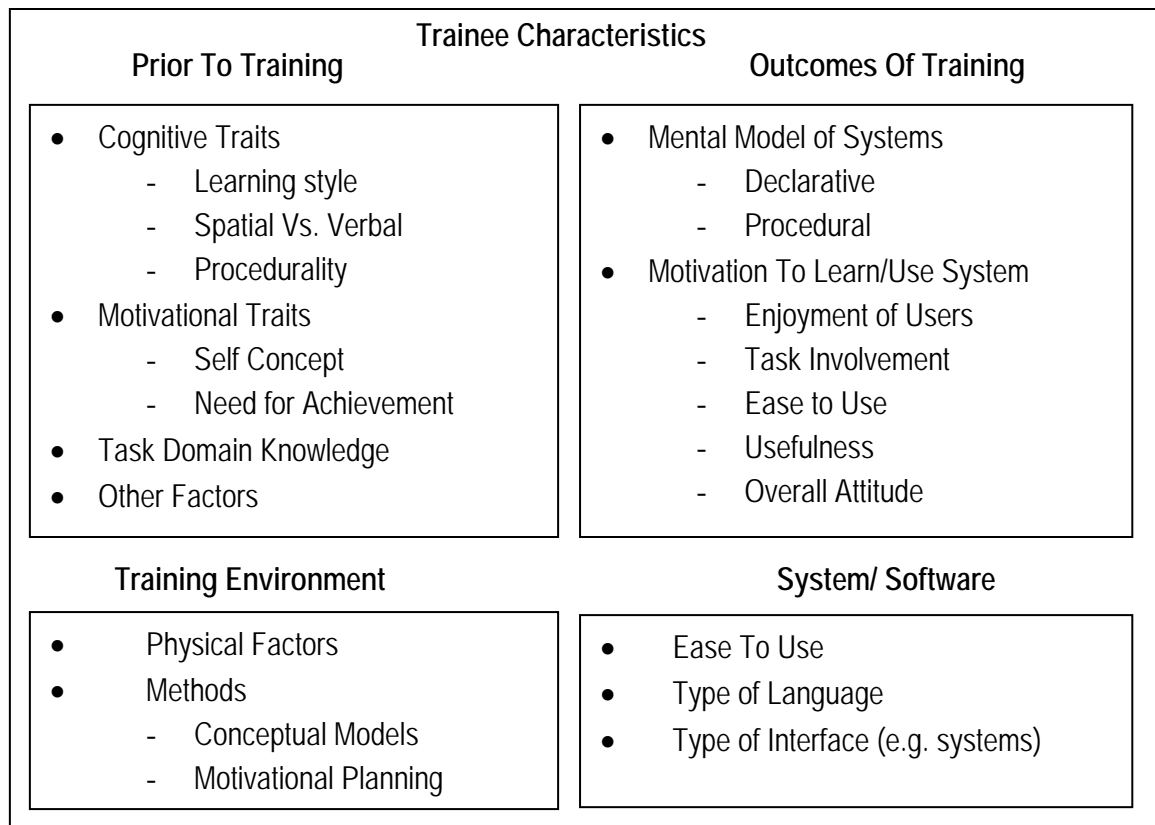
Source: Bostrom, R. P., Olfman, L. and Sein, M. K. (1988). End user computing: A research framework for investigating the training/learning process. In Human Factors in Management Information System, J. M. Carey (Ed.), Ablex Publishing Corporations: Norwood, NJ.

The model shows that learning to use software is an on-going process and not as easy as one perceives. This model represents computer training as a two-step process. The initial period, called training, introduces the software to the trainee. At the end of this initial period, the trainee becomes a user who applies the software on the job. The user continues to learn about the software during the problem solving phases. Three groups of variables are defined for each stage of learning. There are three inputs to the training process: the system/software to be learned, the training environment and the characteristics of the trainee.

The outputs of these processes are the changes in the trainee. Two changes will occur. The trainee will form an initial mental model of the system or software and will develop a particular level of motivation to use the software or system. In the problem solving stages of learning, the inputs and

outputs are similar, except that the trainee now has specific problems to work with and solve. Bostrom et al. (1988) calls this the task environment where the trainee must face problems and decisions that require the knowledge gained from training. Figure 2.5 lists the key variables that appear as soon as someone learns to use software: the system/software to be learned, the training environment, and the characteristics of the trainee.

Figure 2.5: Key Variables for Training/Learning



Source: Bostrom, R. P., Olfman, L. and Sein, M. K. (1988). End user computing: A research framework for investigating the training/learning process, Human Factors in Management Information Systems, J. M. Carey (Ed.), Ablex Publishing Corporations: Norwood, NJ.

2.8.1.1 System/software to be learned

The system/software to be learned will influence the training process because different “languages” have varying sets of characteristics that can have an impact on learning. For example, direct manipulation languages provide representations of objects that behave as if they are the objects

themselves (Hutchins et al, 1985). This greatly reduces the need for users to know syntactical commands thereby making these languages easier to learn (Shneiderman, 1983).

2.8.1.2 Training environment

The training environment includes the physical characteristics of the training setting, and the methods to be used in conveying the material to be learned. Settings can be formal or self-instructional (Bikson and Gutek, 1983). Formal settings are typically structured group classes conducted by an instructor who attempts to provide the trainees with some hands-on experience. Self-instructional training includes the use of such tools as manuals and computer aided instruction (CAI). This type of training method may or may not be supervised by an instructor.

2.8.1.3 Training methods

Bostrom et al. (1988) have identified two specific training methods called the conceptual models and motivational planning and management. Conceptual models are the frameworks for conveying the basic concepts of the system to be learned. They provide a basis for forming mental models. Mental models are mental or internal conceptual representations of the software package (Foley, 1980; Bennett, 1984; Borgman, 1984). They aid users in making inferences about the system, reasoning about it, and guiding actions (Norman, 1983).

Conceptual models can be classified as the analogical and abstract models. Analogical representations present the system to be learned in terms of another system. For example, a spreadsheet serves as an analogy for a modelling language. Abstract models are synthetic representations of a system. A mathematical model is an example of an abstract model. Structural conceptual models are aimed at developing knowledge about the structure of the system to be learned, while functional conceptual models provide information about how a command can be used (diSessa, 1986).

Motivational planning and management is the recognition of the ways that a trainee can be motivated to learn the system, and to have a high motivation to continue to learn the system after training (Wlodkowski, 1985). The objectives of a motivational planning approach include developing the confidence of success, managing reinforcement, connecting the instruction to important needs and motives, and arousing and maintaining curiosity and attention (Keller, 1983). This approach should be used before, during and after the training process.

Before training, instructors can assess the needs and experiences of trainees, and use this information for motivational management. During training, the goal is to design learning materials and tasks to generate the outcomes proposed by Keller (1983). Two broad approaches to the overall design of the training session are called syntactical (traditional) and application training. The syntactical training emphasizes syntax through a specific language related examples and general exercises. The application training focuses on giving the trainees a view of how they can solve their own problems using the relevant software. Trainees are asked to bring their problems to work on during training. These approaches may be integrated. For example, application training could be utilized early in training to demonstrate the usefulness of the software for solving trainees' problems. Syntactical training could be used later to broaden knowledge about the functional capabilities of the software.

2.8.1.4 Trainee characteristics

Trainee characteristics include cognitive traits, motivational traits, referent experience with computers, and task domain knowledge. Cognitive traits are defined as basic problem solving aptitudes, for example visual and spatial ability; and, individual preferences/cognitive styles, for example learning styles such as field independence/dependence. Motivational traits can be broadly classified as self-concept, that is, the trainees' view of their ability to learn target skills; and, need for achievement, that is, desire to succeed at the learning task (Pintrich et al, 1986).

2.9 IT AND ORGANISATIONAL CHANGE

Even organisations (including universities), like people, are not exempted from the dynamics of change. The exception is for some of those who do not adapt themselves to the changing external environment, and remain stagnant at their own risk. Both people and institutions have two options: react to change or become agents of change. If the first choice were selected, the product is stagnation and personal and organisational obsolescence which, in today's competitive economy, is tantamount to failure and self-extermination. On the contrary, if the second option were chosen, namely, to become the agents of change and interpreters of the social context, a proactive attitude is needed. As Buarque (1991) stated, this approach will allow the universities to meet futuristic challenges.

Universities have a constant interaction with the environment. In turn, it repeatedly supplies them with inputs in the form of demographic fluctuations, students, materials, energy, information, social and economic problems, rapid technological and structural changes and evolving social and political attitudes, aspirations and values. Universities take these inputs, and process them by using their philosophy, mission, vision, technology, organisational structure and culture as guide for their educational actions. This allows universities to return back to society some outputs in the form of professionals, scientists, artists, research, information and service. In return, the universities receive financial support to allow this productive cycle to continue for the sake of human, social and economic development of the community (Harrison, 1987; Hanson, 1991). Accordingly, Harrison (1987) argues that an organisation's success is proportionately related to its ability to adapt to its external and internal environment and the selection of the appropriate criteria for effectiveness.

According to Leavitt (1965), there are four interacting components in an organisation: task, technology, structure and people. A change in any one of the variables inevitably results in a change in the other three. A structural change can result in assigning people a different set of tasks as the advent of IT has caused organisations to redevelop job descriptions and job scopes. This is the reason why some of the most dramatic technological changes are due to the rapid change in information technology (McFarlan, 1984). Further to this, IT can cause new skill requirements, redesigned business processes and different organisational entities. The rapid pace of change in IT is simulating significant changes in the required level of skills within the employees, thus changing the daily activities of managers and revolutionising the ability to be responsive to customer needs (Toffler, 1991).

Economic and technical barriers to change, while significant, are not the primary problems (Dede, 1995). By shifting how current resources are allocated, educational institutions can deploy and utilise powerful technologies. A major barrier to educational change is that, despite the rich lessons learned in many diverse institutional-based technology projects, no systematic mechanism exists for sharing ideas or providing information on issues as basic as how to design and implement viable projects, what technology and financial options are available, and how to overcome common problems and barriers. To make use of the benefits IT provides, one must adapt it and then, like clothes, tailor it to one's needs.

Markus and Robey (1988) identified three "causal structures" associated with a technological change: the technological imperative, the operational imperative and the emergent imperative. In the technological imperative, the development of new technologies initiates a change in the organisation

as a response to competitive forces or opportunities. The technological imperative treats IT systems as an independent variable which has an impact on the behaviour of organisations and the people in them (Orlikowski and Robey, 1991). A change in IT occurs first, which then drives the organisations to make further changes in order to utilise the technology to their best advantage.

The major shifts and changes shaping the 1980s and 1990s include: the shift from industrial society to information society; from forced technology to high tech/high touch; from national economy to world economy; from short-term to long-term perspective; from centralisation to decentralisation; from institutional help to self-help; from representative democracy to participatory democracy; from hierarchies to networking; and from either/or to multiple choice. These trends have not stopped yet. These changes have become a part of the daily life of organisations and people.

2.9.1 Trends In IT Change - Emphasis on People

Rogers (1983), in his work on organisational changes, describes a pattern of diffusion across innovations and identifies individuals in organisations as fitting into one of the five descriptive categories:

- Innovators (2.5%)
- Early adopters (13.5%)
- Early majority (34%)
- Late majority (34%)
- Laggards (16%)

The numbers in parentheses indicate the percentages of people in an organisation that will normally be found in each category. The large percentages for late majority and laggards is the main reason why there are many uncooperative or resistant IT users which have proven the downfall of even the most well managed computer system implementation.

Bancroft stated that people "will sabotage the best laid plans unless their real needs and feelings are considered" (1992, p. 15). Bancroft described several cases in which IT innovations were unsuccessful because the technology was the sole focus of the implementation plan. Furthermore, Luffman et al. (1996) wrote that organisations make strategic responses to a changing environment through people, either individually or collectively. This realisation has led to an emphasis on the people aspect of the organisation particularly, within the context of training and development. Training

for a successful technological change is imperative as “we have to pay much more attention to systematic and continuous training and to support functions” (Cartwright, 1996, p. 58) which are critical catalysts for innovation and the integration of technology.

At the individual level, improvements in IT systems have eased many tasks. For example, dispatching documents either by hand or fax have largely been eliminated with the widespread application of the Internet as an office automation tool. By attaching a file containing the document, the information super highway will deliver the document to the designated recipient within a few seconds. The same document, if desired, could be sent to multiple recipients as well. The global economy requires business to operate in the “real” time to ensure efficiency. The ability to optimise any IT system capability will ensure any organisation will have the ability to reduce its “processing” time to become real time. Computers have become a significant component in the educational setting, however, the research has shown that in most cases, the full capacities of educational computers are not being fully utilised by the administrators. Therefore, administrators must equip themselves with the latest technology in order to optimise the facilities in the office environment (Gustafson, 1985).

In the organisational imperative, organisation needs to initiate changes in technology, rather than the other way round. It recognises that people in the organisation design information system to satisfy organisational needs for information. In this perspective, IT is the dependent variable and the focus is on identifying determinants of IT use (Swanson, et. al 1991). With an organisational imperative, the need for change is recognised before there is an IT system to facilitate it. Within this context, IT systems are critical to business process reengineering or BPR (Grotevant, 1998). Redesigning process needs often require capabilities not provided by the existing environment. An organisation, anxious to reap benefits similar to those portrayed in BPR success stories, typically starts with downsizing and right sizing exercises. IT is seen as the vehicle to implement downsizing and right sizing exercises as IT systems are seen as powerful tools that could become the panacea of all problems. With the implementation of IT systems, workers are expected to become multi-skilled and develop abilities to conduct multiple tasks concurrently.

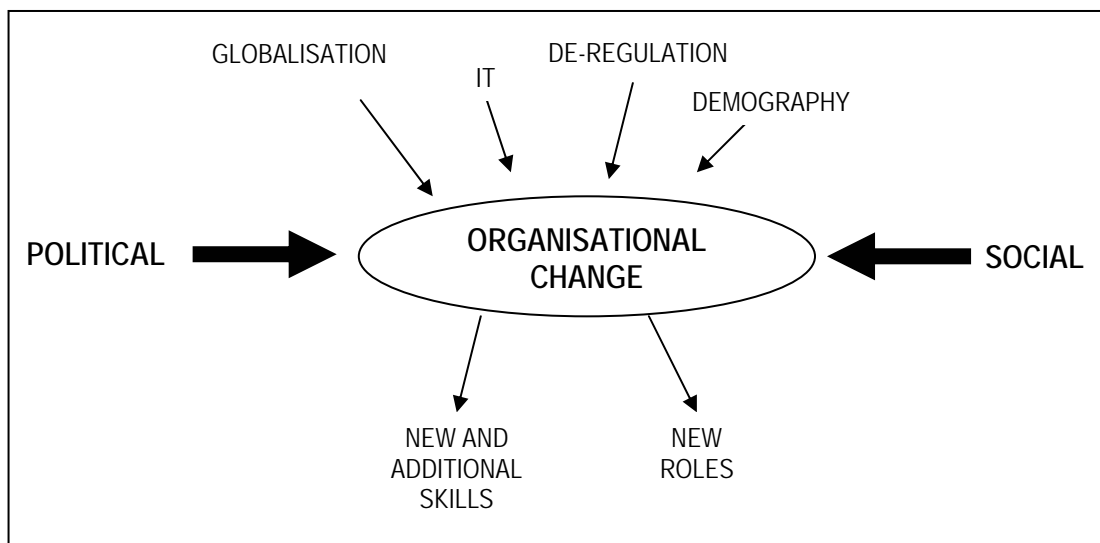
Organisational culture is a pattern of basic assumptions, invented, discovered, or developed by a given group that is the result of coping with problems of external adaptation and internal integration that has worked over time, well enough to become valid and therefore taught to the members as the correct way to perceive, think, and feel in relation to these problems (Evans, 1996). Dealing with technology in any organisation, and especially educational institutions, requires coping with problems

of adaptation and integration. Only a skilled leader can benefit from the technical developments taking place at such a rapid pace.

2.9.2 Organisational Change

Change within an organisation is essential in order to face external changes such as globalisation, demography, deregulation and IT (Figure 2.6). Globalisation and the advancement of technology are both cause and effect that force organisations including universities to make changes in order to keep themselves relevant and competitive. Universities, like any other organisations, are not excluded from the pressures for change. The fact that universities have strong linkages with the society and other stakeholders, forces them to make changes in the way they function and serve the community at large. Roles and skills will evolve to accommodate the new environment. The changing roles involve organisational restructuring while skills are related to the training needs. Political and social factors also have impact on organisational change.

Figure 2.6: Traditional Perception On Change Factors Within An Organisation



Source: Bolman, L. G. and Deal, T. E. (1990). Reframing Organizations: Artistry, Choice and Leadership. San Francisco: Jossey-Bass Publishers.

Since long, universities have been operated in a stable and predictable environment. Traditionally, universities have been financed through government grants as any other public sector organisations. Thus the issues of good 'corporate governance' such as accountability, ability to be financially able, customer-oriented and quality driven are deemed as not being the top priority of the university

activities. The main function of universities is mainly in pursuit of academic matters even to the extent of being incompatible to the needs of the industries.

However, changes in the external environment as well as internal pressures have forced universities to operate more efficiently to meet customers demand. In Malaysia, several public universities have brought drastic changes in their management processes in order to be more efficient in their operations. The process of managing strategic changes includes, among other things, steps taken to implement strategic plans and quality management programmes.

Universities are consistently being evaluated and ranked according to their performance. The relevance of the academic programs offered by the universities is being questioned in terms of meeting the needs of industries as well as students. According to Liu and Dubinsky (2000), university administrators are facing problems of getting limited funds from public sources whilst at the same time have to be more accountable in utilising the funds. Chadwick (1996) argued that universities are facing the problems of increasing the number of students and reduction of resources. At the same time the demands for accountability and providing quality services have increased significantly.

The advancements in IT, most particularly the Internet, are viewed as the underlying mechanisms that bring innovation. Four IT related changes, predicted to be relevant to the future of academic operations of any institution of higher education in the 21st century, include: the conversion from print to electronic medium for the majority of the publications; the convergence of television, computer and telephone technologies; routine use of intelligent agents; and the expanded use of distance education (Halal, Kull and Leffmann, 1997). Thus, in order to survive in the future, managing changes brought by IT should be given top priority by the university administrators.

2.9.3 IT Competencies and Organisational Change

The traditional approach in assessing IT competencies focuses on the basic Microsoft Windows based softwares such as Internet, Powerpoint, Excel, Word and Access as identified by Agabiti (1997) and Jerich (2000). With the improved speed and capability of the computers, coupled with the integrated telecommunication and audio video functions, Jerich (2000) identified the evolution of IT competence to include abilities to perform multimedia programming, utilise scanners and digital cameras and basic hardware maintenance (Abdul Karim, 1999). McConnell and Koch (1990) believed that the proper application of IT in organisations should be one that extends the human

capacity. They proposed six IT competencies as described in Table 2.2. They further argued that the focus should not be on what IT can do but how people can best perform with the latest IT. This ensures full and effective use of IT in the workplace.

Table 2.2: McConnell and Koch's Six IT Competencies

IT Competencies	Description of Competencies
Decision thinking	Concerned with the process of thinking toward a decision rather than focusing on making decisions
Data interpreter	Concerned with interpretation of data to become information and new knowledge and supplying them to others for creating innovation and new ideas
Organising responsibility	Concerned with new way of doing things focusing on responsibilities rather than tasks
Frontline-Empowerment	Concerned with ability for empowering and supporting the frontline which stress on delivering corporate values to customers
The new knowledge skills	Concerned with acquiring new knowledge about new data, how to interpret the data and how to use them effectively
Continuous learning	Concerned with individual effort and motivation to continuously learn and grow.

A major criticism on this study is its narrow focus on IT competencies for executives and management. For support staff such as clerical workers, some of the IT competencies identified in the study, need to be reviewed whilst the descriptions of the competencies need to be 'adjusted' accordingly. Within context of this research, the implementation of IT applications in an institution of higher education has created or expedited significant changes in the competencies required by clerical workers.

2.10 DEMOGRAPHIC VARIABLES

There are certain demographic variables, such as the level of education and work unit, which are known to have significant impacts on IT training (Amran, 2003). Other variables, such as job classification, past experience and employment status, will also be studied in this research to see if there are any differences in the IT competence of university clerical workers based on the aforementioned demographic variables.

For the purpose of this study, the demographic information solicited is as follows: educational background, type of work unit in which they were employed, job classification level, total years of

administrative experience both in and out of the university, and work status. The study investigates the extent to which IT competence differs by these demographic variables. Previous research tends to indicate that some of these demographic variables may influence individual perceptions thus affecting their interest (Maurer, 1994).

2.11 SUMMARY

The models discussed here (i.e., Durand, Baldwin & Ford, Bostrom et al. and Bowman & Deal) indicate that a wide range of variables and environmental factors can have an impact on IT competencies. However, only limited research has been done on these models within a higher educational institution setting, using clerical workers as the unit of analysis. Several issues in these studies, such as the findings based on an extensive literature review, correlational analyses, inadequate criterion measures (e.g., self-reports of competence development), questionable scale constructs in the absence of reliability and factor analyses to confirm dependency and the dimensionality of the items and scales used to measure hypothesised constructs, and potential unreliable construct measures (e.g., constructs measured with only one item), suggest that many of these findings can only be regarded as a preliminary evidence of model's validity. Consequently, our understanding of the competence development among university clerical workers is still greatly restricted.

This review of literature provides a narrow focus on a few models which are deemed as relevant to the research. Though, there are many other models like the ones provided below, on competencies and training effectiveness, however, they should be interpreted cautiously:

1. Huczynski and Lewis' (1980) Transfer Process Model, that focused on the interaction of training course variables, training motivation and work environment, was based on a relatively small sample (n=48) of Scottish subjects, suggesting generalisability limitations. Furthermore, the subjects also attended training programs organised by different organisations (a university-run course versus a course run by a management consultant) indicating that intra-session differences could have affected the outcome.
2. Mathieu et al. (1992) developed and tested a model, based on valence-instrumentality-expectancy theory, which linked the individual and situational variables to the trainees' training motivation, learning and posttest. However, the trainees who were chosen through

self-nomination were suspected to perceive greater training motivation than trainees otherwise assigned.

3. Holton's (1996) model is perhaps the most comprehensive integration of the relevant variables into a model of training effectiveness. Holton suggested that the HRD Evaluation Research and Measurement Model hypothesised that training outcomes (e.g., competence and performance) are a function of three primary influences (ability/enabling elements, motivational elements and environmental elements) and a number of secondary influences such as personality or job attitudes. However, one shortcoming of Holton's (1996) model is its failure to include other training design variables (e.g., use of instructional objectives, use of adult learning principles), although the potential importance of these variables in fostering learning and performance is strongly suggested in most literature. Furthermore, this model has not been empirically tested and researched to validate and correlate its components (Holton, 1996).

CHAPTER III**THEORETICAL FRAMEWORK AND CONCEPTUAL MODELS**

Theoretical framework and conceptual models for this study were developed, based on the research flow chart shown in Chapter 1 (refer Figure 1.1). The uniqueness of this research is that the theoretical framework and conceptual models are continuously developed after the completion of the literature review and the Expert Opinion Assessment (EOA), based on a similar approach by Brown and Bostrom (1994). The EOA is a method used in this study to identify known factors for IT training effectiveness among clerical staff at the higher educational institutions.

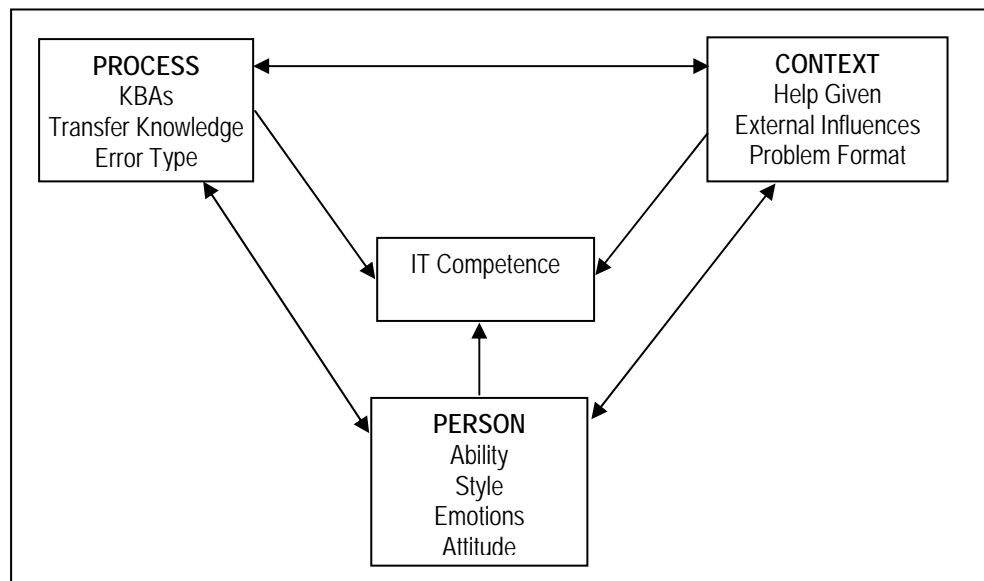
The literature review uncovered four critical models for the study: Durand model (1998) for the definition and assessment of competence, Baldwin-Ford (1988) model which is primarily a model of the training transfer process, the Bostrom et al. Learning/Using Software Model (1988) which is a two-step process for software learning from the training site to the workplace, and the Bolman and Deal (1990) perception on change factors. The works of these theorists, supported with the findings of the EOA, are viewed as important in the study on IT competencies and the conditions for training effectiveness through the identification of several variables for this study. These variables will undergo a process of refinement to formulate a series of theoretical framework and conceptual models in order to address the research questions formulated earlier as some questions need to be addressed accordingly. First, are the existing models appropriate for the institutions of higher education as existing research has mainly focused on larger organisations? Second, are the existing models suitable for the clerical workers, as a relatively high proportion of these models are focused on executives and managers? In the light of these concerns, this study was conducted with the objectives of developing a sound model of competencies of clerical workers in the higher education institutions in Malaysia.

3.1 THEORETICAL FRAMEWORK

Warmbrod (1986) wrote, "I am assuming that we agree that a theoretical/conceptual framework can be defined as a systematic ordering of ideas about the phenomena being investigated or as a systematic account of the relations among a set of variables" (p.2). Based on research from the

models discussed in the previous chapter, a modified version of Ceci's (1990) process-person-context framework will be used as the principal framework for investigation, i.e., to organise the predictor variables in this study. His framework involved three main areas of influence: process variables, i.e., behavior displayed while learning like the use of previous knowledge or making an error; person variables, i.e., cognitive or personality dispositions such as learning styles or attitudes; and context, i.e., environmental influences like task structure or study procedure. Figure 3.1 provides an overview of the specific process, person and context variables examined in this study. Process variables covered knowledge building activities (KBAs), transfer knowledge, errors made and resources used. Persons variables consisted of computer ability, learning style (formal versus informal), emotions and attitudes. Context variables included degree of help given, external influences (e.g., software quality or training procedure) and problem format during training. However, this simplified theoretical framework needs to be elaborated to address the complexity of the study through the development of conceptual models.

Figure 3.1: IT Competence Acquisition Framework



Adapted from Ceci's (1990) model of knowledge acquisition

Figure 3.1 is an initial attempt to show that each factor is capable of influencing or motivating a clerical worker either independently or through interactions with other factors as a group, thus implying the concept of integration. While attractive in its simplicity, it was felt that this framework omitted other key components which could be important for understanding issues of IT competence and perceived IT training effectiveness. As a result, a more comprehensive model for competence was postulated for answering the research questions in the study and to fulfill one of the objectives of the study. Variables from the framework are further refined to provide for the rational explanation of

the interrelationships among constructs, definitions, and propositions and for the explanation of present conditions or prediction of future conditions in natural phenomena (Camp, 2001).

3.2 DEVELOPMENT OF CONCEPTUAL MODEL

In order to operationalise a theoretical framework, Foley and Clifton (1990) suggest that an appropriate conceptual model is needed and it should be developed to reflect the environment within which the study is conducted. A conceptual model lays out the dependent variable, the independent variables, and the relationships between them. Therefore, based on the theoretical framework discussed earlier, an initial conceptual model was developed as shown in Figure 3.2. One's conception of competence in the clerical worker occupation is important because this is how the knowledge, skills and attitude will be subsequently translated into practice in the workplace:

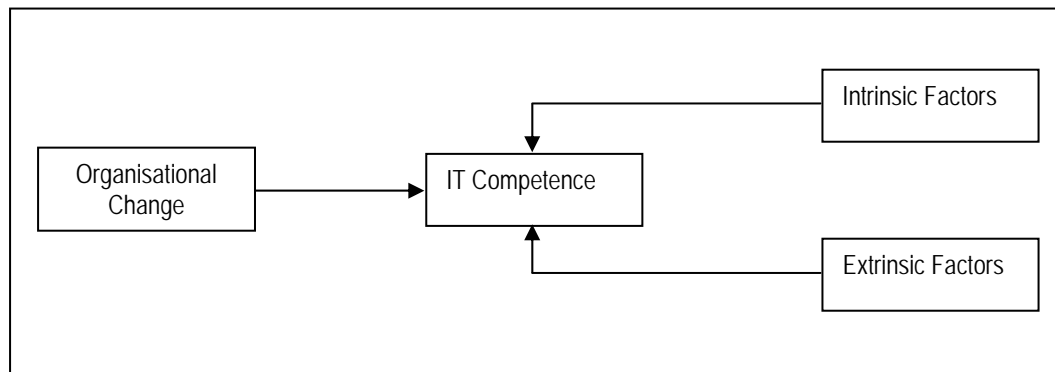
The most fundamental quality in relation to completing a task seems to be its conceptualisation. Of course, a repertoire of knowledge, skills and attitudes is important, but it will be expressed in and used according to the conception of the task, in so far as it will be related to carrying it out and reporting it. (Velde and Svensson, 1996).

Thus the conceptual model for assessing IT competence in this study is based on an alternative conception of competence, i.e., the intentional view (Sandberg, 1991), as opposed to the more traditional behavioural view of competence (e.g., Foyster, 1990; Gonczi, 1992; Thomson, 1993). Sandberg (1991) asserts that the behavioural view is limited because competence is treated as an entity in itself. He argues for the inclusion of the intentional dimension of competence, that is the individual's dynamic conception of the work. This alternative view of competence focuses on the relational link between people's experience of competence and the context or workplace in which the competence is demonstrated. This approach is favoured for this study because of the rapid changes occurring in the environment, for example, the emergence of new occupations and careers, a continuing shift to an information society, increasing internationalism, micro-economic reform and the changing workplace (Candy et al., 1994).

Based on Figure 3.2, the central focus of the study is IT competence. It also shows that for a clerical worker to perform in his/her workplace, he/she is influenced by or could be associated with, at least,

three major factors namely organisational change (from Bolman and Deal), IT competence (from Bostrom et al.) and conditions for training effectiveness (from Baldwin and Ford).

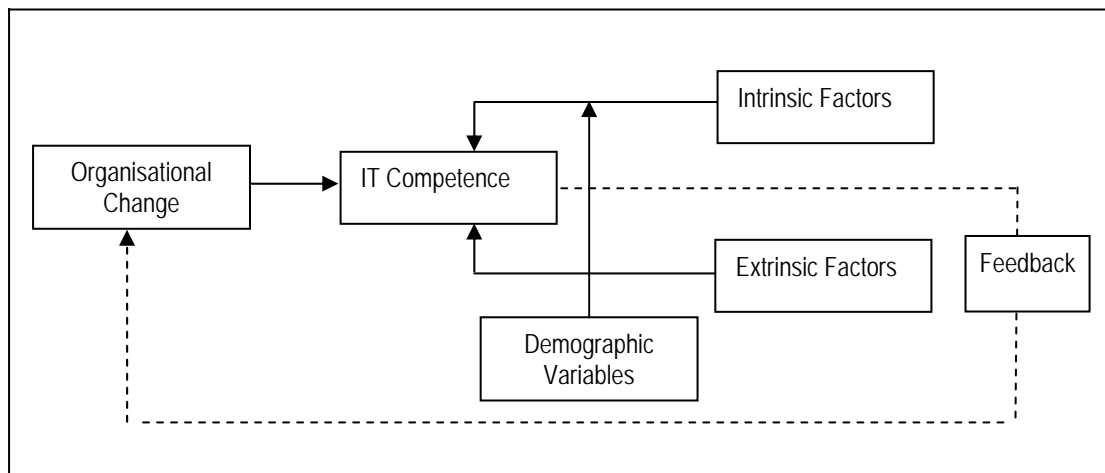
Figure 3.2: Initial Conceptual Model



Organisational factor is classified as a push factor because the pressure of competition creates the need to develop competence and ultimately forces organisations to constantly strive for improved performance by shedding old ways which are not productive and looking for new possibilities to improve performance (Stacey, 1995). Rapid changes in the character of the workplace have fundamentally changed the nature of jobs and have also demanded a different level of performance from workers. At one time, being able to perform one's own job was sufficient. Tasks were of standard nature, repetitive and faced few changes. Whereas, in today's dynamic workplace there is mounting evidence that mere technical competence alone is not sufficient to meet the demands of the future (Evers, Rush and Berdrow, 1998).

Figure 3.3 presents an improved conceptual model that takes into consideration the demographic variables used in the study. Based on the literature review, I noted that both the Baldwin-Ford and Bostrom et al. models failed to take into consideration the effect of demographic variables. I feel that the inclusion of demographic variables would be useful to explain differences in perceptions based on the background of the respondents. A feedback mechanism is included to show the continuous cycle linking IT competence, organisational change and the conditions for training effectiveness. A finalised conceptual model for the study will be presented later upon identification of the intrinsic and extrinsic factors or variables through an expert opinion assessment (to be discussed in Chapter 4).

Figure 3.3: Improved Conceptual Model



3.2.1 Conditions For Training Effectiveness

The Improved Conceptual Model identified conditions for training effectiveness as intrinsic (or built in) and extrinsic (or user defined) factors. To better identify the actual variables, a three-round expert opinion assessment was used. The assessment, which will be elaborated in Chapter 4, was able to identify 59 items which were then consolidated into seven variables as conditions for training effectiveness: trainer competency, trainee characteristics, organisational system, organisational management, training methodology, IT facilities and work culture (refer Appendix 1).

3.2.1.1 Trainer competency as a variable

The first variable is trainee competency which comprises of seven items used to measure the following attributes or items: (1) language proficiency, (2) professional exposure, (3), knowledge (4) Information, Communication and Technology (ICT) skills, (5) communication, (6) instruction, and (7) preparation. These seven items were the recommendations of the expert panel who participated in the expert opinion assessment. A summary of the attributes, related measurements and researchers are provided in Table 3.1.

Table 3.1: Summary of Attributes, Related Measurements and Researchers for Trainer Competency

Item Coding	Item/Attribute	Related Measurement	Researcher(s)	Remark
TCOM1	language proficiency	Language used by trainer (English and Malay)	Lim (1998)	Language barrier is considered as an influential cultural barrier for the learning and training transfer
TCOM 2	professional exposure	Trainer's professional exposure	Tracey (1984)	Substandard instructors will fail to produce the required job skills
TCOM 3	knowledge	Trainer's knowledge	Schrack (1992); Fulkert (1997)	Trainer's level of expertise commensurate with qualification level
TCOM 4	ICT skills	Trainer's Information and Communication Technology (ICT) skills	Fulkert (1997)	Skilful instructors in combination with well-designed and appropriate training programs can lead to improved employee performance and increased organisation performance
TCOM 5	communication	Trainer's communication skills	Fulkert (1997)	Identification of fourteen ASTD skills for trainers: (1) adult learning understanding, (2) objective preparatory skills, (3) coaching skills, (4) feedback skills, (5) group processing skills, (6) intellectual versatility, (7) observing skills, (8) questioning skills, (9) performance observation skills, (10) presentation skills, (11) relationship building skills, (12) subject matter skills, (13) self-knowledge skills, and (14) training and development theories and techniques understanding
TCOM 6	instruction	Instructions given by trainer during training	Fulkert (1997)	Trainer needs thorough understanding of curriculum and instructional system design to deliver quality instructions
TCOM 7	preparation	Preparation of training material by trainer	Fulkert (1997)	Trainers are responsible for the preparation of programme design and development

Based on Table 3.1, most of the researches indicate that a competent trainer has direct or indirect effects on the competency development of trainees. According to Shank (2004), instructor competencies in the areas of administration, design, facilitation, evaluation, and technical matters could influence the outcome of training. For example, a trainer with a high level of language proficiency will be able to conduct training sessions effectively, thus increasing the level of competency of the trainees or participants. Knowledgeable trainers with relevant experience will be confident in conducting training programs and can provide relevant examples during training for the participants to apply their skills.

The importance of trainer competency towards IT competence is reflected by an early study by Dipaolo and Patterson (1983) whereby they delineated that:

The preparation of novice or inexperienced trainers to plan, deliver and evaluate training sessions is a common responsibility of many training and development departments. Training directors and managers who influence training and development decisions recognise that skilful instructors in combination with well-designed and appropriate training programs can lead to improved employee performance and increased organization performance (p. 96).

The American Society for Training and Development (ASTD) realised the need to identify and develop a standard of professional performance and development by their members resulted in the appointment of Patricia McLagan and Richard C. McCulloch to conduct relevant studies in 1981. Resultantly, the McLagan's "Model of Excellence" emerged as the standard for competencies for trainers (Dixon and Henkelman, 1991). The original fourteen ASTD skills include: (1) adult learning understanding, (2) objective preparatory skills, (3) coaching skills, (4) feedback skills, (5) group processing skills, (6) intellectual versatility, (7) observing skills, (8) questioning skills, (9) performance observation skills, (10) presentation skills, (11) relationship building skills, (12) subject matter skills, (13) self-knowledge skills, and training and development theories and techniques understanding (Fulkert, 1997).

For this research, 14 ASTD skills were adapted into the following areas required to be a competent trainer: (1) language proficiency, (2) professional exposure, (3), knowledge (4) ICT skills, (5) communication, (6) instruction, and (7) preparation. The language used by the trainer is seldom addressed in most studies. However, since this study is conducted on Malaysian universities where most of the medium of instruction is Malay, the language barrier is considered as an influential cultural barrier for the learning and training transfer. This is also in accordance to a research by Lim (1998) on the effect of training design, work environment and cultural factors on the transfer of training for Korean HRD professionals.

3.2.1.2 Trainee Characteristics As A Variable

The second variable, trainee characteristics comprises of 10 items used to assess the following attributes or items: (1) self-efficacy, (2) IT awareness, (3) locus of control, (4) current IT skills, (5) language proficiency, (6) rationale, (7) preparation, (8) aptitude (9) interest, and (10) education background. These ten items were recommendations of the expert panel who participated in the expert opinion assessment. A summary of the attributes, related measurements and researchers are

provided in Table 3.2. Though in a different context, the aforementioned attributes were found to be consistent with findings from a study by Weidner et al. (2001) on the influence of trainee characteristics on the effectiveness of health and safety training for professional site workers.

Table 3.2: Summary of Attributes, Related Measurements and Researchers for Trainee Characteristics

Item Coding	Item/Attribute	Related Measurement	Researcher(s)	Remark(s)
TCH1	self efficacy	Trainee's attitude (e.g.: commitment, confidence and openness)	Gist, (1989); Gist, Schwoerer & Rosen, (1989); Mathieu, Martineau & Tannenbaum, (1993); Noe & Schmitt, (1986)	Individual's self-efficacy will have an impact on his/her motivation to transfer
TCH2	IT awareness	Trainee's awareness of IT literacy	Hignite and Echternacht (1992); Shifflett et al. (1993)	Knowledge of computer technologies and capability of computer technologies has an impact on the process of implementation of computer technologies
TCH3	locus of control	Trainee's motivation	Wessbein (2000)	Motivation led to greater preparation, which related to better transfer performance
TCH4	current IT skills	Trainee's current IT skills	Hignite and Echternacht (1992); Shifflett et al. (1993)	Knowledge of computer technologies and capability of computer technologies has an impact on the process of implementation of computer technologies
TCH 5	language proficiency	Trainee's language/communication mastery	Lim (1998)	Language barrier is considered as an influential cultural barrier for the learning and training transfer
TCH 6	rationale	Understanding of the rationale for training	Bynner (1994)	Positive correlation between the number of courses that a worker has taken and their self-reported improvement in skill levels.
TCH 7	preparation	Trainee's preparation before training	Wessbein (2000)	Motivation led to greater preparation, which related to better transfer performance
TCH 8	aptitude	Trainee's aptitude (e.g.: visualisation skills)	Schmidt and Hunter, (1996)	Assessment of aptitude and general ability are consistently shown to be amongst the best predictors of future training and job success
TCH9	interest	Trainee's interest towards IT	Al-Mwadih (1999)	Administrators expressed great interest in computer training since they realised its importance in a developing institution
TCH10	education background	Trainee's education background	Amran, Ebi and Shakir (2003)	Trainee with better educational background have positive outlook towards IT training

Hancock (1990) believes that institutional administrators became models for computer use rather than tentative proponents. Just as lecturers need computer skills to perform their job tasks more effectively, so do institutional administrators. And just as staff development activities enable lecturers to acquire useful computer skills, similar activities provide administrators with the tools and competencies they need to do their jobs more efficiently. Hancock (1990) says that to become effective computer users, administrators need at least five basic competencies. First, they should use computers for personal productivity by learning the basic operations of word processing, database, and spreadsheet software. As they become comfortable with these packages, they can issue their own correspondence, create and manipulate name and address lists, and develop and analyse rudimentary budget information. Their competence in these functions leads to autonomy in basic administrative tasks, sparing more time to interact with management, students and lecturers.

Second, the administrators should be aware of the many administrative tasks microcomputer can simplify. Third, administrators should learn to determine appropriate computer applications for their institutions. To make these decisions, administrators must understand thoroughly the software applications and the conditions that will affect their success in a particular institution. These administrators will further need to assess the costs and benefits for potential electronic applications. Fourth, administrators should be well informed about the selection of the most appropriate hardware and software to meet their institutional needs. Finally, institutional leaders should be able to develop comprehensive plans to implement hardware and software features.

3.2.1.3 Organisational System As A Variable

The third variable, organisational system comprises of ten items used to assess the following attributes or items: (1) compensation and incentives, (2) work performance, (3) clarity of work instructions, (4) job description, (5) justification for IT training, (6) career advancement, (7) performance appraisal, (8) immediate benefit, (9) career development, and (10) group productivity. These ten items were recommendations of the expert panel who participated in the expert opinion assessment. A summary of the attributes, related measurements and researchers are provided in Table 3.3.

According to Doolen et al. (2003), organisational systems that provided teams with the necessary information were found to have a significant and positive linear relationship with both team leader ratings of effectiveness and team member satisfaction. Brown and Bostrom (1994) used the term

organisational design which has some of the attributes in Table 3.3, to study its relationship with end user computing management effectiveness.

Table 3.3: Summary of Attributes, Related Measurements and Researchers for Organisational System

Item Coding	Item/Attribute	Related Measurement	Researcher(s)	Remark(s)
OS1	compensation and incentives	Compensation/ incentives given after training	Baldwin and Ford (1988); Brinkerhoff and Gill (1994)	Barriers and incentives affect employee participation and utilisation of programs. People resist change or try to maintain status quo due to lack of interest in the new ideas, lack of interest in new knowledge and skills, fear of change itself and lack of incentive/reward
OS2	work performance	Work is performance oriented	Rouiller and Goldstein (1993)	Job performance and unit performance affects the degree to which learned behaviour will be transferred onto the actual job
OS3	clarity of work instructions	Clear work instructions given	Tobin (2000)	Quality of materials, ability of instructors and clarity of instructions are the traditional measures of training quality.
OS4	job description	Job description is relevant to IT training	Reynolds and Brannick (2001)	Cognitive task analysis is useful for training and job design
OS5	justification for IT training	Importance of IT training from the university's perspective is made known	Dearden, Reed and Van Reenen (2000)	Overall effect of training on productivity is around twice as high as the wage effect.
OS6	career advancement	Opportunity for promotion	Noe (1986)	Pre-training motivation to learn and post training motivation to transfer have been found to be related to training outcomes and individual influences such as career planning
OS7	performance appraisal	Contributes towards performance appraisal	Tuzuner and Berber (2001)	Performance appraisal is strongly correlated with training need analysis.
OS8	immediate benefits	Immediate organisational benefits after training	Bartlett (1999)	Employee attitudes towards their employing organisation is related to their perception of the amount, access, support, motivation, and perceived benefits of training
OS9	career development	Understanding of the importance of IT training for career development	Knowles, (1980); Noe (1986); Perry, (1990); Thibodeau, (1980).	Pre-training motivation to learn and post training motivation to transfer are related to training outcomes and individual influences such as career planning. Relevance of training programs to an individual's job and career aspirations can affect their motivation to learn
OS10	Group productivity	Group productivity	Barrett and O'Connell (2001)	General training Improves productivity of workers

3.2.1.4 Organisational Management As A Variable

The fourth variable, organisational management comprises of seven items used to assess the following attributes: (1) management commitment, (2) IT awareness, (3) openness, (4) management support, (5) management effectiveness, (6) leadership, and (7) organisational image. These seven items were recommendations of the expert panel who participated in the expert opinion assessment. A summary of the attributes, related measurements and researchers are provided in Table 3.4.

Table 3.4: Summary of Attributes, Related Measurements and Researchers for Organisational Management

Item Coding	Item/Attribute	Related Measurement	Researcher(s)	Remark(s)
OM1	Management commitment	Management commitment at work place	Bartlett (1999)	Coaching behaviours by the leader help to build employee commitment to the organisation. Training is related to organisational commitment
OM2	IT awareness	IT awareness among management	Moran (1998)	Computer awareness curriculum can affect the workers' personal abilities and attitudes, their tendency toward continued improvement of skills, and their increased ability to transfer theory taught to the workplace
OM3	Openness	Openness among management	Abdul Karim (1999)	Faculty administrators exhibited positive attitudes toward computer technologies.
OM4	Management support	Support by management	Broad, (1982); Michalak, (1981); Tannenbaum and Yukl, (1992); Zernke and Gunkler, (1985).	The tangible and/or perceived support of the manager can be major factors both before and after the training intervention
OM5	Management effectiveness	Management effectiveness at work place	Huang (2001)	Training effectiveness is apparent in established firms compared to new firms
OM6	Leadership	Vision of leadership at university	Downing (1999)	Listening, decision making, problem solving, verbal communication, leadership and time management should be emphasised in training
OM7	Organisational image	Organisational image towards IT	Pratt and Rafaeli (1997)	Organisational identification occurs when an individual's beliefs about his or her organisation become self-referential or self-defining

Organisational management is the principal driving force that encourages or inhibits the transfer of training to the work place (Baldwin and Ford, 1988). Within the context of this study, IT could function as both inhibitor and enabler. As such, dealing with technology in any organisation, requires coping with problems of adaptation and integration. It is the skilled leader who can lead the technology movement by showing exemplary leadership and commitment to the cause. Leadership that is proactive in its problem-solving orientation and that values creativity at all organisational levels is

essential for increasing its readiness to cope with new changes and opportunities (Evans, 1996). Currently, the trends of educational reforms and the pursuit of multiple institutional functions in the new century are identified as important challenges brought by the changing education environment (Cheng, 2003). During the 1980s and 1990s, the society and the education environment have changed very quickly, i.e., goals became more complex and uncertain, tasks became more difficult and demanding, expectations from the public became higher, input quality of students and teachers became more diverse and institutional accountability to the public became difficult than before. All these 'indicators' will inevitably become challenges to the leadership of universities as they pursue institutional effectiveness and education quality in such a rapidly changing environment. At the same time, it has become essential for university administrators to be effective at work while serving their customers in the best possible ways.

3.2.1.5 Training Delivery And Methodology As A Variable

The fifth variable, training delivery and methodology comprises of thirteen items used to assess the following attributes: (1) training need analysis, (2) modular, (3) lecture, (4) demonstration, (5) on the job training (OJT), (6) notes and manual, (7) informal, (8) combination, (9) training delivery, (10) course material, (11) practical oriented, (12) class size, and (13) duration of training. These thirteen items were recommended by the expert panel who participated in the expert opinion assessment. A summary of the attributes, related measurements and researchers are provided in Table 3.5.

Adult training methods are usually restricted to on-the-job, lecture-based, computer-based and consultancy and contracted training (Scott, 1999). However, IT training should be application-based since the computer is supposed to be a tool (Rees, 1987) as it is believed that such application-based computer training could foster higher cognitive skills by encouraging the generalisation of these skills and fostering a positive attitude towards change and self-improvement.

Just as training has been used in introducing and supporting other types of pedagogical changes, similar strategies are necessary to prepare administrators for effective use of technology (Brody, 1995). An effective training programme is essential for increased technology competence levels and could significantly reduce the costs of technology implementation due to reduced support being necessary for users (Brody, 1995). Additionally, if the proper training is not provided at the front end of the implementation process, the full benefits of the technology may not be realised (Costello, 1997).

Table 3.5: Summary of Attributes, Related Measurements and Researchers for Training Delivery And Methodology

Item Coding	Item/Attribute	Related Measurement	Researcher(s)	Remark(s)
TDM1	Training need analysis	Training contents	Agabiti (1997)	Universities are recommended to conduct programme improvement and needs assessments every 3-5 years
TDM2	Modular	Modular base	Nottinghamshire Research Observatory Ltd (2002)	Flexible Methods of Delivery such as short courses, short notice booking, credit transfer system, on-site, one-to-one training and modular courses have impact on training transfer
TDM3	Lecture	Lecture base	Elder (1997)	Hands off approach does not work in an academic environment
TDM4	Demonstration	Demonstration oriented	Elder (1997)	Hands off approach does not work in an academic environment
TDM5	OJT	On job training	Reddy (1996)	Adequate on-the-job training to secretaries would make them less inclined to leave the university
TDM6	Notes and manual	Using notes and manual	Elder (1997)	Hands off approach does not work in an academic environment
TDM7	Informal	Informal	Enos (2001)	Managers learned mostly from informal learning. Work environment variables and informal learning were found to have no significant relationship with the transfer of learning. Further analysis showed that a significant inverse relationship existed between organisational support and informal learning.
TDM8	Combination	Combination	Nottinghamshire Research Observatory Ltd (2002)	Flexible delivery methods such as short courses, credit transfer system, on-site, one-to-one training and modular courses have impact on training transfer
TDM9	Training delivery	Training and teaching delivery	Blank (1983); Fulkert (1997)	Trainer needs thorough understanding of curriculum and instructional system design to deliver quality instructions
TDM10	Course material	Course material	Fulkert (1997)	One of the fourteen ASTD skills for trainers is subject matter skills
TDM11	Practical oriented	Practical oriented	Elder (1997)	Hands off approach does not work in an academic environment
TDM12	Class size	Class size	The California Education Policy Seminar and The California State University Institute for Education Reform (1996)	Class size has impact on training transfer
TDM13	Duration of training	Duration of training	Jerich (2000)	Planning of training duration is important as the lack of time was the strongest barrier to the development of knowledge and skills in the workplace and for programme attendance

3.2.1.6 IT Facilities As A Variable

The sixth variable, IT facilities comprises of nine items used to assess the following attributes: (1) hardware, (2) software, (3) equipment support, (4) computer availability, (5) software availability, (6) technical support, (7) user friendly, (8) reliability of technology, and (9) software relevance. These 9 items were recommendations of the expert panel who participated in the expert opinion assessment. A summary of the attributes, related measurements and researchers are provided in Table 3.6.

Table 3.6: Summary of Attributes, Related Measurements and Researchers for IT Facilities

Item Coding	Item/ Attribute	Related Measurement	Researcher(s)	Remark(s)
ITF1	Hardware	Hardware for training	Miller (1995)	The trends or events most likely to influence the technological delivery of instruction include: computers in classrooms for information acquisition and delivery, disparity in wealth among schools and students, technology that allows teachers to design multimedia lessons and individualise instruction and schools linked together through audio/video communication
ITF2	Software	Software for training	McKay (1999)	Metacognitive strategy training may be an appropriate instructional strategy for software training
ITF3	Equipment support	Supporting equipment for training	Miller (1995)	The trends or events most likely to influence the technological delivery of instruction include: computers in classrooms for information acquisition and delivery, disparity in wealth among schools and students, technology that allows teachers to design multimedia lessons and individualise instruction, schools linked together through audio/video communication and a national information infrastructure
ITF4	Computer availability	Computers at work place	Baldwin and Ford (1988)	Support and opportunity to use will lead to learning and retention
ITF5	Software availability	Software at workplace	Baldwin and Ford (1988)	Support and opportunity to use will lead to learning and retention
ITF6	Technical support	Technical support at work place	Amran (2002); Baldwin and Ford (1988)	Staff's ability to support is the eighth most important technical issue that affects IT strategic planning. Support and opportunity to use will lead to learning and retention
ITF7	User friendly	IT systems used at workplace	Amran (2002)	Acceptance by end-users is the fifth most important technical issue that affects IT strategic planning
ITF8	Reliability of technology	Reliability of equipment and peripherals	Amran (2002)	Reliability of technology is the fourth most important technical issue that affects IT strategic planning
ITF9	Software relevance	Latest versions of software used	Jones (1997)	The technologies that rated highest had, as characteristics, the ability to be networked with other technologies and the ability to perform multiple tasks

IT facilities are in fact infrastructures, and are also known as infostructures that support the transfer of IT training (Amran, Ebi and Ismail, 2002). Within this context, Senn (1998) had highlighted the importance of technical support and reliability of IT to complement the computer software and

hardware. As such we have to look at orgaware, technoware, humanware and inforware in an integrated manner to ensure the successful transfer of IT training to the workplace (Amran and Al-Firosh, 2001).

3.2.1.7 Work Culture As A Variable

The seventh variable, work culture comprises of three items used to assess the following attributes: (1) peer support, (2) team work, and (3) learning organisation. These three items were recommendations of the expert panel who participated in the expert opinion assessment. A summary of the attributes, related measurements and researchers are provided in Table 3.7.

Table 3.7: Summary of Attributes, Related Measurements and Researchers for Work Culture

Item Coding	Item/Attribute	Related Measurement	Researcher(s)	Remark(s)
WC1	Peer support	Support form colleagues	Ford et al. (1992); Ford and Fisher (1994)	Supportive work groups were associated with performance of more complex and difficult tasks. Importance of the immediate job context that surrounds the employee as critical to transfer. Managers who believed their subordinates and peers were supportive of their training efforts were more likely to perceive greater transfer of their training skills.
WC2	Team work	Working in teams or groups	Haccoun and Saks (1998).	Most training activities aim to enhance teamwork, self-management or leadership skills, but are not easily linked to organisational performance measures
WC3	Learning organisation	Learning/knowledge culture	Pate et al. (2000).	Workers participating in lifelong learning programs showed that investment in these programs likewise results in positive benefits from general training

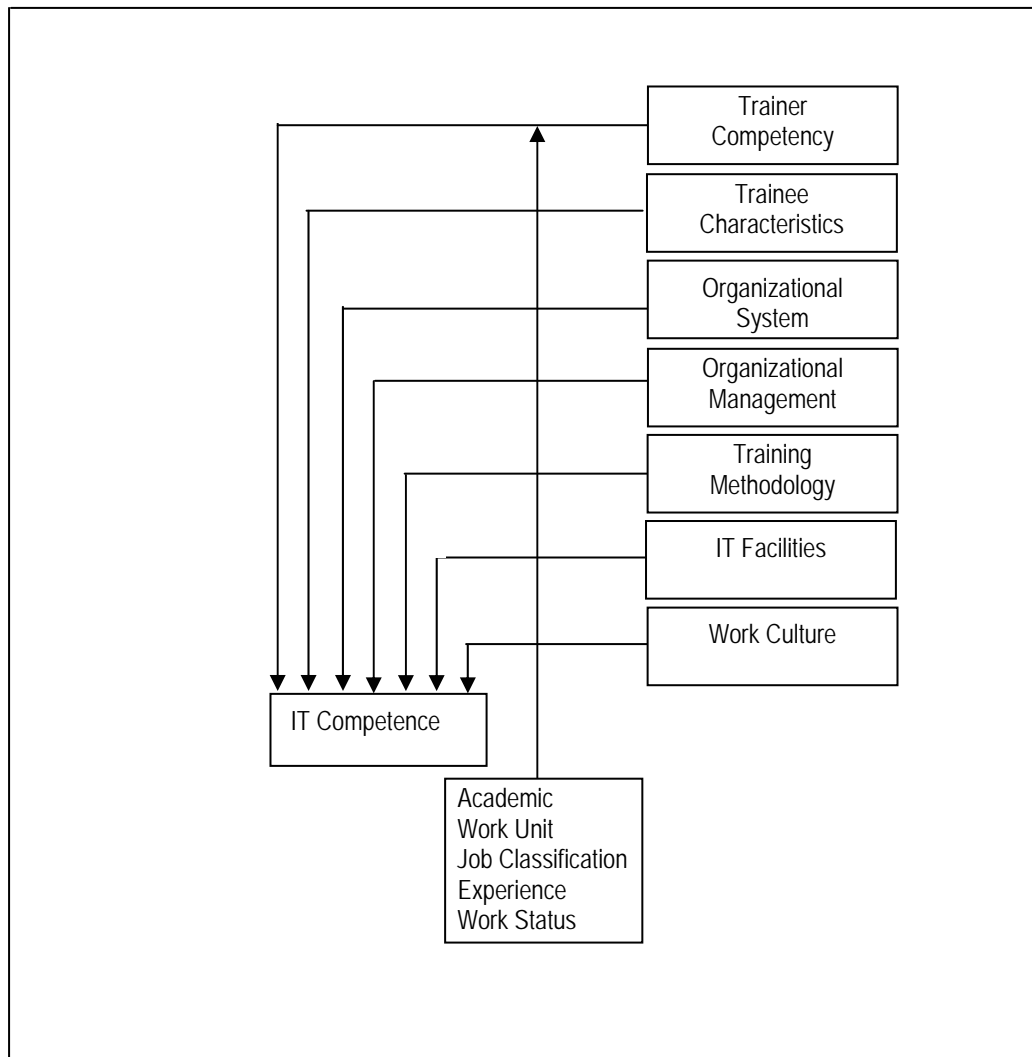
Work culture is a pattern of basic assumptions, invented, discovered, or developed by a given group as a result of coping with problems of external adaptation and internal integration that has worked over time, well enough to become valid and therefore taught to the members as the correct way to perceive, think, and feel in relation to these problems (Evans, 1996). A work culture such as lifelong learning is a new name for an old idea, as humans bear the potential for learning from the day of birth to the day of death (Hanna et al., 1994). Based on a case study at a manufacturing organisation, Southern and Allistair (1994) believed that there are many benefits of using IT as the main driver in an "information-based" culture. Problem areas are now known as areas for potential improvement.

The continuous improvement ethic, which was already in place in the company, now has a better basis for better implementation.

3.3 THE FINALISED CONCEPTUAL MODEL

The finalised conceptual model presented in Figure 3.4 is designed by taking into consideration the conclusions of the expert opinion assessment as well as the initial and improved models. This model shows IT competence as the dependent variables. Seven independent variables and five moderators were used for the study. Supporting hypotheses will be formulated based on the finalised conceptual model.

Figure 3.4: A Conceptual Model of IT Competence



The finalised conceptual model for this study is developed by using the factor approach. The factor approach is favoured over the process approach so as to better understanding the relationship between causes and effects. Within the context of this research, the causes are the seven independent variables, while the effect is IT competence. Furthermore, “both predictors and outcomes are conceived as variables that can be measured along some type of scale” (Newman and Robey, 1992, p. 250). In factor theories, these variables are usually conceptualised as variables: entities which can take on a range of values (Malhotra, 1997).

The factor approach is also employed as it calls for the exclusion of the feedback loop and organizational change (push factor) from the finalised conceptual model. This makes the testing of the model more do-able and achievable. Based on the finalised conceptual model, thirteen variables (7 independent variables, 5 moderators and 1 dependent variable) were identified and will be used for this research. Though the independent variables are considered to be related to effective IT training (dependent variable), it is not known whether the relationship is positive or negative, strong or weak. How the seven independent variables and five moderating variables best relate to IT competence needs to be operationalised.

3.4 RESEARCH HYPOTHESES AND PROPOSITIONS

Research questions 1, 2 and 5 as well as research questions 3 and 4 are oriented towards qualitative and quantitative methods respectively. As such, research hypotheses were formulated for research questions 3 and 4, while research propositions were formulated for research questions 1, 2 and 5.

3.4.1 Research Hypotheses

A series of hypotheses could be developed to answer the following research questions 3 and 4 (RQ3 and RQ4):

RQ3 What are the conditions for effective training in order to enhance IT competencies among Malaysian university clerical workers and how are the conditions ranked?

RQ4 What is the relationship between conditions for effective training and IT competence, and are there differences in IT competence and the conditions for effective training based on the background of clerical workers?

Based on research question 3 there is only one hypothesis to be tested using Kendall's coefficient of concordance based on the outcomes of the Expert Opinion Assessment:

Ho₁: There is no consistency in response from the experts

Based on Figure 3.5, a correlational analysis could be developed to investigate how the conditions for IT training are likely to relate with IT competence. As such, the following null hypotheses are formulated accordingly to answer research question 4:

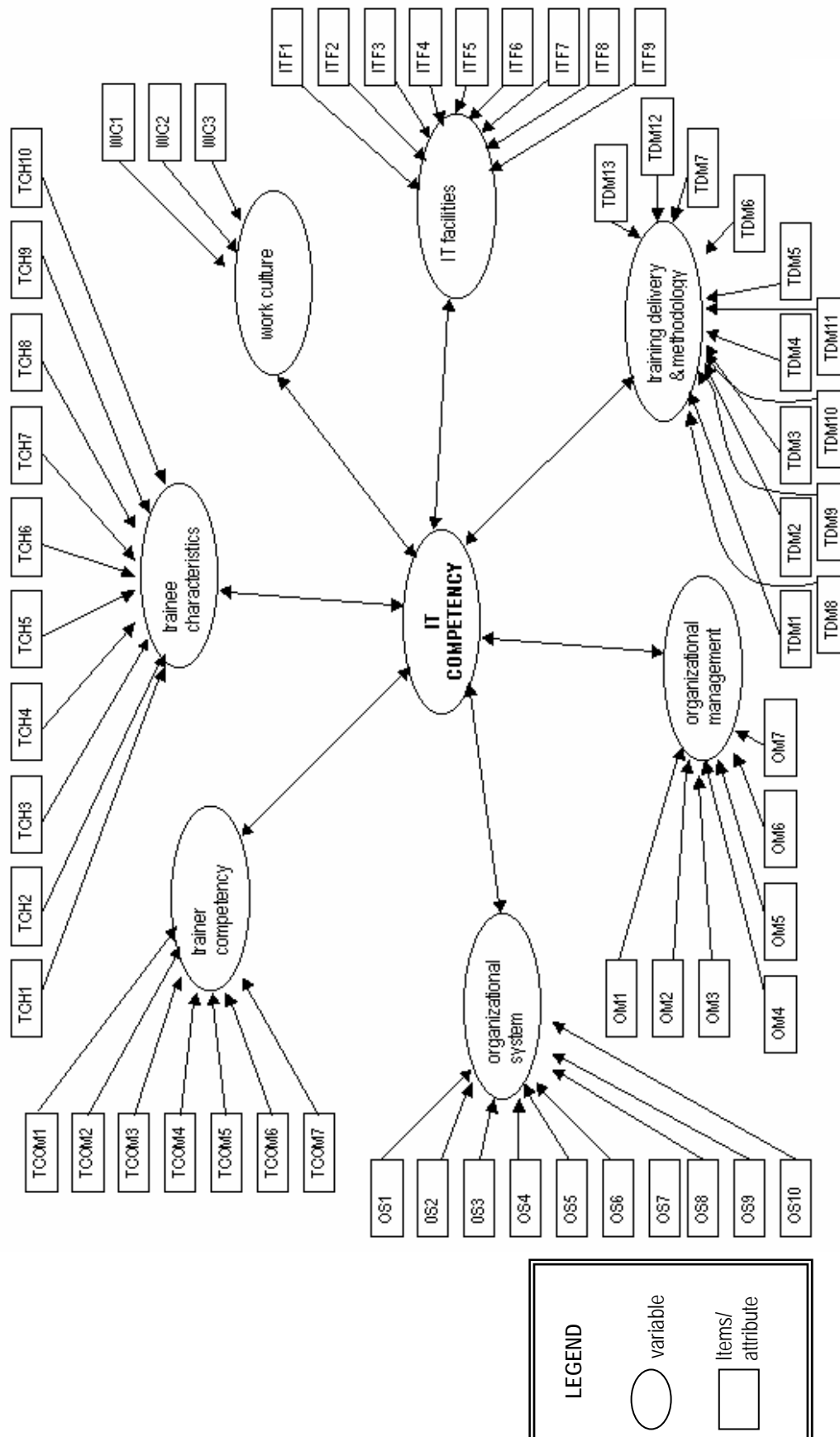
- Ho₂: There is no correlation between IT competence and trainers' competency
- Ho₃: There is no correlation between IT competence and trainee characteristics
- Ho₄: There is no correlation between IT competence and organisational system
- Ho₅: There is no correlation between IT competence and organisational management
- Ho₆: There is no correlation between IT competence and training delivery and methodology
- Ho₇: There is no correlation between IT competence and IT facilities
- Ho₈: There is no correlation between IT competence and work culture

The existence of five demographic variables in the study allows comparison of IT competence to assess the existence of differences. As such, a maximum of 30 null hypotheses⁷ using Mann Whitney U and Kruskal Wallis were formulated to compare means ranking of all items (or attributes) measuring IT competence in the questionnaire by each demographic variable in order to answer research question 4:

- Ho₉: Mean ranking for *I can feel there is an increase in IT skill after training* is the same for all levels of academic qualification
- Ho₁₀: Mean ranking for *I can feel there is an increase in IT knowledge after training* is the same for all levels of academic qualification
- Ho₁₁: Mean ranking for *I have acquired positive attitude after IT training* is the same for all levels of academic qualification
- Ho₁₂: Mean ranking for *self productivity has increased after IT training* is the same for all levels of academic qualification
- Ho₁₃: Mean ranking for *IT training has been successfully transferred to the work place* is the same for all levels of academic qualification
- Ho₁₄: Mean ranking for *IT training has improved team work effectiveness* is the same for all levels of academic qualification

⁷ Originally there are 6 items and 5 demographic variables in the questionnaire thus implying the possibility of 6 X 5 = 30 hypotheses to be generated. However, certain items may be omitted after conducting the factor analysis.

Figure 3.5 Relationship Between Variables, Attributes And It Competencies



- Ho₁₅: Mean ranking for *I can feel there is an increase in IT skill after training* is the same for all types of work unit
- Ho₁₆: Mean ranking for *I can feel there is an increase in IT knowledge after training* is the same for all types of work unit
- Ho₁₇: Mean ranking for *I have acquired positive attitude after IT training* is the same for all types of work unit
- Ho₁₈: Mean ranking for *self productivity has increased after IT training* is the same for all types of work unit
- Ho₁₉: Mean ranking for *IT training has been successfully transferred to the work place* is the same for all types of work unit
- Ho₂₀: Mean ranking for *IT training has improved team work effectiveness* is the same for all types of work unit
- Ho₂₁: Mean ranking for *I can feel there is an increase in IT skill after training* is the same for all levels of job classification
- Ho₂₂: Mean ranking for *I can feel there is an increase in IT knowledge after training* is the same for all levels of job classification
- Ho₂₃: Mean ranking for *I have acquired positive attitude after IT training* is the same for all levels of job classification
- Ho₂₄: Mean ranking for *self productivity has increased after IT training* is the same for all levels of all job classification
- Ho₂₅: Mean ranking for *IT training has been successfully transferred to the work place* is the same for all levels of job classification
- Ho₂₆: Mean ranking for *IT training has improved team work effectiveness* is the same for all levels of job classification
- Ho₂₇: Mean ranking for *I can feel there is an increase in IT skill after training* is the same for all years of experience
- Ho₂₈: Mean ranking for *I can feel there is an increase in IT knowledge after training* is the same for all years of experience
- Ho₂₉: Mean ranking for *I have acquired positive attitude after IT training* is the same for all years of experience
- Ho₃₀: Mean ranking for *self productivity has increased after IT training* is the same for all years of experience
- Ho₃₁: Mean ranking for *IT training has been successfully transferred to the work place* is the same for all years of experience
- Ho₃₂: Mean ranking for *IT training has improved team work effectiveness* is the same for all years of experience
- Ho₃₃: Mean ranking for *I can feel there is an increase in IT skill after training* is the same for all types of work status
- Ho₃₄: Mean ranking for *I can feel there is an increase in IT knowledge after training* is the same for all types of work status
- Ho₃₅: Mean ranking for *I have acquired positive attitude after IT training* is the same for all types of work status
- Ho₃₆: Mean ranking for *self productivity has increased after IT training* is the same for all types of work status
- Ho₃₇: Mean ranking for *IT training has been successfully transferred to the work place* is the same for all types of work status
- Ho₃₈: Mean ranking for *IT training has improved team work effectiveness* is the same for all types of work status

3.4.2 Research Propositions

Qualitative propositions are similar to hypotheses only that they address issues involving “what” and “how” questions. Propositions are tested in the sense of coming up with a “yes” or “no” answer or counting instances that fit and those that do not. As such, based on Table 3.8, the following propositions were developed accordingly to address the research questions of this study.

Table 3.8: Formulation of Propositions

RQ1: How do clerical workers of a Malaysian university acquire IT competence?	Prop ₁ : Clerical workers acquire IT competence through formal training process.
RQ2: What is the existing level of IT competence of clerical workers in the Malaysian university?	Prop ₂ : Malaysian university clerical workers' levels of IT competence are below average.
RQ5: How do the conditions for effective training affect IT competence of clerical workers of a Malaysian university?	Prop ₃ : Each condition for effective training has the same impact on IT competence of clerical workers of a Malaysian university.

The first proposition will be answered based on an analysis of a semi-structured interview conducted upon a sample of clerical workers at Universiti Teknologi Malaysia (UTM). A process or procedure on how clerical workers acquire IT competence will be presented accordingly.

The second proposition will be answered by analysing the data from non-participation observations and a specially developed IT competency checklist. An index will be calculated to measure the level of IT competence at UTM.

The third proposition would be answered mainly by the analysis of the semi-structured interview conducted at UTM, and compared with the conclusions drawn by the Expert Opinion Assessment and correlational analysis conducted on data from the survey questionnaires conducted at 24 public universities in Malaysia.

CHAPTER IV

METHODS OF THE STUDY

Assessing clerical workers' IT competence is a complicated, sometimes interactional and sometimes individualistic. Studying how IT competence could be developed requires a method of research that can capture the multiplicity of activities that make up the learning process as well as permit an understanding of the organisational environment that influences these activities. Methods selected must be able to answer the research questions posed earlier. Table 4.1 provides a summary of tools utilised and subjects used to address the respective research questions.

Table 4.1: Research Question, Research Tools and Site/Subject for the Study

Code	Research Question	Tools	Site/Subject
RQ1	How do clerical workers of a Malaysian university acquire IT competence?	Case Study Analysis (Interview, checklist and Document Review)	21 clerical workers from UTM
RQ2	What is the level of IT competence of clerical workers in the Malaysian university?	Case Study Analysis (Interview and Observation)	21 clerical workers from UTM
RQ3	What are the conditions for effective training in order to enhance IT competencies among Malaysian university clerical workers and how are the conditions ranked?	Expert Opinion Assessment (EOA)	25 experts and academicians
RQ4	What is the relationship between conditions for effective training and IT competence, and are there differences in IT competence and the conditions for effective training based on the background of clerical workers?	Survey Questionnaire	554 clerical workers from 24 Malaysian universities
RQ5	How do the conditions for effective training affect IT competence of clerical workers of the Malaysian university?	Case Study Analysis (Interview) and Survey Questionnaire	21 clerical workers from UTM and 554 clerical workers from 24 universities

4.1 TRIANGULATION

Based on Table 4.1, the methods used for the research is a combination of quantitative or qualitative studies or what is known as triangulation. Triangulation means studying the same research problem from varied perspectives in terms of data sources, methods, investigators or theories (Denzin, 1978), so that the convergence of results can be obtained to increase their credibility.

The objectives of the research can be achieved through the combination of the qualitative and quantitative approaches when answering RQ1, RQ2, RQ3, RQ4 and RQ5. With respect to RQ1, RQ2 and RQ5, a qualitative study is necessary to explore how clerical workers acquire IT competence in a Malaysian university (RQ1) and the level of IT competencies among Malaysian university clerical workers (RQ2). A purposely develop set of research instruments comprising of a case study utilising interview (refer Appendices 2A and 2B), document review and observation are used to answer these research questions. In answering RQ3 and RQ4, a quantitative study would be more useful for generalising the conditions for training effectiveness (RQ3) and the relationship between conditions for training effectiveness and IT competence (RQ4). Expert opinion assessment (Appendix 1) and survey questionnaires (Appendices 4A and 4B) will be used specifically to answer RQ3 and RQ4 respectively. Finally, the triangulation method is also deployed to cross check findings from RQ4 and RQ5.

Another form of triangulation occurs when the qualitative case study research gathers information from multiple data sources in the form of interview, observation and document analysis. Van Maanen (1983) terms this as "within-method triangulation" which can also double up as a test for internal reliability and consistency of the responses. As such, this research deploys the "triangulation within triangulation method" by utilising Van Maanen's (1983) approach within the traditional concepts of (Denzin, 1978) and Greene et al. (1989).

4.2 QUALITATIVE METHODS

Choice of research method depends upon the nature of the research problem. The method of research best suited to examine the individual within its context and the dynamics between the individual and its context is qualitative research (Bogdan and Bicklen, 1982; Lincoln, 1985). Methods of qualitative research "allow the author to study relationships or events as they happen in human life

situations” by questioning and observing “persons going about their normal routines” (Merriam and Simpson, 1984, p.63).

As for the study of IT competencies among clerical workers, there is a little research and not much understanding about how acquisition of competencies occurs. To increase this understanding, the meaning of IT competencies at work must be interpreted within the context of the complexity of the organisation, tasks which require the unique perspective provided by qualitative methodology. In addition, qualitative research makes sense when the objective is to develop new or to refine existing theory (Merriam and Simpson, 1984).

Qualitative research is frequently used as a generic term under which a number of research strategies reside (Bogdan and Biklen, 1984). These strategies include case methods, naturalistic inquiry, and phenomenological or ethnographic research, to name a few. Many different research procedures are used in qualitative research, including interviews, observations and analysis of documents all of which will be employed in this study.

As in any qualitative data inquiry, data analysis tended to be ongoing starting from the initial fieldwork until the final stage of writing the thesis, anticipating and accommodating changes generated by the data being analysed. General issues discussed with people yielded newly emerging ones necessitating further expansion of literature review. Categories of themes, sometimes, had to be collapsed and combined in order to accommodate the recurring patterns of topics. Because of these factors, data analysis was overlapping and cyclical in nature.

There were essentially three levels of data analysis in the present study. The first level involved the identification of recurring patterns of themes and topics from the raw data based on the framework and literature review (see Miles and Huberman, 1984 for their similar method of pattern coding as way to identify an emergent theme, pattern, and explanation). Some responses were direct while others were riddled with hidden meanings. For instance, when talking about competent clerical worker, a respondent referred to “someone who gets a promotion, reward or award” while another, offering a thoughtful reflection, believed that “those who gets things done”. Efforts were made to be inclusive when analysing this raw data so that subtlety in meaning and message would not be overlooked. This raw data, gathered from interviews was transcribed verbatim using pseudonyms for the interviewees using MS-word and filed under each respondent, such as “A” for the interview with the first participant. Once the topics and themes were identified and irrelevant information was weeded out, a new file was created with an “a” beginning (for example, “aintA” referring to the

analysed interview with the first participant) leaving the original file (A) intact for later use, i.e., for verification and cross checking purposes. The analysed interview consisted of loosely classified general headings of themes, such as “varying notions of IT competence,” or “factors affecting IT training.” Caution was taken not to narrow down the classification too much because doing so would minimise possible inclusion of newly emergent issues. Besides, it would stifle my interest and enthusiasm in the fieldwork.

At this level, two files were created: the interview file with the first participant (A) and the analysed interview with the participant (aintA). In addition to these two files, it is important to mention here that my personal files consisting of comments on both the contents and events during fieldwork, were very useful in the three levels of data analysis. They were like entries to a personal diary recorded when certain issues were thought to deserve special treatment. Normally they complemented the “notes” prepare after finalising each of the interview files. Many of these notes accurately recorded the potential themes generated by the later data. Through proper management of files and the convenience of moving the texts around, the use of computer during data collection and subsequent data transcriptions helped the organisation of the themes. This way, issues and themes were examined with more consistency and greater depth.

The second level of analysis involved the grouping of the recurring themes and topics from the set of the analysed interviews, personal notes and observational notes. This required a close examination of each one of them and thorough comparison with the other analysed interviews, and a tedious process of classification. During this stage, a significant amount of information had to be excluded due to irrelevancy or ambiguity. Frequent re-examination of the raw data, checking against the other interviews, had to be done to check the internal reliability and consistency of the responses (see Van Maanen's (1983) concept of “Within-method triangulation”). Some groupings needed to be collapsed while a few new groupings and sub groupings were developed (refer Appendix 2C). There was a lot of reshuffling of themes and topics involved. The heading for “varying notions for IT competence,” for example had to be narrowed down, reclassified, and regrouped into several themes.

The third level of data analysis required the categorisation of themes and topics into a few tentative major headings for the purpose of data reduction (see Miles and Hubermans' (1984) three techniques: data reduction, conclusion drawing and verification). The re-identification and regrouping of themes were carried out until meaningful and manageable classifications could be established. Thus, the three levels mentioned were not necessarily executed in any special order but cyclically: both within each level and between levels of analysis. This is important due to the nature of this

interpretive study which requires that description, narration, and interpretation be integrated and unified in the selected themes and topics. For this research, I used Berg's (2004) recommendation in which data display will involve tables of data; tally sheets of themes; summaries or proportions of various statements, phrases or terms; and similarly reduced and transformed groupings of data.

4.2.1 Measuring Competencies

There are a variety of methods for determining employee competency scores. Parry (1998) as well as LeBleu and Sobkowiak (1995) identified multi-source assessments or 360-degree feedback, assessment centres and rating scales are methods which are widely used. Rating scales are the most popular form of gathering data on job characteristics (Peterson et al., 1997). The most common type of rating scale is a written instrument. The rating scale method is a process whereby people familiar with a job make judgements on a variable against a scale. A rating scale is popular due to its low cost method for gathering data on job competencies. A disadvantage of rating scales is that they measure perceptions of the person making the judgement about job competencies. Within context of this study, I used a modified version of the Information Technology Self-Assessment Checklist which is based on the Minnesota Information Technology Competency List (1997) as well as McConnell and Koch's IT Competencies (1990) which is presented in Appendix 2a. This checklist was developed to assess the level of IT competencies among clerical workers in a Malaysian university.

4.2.2 Case Study

The case study approach to research differs from other research designs because it focuses on discovery and interpretation of a specific phenomenon, such as an event, person or group of people connected by a common activity or enterprise, process, or a company or institution. While the case study method focuses on what is known as a "bounded system", it is particularly appropriate when the phenomenon cannot be isolated and reliably studied out of context (Yin, 1994).

A case study research can be positivist (Yin, 1994). Positivists generally assume that reality is objectively given and can be described by measurable properties which are independent of the observer (researcher) and his or her instruments. Positivist studies generally attempt to test theory, in an attempt to increase the predictive understanding of phenomena. In line with this, Orlikowski and

Baroudi (1991) classified IT research as positivist if there was evidence of formal propositions, quantifiable measures of variables, hypothesis testing, and the drawing of inferences about a phenomenon from the sample to a stated population. From a broader perspective, there are six different kinds of theory-building research objectives involved in case study researches (Lijphart, 1971; Eckstein, 1975):

1. Atheoretical/configurative idiographic case studies. These studies have a role as good descriptions that might be used in subsequent studies for theory building, but by themselves, such case studies do not cumulate or contribute directly to theory.
2. Disciplined configurative case studies use established theories to explain a case. The emphasis may be on explaining a historically important case, or a study may use a case to exemplify a theory for pedagogical purposes. A disciplined configurative case can contribute to theory testing because it can "impugn established theories if the theories ought to fit it but do not," and it can serve heuristic purposes by highlighting the "need for new theory in neglected areas" (Eckstein, 1975, p. 99).
3. Heuristic purposes (inductively identifying new variables, hypotheses, causal mechanisms, and causal paths). "Deviant" or "outlier" cases may be particularly useful for heuristic purposes, as by definition their outcomes are not what traditional theories expect them to be. Also, cases where variables covary as expected but are at extremely high or low values may help uncover causal mechanisms (Van Evera, 1997). Such cases may not allow inferences to wider populations if relationships are non-linear or involve threshold effects, but limited inferences might be possible if causal mechanisms are identified (just as cancer researchers use high dosages of potential carcinogens to study their effects).
4. Theory testing of single or competing theories. Theories need to be tested to identify whether the test case(s) are most likely, least likely, or crucial for one or more theories. Testing may also be devised not just to affirm or infirm theories, but to identify their scope conditions, or the conditions under which they are most and least likely to apply.
5. Plausibility probes. These are preliminary studies on relatively untested theories to determine whether more intensive and laborious testing is justified. The term "plausibility probe" should not be used too loosely, as it is not intended merely to lower the standards of evidence and inference and allow easy tests on most likely cases.
6. "Building Block" studies of particular types or sub types to identify common patterns, a particular kind of heuristic purpose. These can constitute component parts of larger contingent generalisations and typological theories. Some methodologists have criticised single case studies and studies of cases that do not vary in their dependent variable (King,

Keohane, and Verba, 1994). However, it can be argued that single case studies and "no variance" studies of multiple cases be useful if they pose "tough tests" for theories or identify alternative causal paths to similar outcomes when equifinality is present (Rogowski, 1996, p. 467). Furthermore, according to Yin (1994) a single case approach is often useful for revelatory cases.

These research objectives vary in their mixes of induction and deduction. Also, a single research design may be able to accomplish more than one purpose -- such as heuristic and theory-testing goals -- as long as it is careful in using evidence and making inferences in ways appropriate to each research objective. For example, it is not legitimate to derive a theory from a set of data and then claim to test it on the same data, although it is sometimes possible to test a theory on different data, or new or previously unobserved facts, from the same case (Van Evera, 1997).

What differentiates case study research strategies, according to Merriam, is its product which Merriam defines as "an intensive, holistic description and analysis of a single entity, phenomenon or social unit" (1988, p. 16). Eisenhardt (1989) focuses on the explanatory study, describing the process of inducing theory using case study data. For Gummesson (1991), however, case studies often have multiple, overlapping purpose and rarely fall into the distinct types Yin describes. Gummesson (1991) finds case study a valid strategy for gaining a "holistic view of a process" within organisation. Case study will be used in this instance with the goal of both understanding of how a Malaysian university organises training activities as the means to improve clerical workers' IT competencies. Within this context, Universiti Teknologi Malaysia (UTM) is most suited to be used as a single exploratory case study (Marshall and Rossman, 1989) due to its uniqueness (refer Annexure 1). Though, single case research designs can fall prey to the mistakes of selection bias or over-generalisation of results, adherence to any of the six theory-building purposes identified earlier justifies the use of single well-selected case. Single case research design also serves the purpose of theory testing particularly well, if they are most or least likely or crucial cases. Prominent case studies by Arend Lijphart, William Allen, and Peter Gourevitch have changed entire research programs by impugning theories that failed to explain their most-likely cases (Rogowski, 1996, p. 467). Similarly, studies of single "deviant" cases, and of single cases where a variable is at an extreme value, can be very useful for heuristic purposes of identifying new theoretical variables or causal mechanisms. Single case studies can also reject variables as being necessary or sufficient conditions (Dion, 1998).

4.2.2.1 The Study and the Researcher-Researched Relationship

This is a case study focusing on how clerical workers acquire IT competence at the UTM (refer Annexure 1). In order to understand the process of acquiring IT competence, the interviewing methodology is employed. The principal focus of this research is to seriously examine the participants' perceptions on the subject matter across various units and faculties. This section describes the nature of the nonparticipant-observation by highlighting the relationship between the researcher and the researched. Such information is thought useful for later discussion of data collection methods, and it also provides background information on the validity and reliability discussed under the "Data Analysis" section.

My familiarity with the workplace and the UTM community, the ever presence of support and assistance, and background knowledge of the training programs greatly facilitated this study. My past experience as an academic staff since 1989 and the interaction I had with colleagues and other staff during past research projects on similar topic for the university's Research Management Centre⁸ managed to raise and retain my curiosity about and interest on the topic since then. Much has been discovered and rediscovered by conducting this research.

My presence as a researcher was viewed positively by most of the clerical workers since I had been moved from faculties to units during my service at UTM. However, my role as a researcher and the potential "threat" brought along were still felt by some members of the units and faculties. But, the "tension" created was later minimised once I had established rapport with the community and a regular presence in the working structure because "as participation increases, marginality decreases, and you begin to experience what your 'others' see and think and feel" (Glesne and Peshkin 1992, p. 58). I was an insider in the sense the clerical workers see me as a conduit to share their problems at the work place. Glazer (1982), in defining reciprocity, stresses the importance of the researcher-researched relationship through "the exchange of favours and commitments, the building of mutual identification and feeling of community (p. 50)." Thus I was not surprised to see that I had received total trust and support from all parties since they perceived that research of this type would be both useful to them and contributive to the field of IT competence in general. My perceived role as an insider helped establish good rapport with the clerical workers. Weir and Roberts (1994), favouring the role of an insider, opine:

⁸ I have been conducting various researches for UTM through the Research Management Centre. Some of the past researches are on IT competencies but conducted on a small scale (i.e., faculty based) and are comparative studies in nature.

Insiders have far greater experience of the situation, and are aware of the history of developments. Collectively and individually they have considerably more insights into the working of a programme or project than any other short stay outsider can possibly be expected to possess (p. 22).

However, I was careful not to let such a good rapport with the participants, i.e., my role as an insider, may have negative consequences on my neutrality. On this matter, Patton (1990) asserts: "Rapport is a stance vis-à-vis the person being interviewed. Neutrality is a stance vis-à-vis the context of what the person says" (p. 231). Capturing the essence of qualitative research requires researchers to steadfastly focus on the issues and be objective in their description. My good rapport with the participants served as a vehicle to achieve such goals.

Unlike casual conversation, interviewing was a novel concept for most of my informants. As such, mutual understanding and respect had to be established at the outset. They were prerequisite to a successful interview. Glesne and Peshkin (1992), in discussing a shift from covert research to a more overt one, stress the importance of a greater sense of responsibility to and reciprocity with the informants. A clerical worker (participant R) who, to give one example, complained to me:

When I called for permission to interview them, I had to go through a rude process of interrogation "Why me?", "Why do you want to know?", "Who will read your transcript? Many also cynically questioned", "I don't think what you are doing will be very useful".

There are others who kept focusing on your intention rather than on the interview questions expressing their fear of negative repercussions. This is just to get an interview. However, the nightmare has not begun until the time of the interview itself. At other times, I received full encouragement, such as participant B who said, ". . . it is time for someone to look at our problems. We need to go beyond the limited scope. We need to look at the relevance of the training programme from the users' perspectives. To me you do the right thing by going to different people asking them what they personally think."

People interviewed tended to downplay the importance of their personal opinion, undermining their own valuable experience and expertise. More than half of the people interviewed would say: "But my opinion will be biased and personal . . . You know all what I am going to say. If you want to know about IT competence, you should talk to the computer people. You can get all the history of IT."

These personal opinions also carry a number of technical and professional experiences drawn after years of rigorous working, thinking process and rich background knowledge in the interrelated fields.

Sometimes humility played a major role as in the case of participant K: "I don't have anything new for you. Everything will be too trivial for you." But an encounter like this naturally led to an extended, informative conversation uncovering many issues without probing. To me this is a good example of making the familiar unfamiliar in ethnography. As Erickson (1990), in voicing concern over the invisibility of everyday life, puts it:

[In quoting the anthropologist Kluckhohn],. . ."the fish would be the last creature to discover water." Fieldwork research on teaching, through its inherent reflectiveness, helps researchers and teachers to make the familiar strange and interesting again" (p. 83).

A casual approach proved to be another aspect of interviewing, crucial to conducting research in the contexts of IT competence among Malaysian clerical workers. Exchanging personal information and casual conversation was a necessary part of an effective interview. There were situations when friendly interviewees, attempting to make sense of my questions, zealously interrupted it, leaving no opportunity for me to recompose my question. This however, turned out to be positive since they could rephrase the question in a form more meaningful to them. And to me such an attempt serves as an "identification of the meaning-interpretation of the actor" as Erickson (1990, p. 100) calls it, which is crucial in interpretive research; or in Patton's (1990) words, a successful interviewer should be able to "access the perspective of the person being interviewed" (p. 196). They would be eager to share once a more informal and casual atmosphere was attained.

4.2.2.2 Validity and Reliability

According to Breakwell (1995), "the interview approach relies upon respondent being able and willing to give accurate and complete answers to questions posed, no matter what their format. Yet respondents may be motivated to lie. They may dislike or distrust the researcher. They may wish to sabotage the research. They may be too embarrassed to tell the truth. Even if they wish to co-operate, they may be unable to answer accurately because they cannot remember the details requested or because they do not understand the questions."

I overcame these difficulties by constructing a systematic series of questions which, at the same time as helping the respondent to remember or to understand, will provide evidence of consistency (or not) across responses. Having a pattern of questions which allows for internal consistency checking offers you one way of assessing the validity of the data. If a respondent is inconsistent in the pattern of answers, I extend the questioning by using probes to achieve clarification, or I may choose to exclude those data from the analysis Breakwell (1995). In addition, my knowledge and familiarity of the setting and its members placed me in the best position to select informants that would potentially contribute insights. This, to a great extent, guaranteed both dependable and consistent results within the individuals and across different individuals.

The rapport established with the participants, cooperation received from them, and casual environment produced (discussed earlier under "The researcher-researched relationship") contributed towards the internal validity for this research. Such factors serve as a vehicle for assessing the assumptions I gathered from data collected and from the "reality" the data were derived because a case study worker:

. . . "constantly attempts to capture and portray the world as it appears to the people in it. In a sense for the case [study] worker what seems true is more important than what is true...[and] the internal judgments made by those he studies, or who are close to the situation, are often more significant than the judgments of outsiders" (Walker, 1980, p. 45)

The above factors allowed me to set several strategies to ensure internal validity. In this study multiple sources of data or triangulation was used which include document investigation, participant-observation, and interviews (Denzin, 1988). Furthermore, by knowing who the key participants were, how and where they could be reached, I could easily go back to them to ask if the interpretations were plausible. Guba and Lincoln (1981) consider this "member check" as a useful strategy that should be done throughout the fieldwork.

For this qualitative case study, strategies such as triangulation and checking interpretations with the individuals interviewed or observed were used to establish validity. However, Guba and Lincoln (1985, p. 288) feel that the triangulation of data collection methods strengthen the "dependability" and "consistency" of the results obtained from the data. Guba and Lincoln (1985) believe that the two terms better describe the term "reliability" and are linked with internal validity "since it is impossible to

have internal validity without reliability, a demonstration of internal validity amounts to a simultaneous demonstration of reliability" (Guba and Lincoln, 1981, p.120).

To what extent the findings of this study are generalisable or can be applied to other situations depends on the established typically or modal category of the case (Goertz and LeCompte, 1984). I believe that the IT competence of clerical workers in UTM typifies the problem experienced by clerical workers in other institutions including the private sector not just in Malaysia but also in other parts of the world, since IT diffusion knows no boundary or restriction.

4.2.3 Semi Structured Interview

Interviews provide an important source of data for this study. The decision was made to interview because this method allows me access to the thoughts and feelings of the interviewees which other methods such as observations and questionnaires do not provide with the same quality of richness data. As Patton (1990) notes, it is necessary to ask people questions about how they organise the world and the meanings they attach to what goes on if one wishes to gain insight into how they interpret that world. Although Brookfield (1987) recommends that interviews only be used "when no other technique can gather the information one is seeking," in his view interviews are particularly suited to investigations which have an idiographic rather than nomothetic rationale, this is, which are concerned with depicting highly specific nature of individuals experiences rather than with advancing broad generalisations concerning laws of human behaviour (p. 4). The purpose of this study- understanding how clerical workers acquire IT competencies-is clearly in the category Brookfield considers appropriate.

Guba and Lincoln (1985) suggest that the interview "is a conversation with a purpose" (p. 268) of which "the collection of data must occur in a face to face situation in a research context . . . and involve the posing of questions by the investigator" (p. 6). According to Guba and Lincoln (1985), "the ability to tap into the experience of others in their own natural language, while utilising their value and belief frameworks, is virtually impossible without face to face and verbal interactions with them" (p. 155). In The Active Interview, Holstein and Gubrium (1995) point out that the respondent is not a passive vessel for the interviewer to open and unload. The interview is a social interaction where the validity of the data derives the collaboration of the interviewer and the respondent to construct meaning about "situated experimental realities in terms that are locally comprehensible."

Many factors influence the quality of the data gathered in an interview, including the structure of the interview, the types of questions asked, and the ability of the interviewer. There are varying perspectives on how structured or unstructured an interview should be (Jones 1985). Merriam and Simpson (1984) point out that by increasing the structure, the consistency and ability to compare data are increased. But increasing the structure may not allow the subject to give form to the topic under discussion Guba and Lincoln (1985). By contrast, the unstructured interview explores all the possibilities relating to the research topic (Merriam and Simpson, 1984).

An alternative is the semi-structured interview which strikes a middle ground between the structured and unstructured formats in an attempt to gain the benefits of both. Patton (1990) describes the semi-structured interview as asking “essentially similar questions with similar words” (p. 198). Because a set of questions was used to discover a predetermined problem, Bogdan and Biklen (1982) point out that the one can be “confident of getting comparable data across subjects” (p. 136).

However, the semi-structured interviews are expected to probe beyond their prepared questions depending on new perspective offered by the interviewee (Berg, 1989). This method is thus “flexible enough to allow new directions” to enable the researcher to “learn things he/she had not identified previously as important to the issue under study” (Fingeret, 1982, p. 91). For the advantages in comparative analysis of data and flexibility, the semi-structured interview is the most appropriate approach for studying IT competencies among clerical workers.

The types of questions asked and the ability of the interviewer are the potential limitations of interviewing (Brookfield, 1987; Jones, 1985; Patton, 1990). To avoid these limitations, it is generally recommended to phrase questions that are open-ended, conversational and simply termed that interviewees will understand, to use variety in the types of questions, to probe and develop unexpected responses and emerging themes, to be neutral and emphatic and non-evaluative of responses (Berg, 1989; Brookfield, 1987; Jones, 1985; Patton, 1990). Finally, to facilitate the study, a checklist (Appendix 2a) is incorporated into the semi-structured interview to assess current IT competence of the clerical workers interviewed. According to Breakwell (1995, p. 239), “the interview is a virtually infinitely flexible tool for research. It can encompass other techniques (for instance, as part of an interview, a self-completion questionnaire can be administered or psychological measurements can be taken). Additionally, it can be placed alongside the other data elicitation procedures (for example, it can be used in tandem with ethnography or participant observations).”

4.2.3.1 The Interview Process

The broad research questions framed a set of parameters for the investigation of documentary evidence. The interviews combined aspects of semi-structured interviews with probing questions and were guided by a list of questions or issues. They sought to explore questions related how IT competencies relate to certain conditions for training effectiveness and whether the clerical workers' background has any significant impact on their IT competencies. The semi-structured interview which was structured on the critical incident technique and the competency checklist is suitable to study competencies of different kind of job roles (Spencer and Spencer, 1993) as it was guided by a set of probes and with a focus on events where IT competence development was exhibited. Each interview usually begins with introducing and explaining the purpose of the interview, explaining how the data will be used and obtaining permission for using a tape recorder during the interview. Central to each question asked are the incidents or events that promote or inhibit IT competence. The interviewees are encouraged to describe both positive and negative examples in detail, including the context, motives and outcomes of these incidents.

Generally, I used to start an interview by conveying my appreciation to the clerical worker for participating in the study. The intent of the interview and the need for the clerical worker to respond as honestly and sincerely to each of the questions based on their true feelings and experiences is emphasised so that the clerical worker feels that he/she is important to the study. To create a relaxed environment, I start by asking how the participant feels followed by questions related to their work. Each question that followed has a higher degree of "complexity" as follows:

How long have you worked at UTM and elsewhere?

What is your scope of work and your daily routine?

General questions like "How do you acquire IT competencies?" and "What are the attributes for organisational management that will determine effectiveness in transfer of IT training to the work place? Why?" as well as the critical incidents in IT training produced more engaged discussion than the one elicited by close-ended or structured questions. I found, in many instances, that people preferred to decide the direction of the interviews, sometimes rephrasing questions in ways that were meaningful to them. This helped me in getting close to their perspective. The interview is thus a process of restructuring meanings. Holstein and Gubrium (1995), in describing active interviewing, stress the need to "systematically activate applicable ways of knowing-the possible answers-that respondents can reveal, as diverse and contradictory as they might be" (p. 37). Besides, general

questions helped to ease their suspicions about my intension as a researcher. Such questions allowed the interviewees to question me, get to know me better, and develop good rapport.

At the end of each interview, the interviewee would be asked to provide their full name, age, work experience and work unit for reference and comparisons. Each interviewee was then given a book as a token of appreciation and assurance of maintaining anonymity.

Each interview was tape-recorded and subsequently transcribed. The transcription process was a time consuming process. However, it gives me valuable input in the form of familiarity with the content of each interview as well as understanding the emphasis of the interviewees based on their intonation during the interview session. The time span of the interviews ranged from 60 minutes to 90 minutes in length.

4.2.3.2 Clerical Workers Interviewed

This research gathered qualitative data from responses to conversations and semi-structured interviews conducted with 21 participants, among whom 2 were senior stenographers, 3 were stenographers and 16 were clerks (refer Table 4.2). Though qualitative analysis is independent on the number of participants, I took great care to ensure the diversity of interviewees by making sure that all categories of clerical workers from various faculties and unit were selected in this study.

The participants of the semi-structured interviews were all clerical staff with a minimum of 4 years service at UTM. They were chosen both because of their interest and availability and because they represented a cross section of different areas of the university. It is interesting to note the uniqueness and diversity of the respondents' background. There are two clerical staff who are sisters (K and S). There is also one male senior stenographer, L who provides clerical services to the Dean of the Islamic and Social Studies Centre. Finally, there are three other male clerical workers who participated in the interview thus providing a diverse background of participants.

As in any qualitative case study, "the crucial factor is not the number of respondents but rather the potential of each person to contribute to the development of insights and understanding of the phenomenon" (Merriam, 1988, p. 77). This research gathered information from various categories of clerical workers to ensure multiple data sources in order to provide the basis for triangulation in which data of different kinds could be compared.

Table 4.2: Demographic Information of Interviewed Participants

Name (code)	Age	Job Classification	Experience	Work Unit
A	30	administrative clerk	4½ years	Faculty of Electrical Engineering
B	43	chief clerk	25 years	Computer Centre
C	28	research clerk	5 years	Research Management Centre
D	34	administrative clerk	13 years	Bureau of Innovation & Consultancy
E	34	accounts clerk	15 years	FSCIS
F	33	accounts clerk	11 years	Bureau of Innovation & Consultancy
G	34	academic clerk	13 years	FSCIS
H	49	Stenographer	32 years	FMHRD
I	??	senior stenographer	32 years	FMHRD
J	28	accounts clerk	5 years	Research Management Centre
K	37	administrative clerk	15 years	Chemical Engineering Pilot Plant
L	28	senior stenographer	7 years	Islamic and Social Studies Centre
M	40	library clerk	20 years	Library
N	27	library clerk	7 years	Library
O	40	filing clerk	18 years	Islamic and Social Studies Centre
P	51	senior stenographer	29 years	FEGIS
Q	45	Stenographer	23 years	FEGIS
R	28	academic clerk	10 years	FSCIS
S	41	Stenographer	23 years	FSCIS
T	26	Hostel clerk	8 years	Chancellory
U	37	Hostel clerk	18 years	Chancellory

Note: FSCIS = Faculty of Science Computer and Information System
 FEGIS = Faculty of Engineering and Geo-Information Sciences
 FMHRD = Faculty of Management and Human Resource Development
 PPIPS = Islamic and Social Studies Centre

4.2.4 Observations

Observation allows a researcher to understand a phenomenon to “an extent not entirely possible using only the insights of others obtained through interviews” (Patton, 1990, p. 25). Much of the literature on research methods has suggested that observational studies may help a researcher to comprehend complex issues through direct observation, either as a participant- or a nonparticipant-observer (Sekaran, 2003). This method plays an important role in gaining an insight into the day-to-day life of clerical workers in Malaysian universities. Factors, like working conditions as well as IT equipment and facilities can best be understood without asking the respondents themselves for information. Further to this, clerical workers' interaction in the university, the working space and the university premises' cleanliness and landscape, the general behaviour of the clerical workers while carrying out their tasks and responsibilities can best be determined by direct observation method. Each observation was recorded in the forms of contact sheets (See Appendix 3 for a sample) which

details each recorded entries including descriptions of activities, language, behaviour, lists of personnel present, the setting or environment and my own personal subjective notes and observations.

Observational data were gathered in a two-month period at UTM Skudai. During any spare time, I would sit at the administration office of a faculty and observe the daily work of clerical workers. An important feature of the participant observation research is its reflective character: to recognise that researchers are part of the social world they study (Borhek and Curtis (1975); Gouldner (1970); Hammersley 1992). Hammersley and Atkinson justify the crucial roles of reflexivity and participant-observation in social research in which “we act in the social world and yet are able to reflect upon ourselves and our actions as objects in the world” (1983, p. 25).

4.2.5 Document Review

Document investigation in this research was not an end in itself. Rather than using document investigation for the sole purpose of “historical analysis” (see Marshall and Rossman, 1989), this study transformed “static” information into a dynamic quest for factual confirmation and critical analysis. Thus, besides providing the necessary background information on the setting and topic of investigation prior to and during fieldwork, the analysis of documents helped to select and provide evidence for information gathered through other methods.

Patton (1990) suggests that useful documents to be reviewed for a research might include: (a) correspondence, (b) financial and budget records, (c) organisational rules, (d) regulations, (e) memoranda and (f) charts. For purpose of this study, efforts were made to collect documents or secondary data from the universities visited and also from relevant ministries. For example, during the conduct of questionnaires at the universities, annual reports and bulletins, as well as organisational charts and other relevant documents were collected at the same time. These documents are particular useful in providing additional information on the universities surveyed.

In addition, relevant secondary data will be collected from government agencies and ministries to support the analysis. This included published working papers from the Ministry of Education and projections and statistics from the Department of Statistics. Further to this, university and ministry websites will be frequently accessed to obtain updated reports from time to time. Documents reviewed on UTM are compiled in Annexure 1.

Finally, minutes of meetings from the Centre of ICT and information identified from bulletins, prospectuses, reports, magazines, and newsletters published by UTM and several departments, faculties and units was confirmed and, sometimes, compared with data gathered from interviews and observations. Minutes of meetings, for instance, not only offered useful new information but they also pointed to other potential sources of information.

4.3 QUANTITATIVE METHODS

Quantitative tools utilised for this study comprise of expert opinion assessment and survey questionnaire. For the Expert Opinion Assessment, a non-parametric analysis using Kendall's coefficient was utilised. For the survey on clerical workers, factor analysis and reliability tests will be conducted. Subsequently, simple descriptive and inferential statistical analyses were conducted accordingly. The .05 level of confidence was used to determine statistical significance.

4.3.1 Expert Opinion Assessment

A three-round expert opinion assessment (EOA) was used to identify conditions for training effectiveness. According to Thompson (1990) an expert opinion method is an alternative to a number of techniques for combining experts' opinions under the assumption that the experts are statistically independent. Similar to Delphi technique which is more suited as a predictive tool (Miller, 1995), the EOA is a procedure to solicit opinion, judgment and consensus from a group of experts using carefully designed instruments. The EOA also serves as an exploratory study to identify factors perceived as important to facilitate the transfer of IT training to the work place. By identifying these factors, the literature review would be more focused, as only related factors would be considered for the research accordingly.

To achieve an acceptable degree of reliability, I identified the following characteristics as important to the study:

1. Anonymity: The expert participants remain anonymous to one another; they interact only with me.
2. Controlled feedback: All information is gathered and redistributed through me.
3. Group response: Individuals contribute information into a group response.

4. Expert opinion: Panellists are selected based on knowledge of the field.
5. Reduced cost and time limitations: The structure of the technique eliminates the need for the participants to arrange costly and time-consuming face-to-face interactions.

4.3.1.1 Developing the Expert Opinion Assessment Instrument

A pilot study of the Expert Opinion Assessment (EOA) was conducted among seven master students for three rounds over three days. After the survey instruments were ascertained to be reliable, I invited 25 experts who were either academicians or professionals with at least eight years of experience and are knowledgeable on the subject issue to become the panel of experts for the study. The first round survey asked only one question: "List as many conditions for IT training effectiveness that affect the performance of clerical staff at Higher Education Institutions. Remember to use the term 'Conditions for IT Training Effectiveness' in a broad sense." The responses to this question were analysed and common responses were reworded to avoid duplication. A list of the responses was conducted and used on the second round instrument. The second round survey presented a synthesised list of responses from the first round. The experts were asked to rank each factor based on their importance whereby "1" is rated as most important and "7" is rated as least important. In the third round, a separate survey was constructed for each member of the panel by boldfacing factors that differed from the consensus opinion based on each factor's mean rank scores. Each expert was given an opportunity to change his/her response or to present an argument for disagreement. These arguments were incorporated as comments in subsequent sections allowing the experts to look beyond the calculated data.

Though the EOA has problems in maintaining secrecy among the participating experts as well as possible attrition as the EOA progresses, it was an efficient tool to gather quick results. The study took a maximum of two months to complete.

4.3.1.2 Kendall's Coefficient of Concordance (W)

Following the completion of the third round of the EOA, the Kendall's Coefficient of Concordance (W) was computed for the scored ranking to measure the level of consensus among the experts for the

factors proposed with respect to both rounds. The Kendall's Coefficients of Concordance (W) will be tested for statistical significance by observing the p-value and comparing the Chi-square test statistics with the critical value.

Kendall's W is a measure designed to determine to which a set of ranked scores agree (Siegel, 1956). A significant W indicates that the participants are essentially applying the same standard in judging the importance of the factors and they are in consensus. As such, what is desired is a high W (close to 1) and a low p-value (less than 0.05) so that the null hypothesis that there is no consistency in response from the experts can be rejected.

4.3.2 Survey Questionnaire

A questionnaire was developed by taking into consideration all the variables uncovered in the EOA. The university clerical workers were sent a letter with the questionnaire inviting them to participate in the survey. In accordance with the norm, participation in the study was voluntary and the subjects were free to withdraw at any time without penalty. They were free to decline to answer any questions they did not wish to answer. The subjects were informed that their responses would be anonymous and confidential and that all questionnaires would remain with me.

In line with Kirkpatrick's recommendations (1971), the study's data collection instrument is a structured multi-item questionnaire with an open-ended question (refer Appendix 4a). Open-ended questions in the survey questionnaire free the subjects from the limitations of forced choice answers and potentially allow the expression of the subject's personal opinions. Open-ended questions have the potential of bringing out silent factors and can capture idiosyncratic differences (McMillian and Schumacher, 1997).

The questionnaire for the study consists of the following sections: (1) trainer competency; (2) trainee characteristics; (3) organisational system; (4) organisational management; (5) training methodology; (6) facilities; (7) work culture; (8) IT competence; and (9) demographic information. Towards the end, the respondents were requested to provide comments to ensure that their personal views could be expressed without being restricted by the five-point scale.

Data for the study was collected by a survey questionnaire designed to obtain university clerical workers' perceptions relating to conditions for training effectiveness and IT competence. Research by survey is a typical way to "determine the opinions, attitudes, preferences, and perceptions of persons of interest to the researchers" (Borg and Gall, 1993, p. 219). Investigations are generally conducted

for the interrelationships of certain responses, especially those involving demographic information (Krathwohl, 1993, p. 361-362) and attitudinal variables in educational research (Vierra, Pollock and Golez (1998).

Both closed and open-ended questions are used in the survey questionnaire. Close-ended questions comprised of scales to measure differences in perceptions along a five-point continuum. Likert-like scales provide more information about the respondents' degree of contribution, agreement or necessity, and can provide subtler and deeper ramifications of the perception to be explored (Oppenheim, 1992). The appropriate number of points used in the scale is often debated. Some researchers agree that the optimal length of the scales needs to be determined by the nature of what is to be examined and the extent to which respondents can discriminate among levels (Light, Singer and Willet, 1990). According to Oppenheim (1992), reliability of the five-point scale is good and permits a greater range of answers to respondents than smaller point scales. I followed Oppenheim's (1992) recommendation in using the five-point scale as it is good and permits a greater range of answers to respondents than smaller and larger point scales.

4.3.2.1 Checking Content Validity of the Survey Instrument

To ensure the validity of the survey questionnaire for assessing IT competence, three prominent Malaysian professors who are experienced in scale development and quantitative methods were invited to evaluate its content validity. They were asked to rate in a 3-point scale of low, moderate and high relevance in the following three aspects: (1) the proposed eight variables, (2) the subject - clerical workers, and (3) the context - institutions of higher educations in Malaysia. They were also asked to give their comments in terms of clarity and conciseness, and on any other changes, additions or deletions of items (or attributes) which they felt were unnecessary.

Most of the items were rated with moderate to high relevance. In light of the recommendations by the professors, the instrument was further modified. With some items added, changed or removed, a modified version with sixty seven items was resulted. An example is the expansion of the variable IT facilities from nine items to thirteen items by taking into consideration facilities at training site and the workplace (the original version only focused on IT facilities at the training site). Table 4.3 presents the number of items for each variable that was developed.

Table 4.3: Number of Items According to Variables

Variables	Number of Items
Trainer competency	7 (7)
Trainee characteristics	10 (10)
Organisational system	10 (8)
Organisational management	7 (8)
Training methodology	13 (12)
IT facilities	9 (13)
Work culture	3 (3)
IT competence	6 (6)
Total	65 (67)

() = number of items after content validity check

4.3.2.2 Developing and Testing the Survey Instrument

After the validation process, a pilot test was conducted for three reasons. Firstly, it helps to pre-test the performance of the scale so as to identify problematic or redundant items. Secondly, it also helps to adjust the length of the instrument. Thirdly, it can also be used for collecting comments from the respondents for further modifications of the instrument.

A pilot study of the questionnaire was conducted by distributing a copy of the questionnaire to a small random sample of thirteen clerical workers representing all job classification levels. Selected clerical workers were asked to answer the questionnaire as well as comment on item clarity, understanding and readability. Based upon analysis of the results, the questionnaire was modified and re-piloted for a second time. To further validate item reliability and consistency, a reliability analysis was conducted for the questionnaire at the end of the second pilot. All of them were able to complete the whole set of questionnaire within 20 minutes, which was a manageable time for a 4-page questionnaire like the one used in this study.

4.3.2.3 The Questionnaire

The measures for the aforementioned variables, including IT competence and other variables for collecting information on clerical workers' demographic background, formed the pilot test questionnaire. The pilot test questionnaire was able to fit conveniently into four A4-sized pages. A cover page was used to explain the purpose of the questionnaire survey to the respondents. Additionally, a back page was used for them to give additional comments on the questionnaire.

The vast majority of clerical workers in Malaysian universities are Malays. However, the few non-Malays (Chinese and Indians) who participated in the survey, could also understand Malay which is the official language in Malaysia. The questionnaire was translated into Malay before distribution. After translating the questionnaire, it was moderated by an English lecturer to ensure that the common clerical workers can comprehend the language and wording used in the questionnaire. It was then translated back into English by a different English lecturer and was compared with the original English version so as to ensure that there was no significant deviation in the meaning between the original English version and the translated Malay version. The finalised version (refer Appendix 4A) of the questionnaire to be used for the fieldwork comprises of nine sections and seventy two questions:

- Section 1: trainer competency consists of seven items used to assess the following attributes: (1) language proficiency, (2) professional exposure, (3), knowledge (4) ICT skills, (5) communication, (6) instruction, and (7) preparation.
- Section 2: trainee characteristics comprises of ten items used to highlight the following attributes: (1) self-efficacy, (2) it awareness, (3) locus of control, (4) current it skills, (5) language proficiency, (6) rationale, (7) preparation, (8) aptitude (9) interest, and (10) education background.
- Section 3: organisational system involves of eight items used to unveil the following attributes: (1) compensation and incentives, (2) work performance, (3) clarity of work instructions, (4) job description, (5) justification for it training, (6) performance appraisal, (7) immediate organisational benefit, and (8) opportunity for promotion.
- Section 4: organisational system comprises of eight items used to reveal the following attributes: (1) management commitment, (2) importance of it training, (3) it awareness, (4) openness, (5) management support, (6) management effectiveness, (7) leadership, and (8) organisational image.
- Section 5: training delivery and methodology comprises of twelve items which attempted to explain the following attributes: (1) training contents, (2) modular, (3) lecture, (4) demonstration, (5) OJT, (6) notes and manual, (7) informal, (8) combination, (9) training and teaching delivery, (10) course material, (11) practical oriented, and (12) class size.

- Section 6: IT facilities comprise of thirteen items used to disclose the following attributes: (1) hardware for training (e.g., Computer), (2) software for training (e.g., windows, lotus etc), (3) supporting equipment for training (e.g., LCD, OHP, etc), (4) technical support (e.g., Maintenance) at training site, (5) computer system (e.g., Networking) at training site, (6) reliability of equipment and peripherals at training site, (7) versions of software used at training site, (8) computers at work place, (9) software at work place, (10) technical support at work place, (11) it systems used at work place, (12) reliability of equipment and peripherals at work place, and (13) versions of software used at work place.
- Section 7: work culture involves of three items used to transpire the following attributes: (1) peer support, (2) team work, and (3) learning organisation.
- Section 8: IT competence covers of six items used to measure the following attributes: (1) improved it skills, (2) improved it knowledge, (3) positive attitude, (4) self productivity, (5) successful transfer, and (6) team work effectiveness.
- Section 9: demographic background consists of education completed, type of work unit in which the clerical workers were employed, job classification level, total years of administrative experience both inside and outside the university, work status and the name of the university where the clerical workers work. The study investigates the extent to which education level, work unit, job classification level and total years of administrative experience influence the clerical workers' perceptions regarding transfer of it training. Previous research tends to indicate that some demographic variables may influence individual perceptions thus affecting their interest in continuous learning (Maurer, 1994).

By making use of the survey instrument developed and validated earlier, the major part of the quantitative study was carried out using face-to-face method for survey of clerical workers in selected public institutions of higher education in Malaysia. Fieldwork commenced from mid July until mid November 2003. Factor analysis and reliability tests were than conducted on the data collected for statistical validity and reliability following which descriptive and inferential analyses were performed to answer the research questions in this study.

4.3.2.4 Sampling Frame for Survey

Listings of public universities were obtained from the Ministry of Education webpages. The sample, that is, the clerical workers in Malaysian universities, was chosen from all the public universities in Malaysia (refer Table 6.5). For universities with branch campuses (e.g., Universiti Teknologi MARA or UiTM has 13 branches), cluster sampling technique was used to identify the branch campuses to form the final sampling frame. Altogether, twenty four public universities and 4,441 clerical workers were identified as population of the study (refer Table 4.4).

Table 4.4: Population of the Study

UNIVERSITY	CC (M)	CC (F)	C (M)	C (F)	SSSt (M)	SSSt (F)	St (M)	St (F)	Total
Kolej Agama Sultan Zainal Abidin (KUSZA)	1	1	7	23	0	1	0	4	37
Kolej Universiti Islam Malaysia	3	2	7	20	0	0	0	15	47
Kolej Universiti Kejuruteraan & Teknologi Malaysia	0	0	3	5	0	1	0	1	10
Kolej Universiti Kejuruteraan Utara Malaysia	0	0	2	8	0	2	0	3	15
Kolej Universiti Sains & Teknologi Malaysia	0	2	8	19	0	3	0	12	44
Kolej Universiti Teknikal Kebangsaan Malaysia	2	0	13	42	0	5	0	26	88
Kolej Universiti Teknologi Tun Hussein Onn	2	2	31	29	0	2	0	24	90
Universiti Islam Antarabangsa (UIA)	18	17	51	159	0	17	0	38	300
Universiti Kebangsaan Malaysia (UKM)	15	6	120	147	3	13	4	110	418
Universiti Malaysia Sabah (UMS)	2	1	13	15	0	3	0	20	54
Universiti Malaysia Sarawak (UNIMAS)	3	1	21	77	0	4	0	31	137
Universiti Pendidikan Sultan Idris (UPSI)	0	1	29	75	0	4	0	17	126
Universiti Putra Malaysia (UPM)	20	10	135	337	0	23	1	74	600
Universiti Sains Malaysia (USM)-Main Campus	21	12	188	226	0	8	2	120	577
Universiti Sains Malaysia (USM)-Kubang Kerian	5	2	61	53	0	1	0	26	148
Universiti Teknologi Malaysia (Main Campus)	19	3	119	238	1	6	3	61	450
Universiti Teknologi Malaysia (Kuala Lumpur)	10	1	50	112	1	3	1	25	203
Universiti Teknologi MARA (Melaka)	3	0	21	7	0	0	0	4	35
Universiti Teknologi MARA (Segamat)	0	0	6	8	0	0	0	2	16
Universiti Teknologi MARA (Main Campus)	26	22	153	276	0	10	0	88	575
Universiti Teknologi MARA (Terengganu)	0	1	4	8	0	0	0	4	17
Universiti Teknologi MARA (Perak)	1	0	4	4	4	0	2	2	17
Universiti Utara Malaysia (UUM)	4	3	69	68	0	10	0	39	193
Universiti Malaya	10	1	50	112	1	6	3	61	244
Total population of 24 public Malaysian universities	165	88	1165	2068	10	122	16	807	4441

Note: CC = chief clerk, C = clerk, SSSt = Senior stenographer, St = stenographer, M = male, F = female

Identification of the clerical workers was a slow process. I had to write to each university requesting for the breakdown of clerical workers' structural hierarchy. Since most of the clerical workers are females, stratified sampling technique was used to ensure male clerical workers are also selected to form the sampling frame and to ensure deployment of a scientific method to select the final sample which is not biased (refer Table 4.5). According to Sekaran (2003), a stratified random sampling is a "probability sampling design that first divides the population into meaningful, non-overlapping subsets, and then randomly chooses the subjects from each subset" (p. 424). Within the context of

this study, since each university is treated as independent, thus making stratified sampling method appropriate to form the final sampling frame for the survey.

Table 4.5: Finalised Sampling Frame of the Study

UNIVERSITY	Chief Clerk	Clerk	Senior Stenographer	Stenographer	Total
Kolej Agama Sultan Zainal Abidin (KUSZA)	1	4	0	1	6
Kolej Universiti Islam Malaysia	0	18	0	2	20
Kolej Universiti Kejuruteraan & Teknologi Malaysia	0	13	0	1	14
Kolej Universiti Kejuruteraan Utara Malaysia	0	4	0	0	4
Kolej Universiti Sains & Teknologi Malaysia	1	10	0	0	11
Kolej Universiti Teknikal Kebangsaan Malaysia	1	11	0	1	13
Kolej Universiti Teknologi Tun Hussein Onn	0	27	0	5	32
Universiti Islam Antarabangsa (UIA)	3	20	1	1	25
Universiti Kebangsaan Malaysia (UKM)	1	30	2	9	42
Universiti Malaysia Sabah (UMS)	0	10	0	1	11
Universiti Malaysia Sarawak (UNIMAS)	2	10	1	3	16
Universiti Pendidikan Sultan Idris (UPSI)	0	22	0	3	25
Universiti Putra Malaysia (UPM)	20	33	1	1	55
Universiti Sains Malaysia (USM)-Main Campus	3	29	1	5	38
Universiti Sains Malaysia (USM)-Kubang Kerian	0	10	1	0	11
Universiti Teknologi Malaysia (Main Campus)	5	57	2	11	75
Universiti Teknologi Malaysia (Kuala Lumpur)	1	12	0	2	15
Universiti Teknologi MARA (Melaka)	1	6	0	1	8
Universiti Teknologi MARA (Segamat)	0	11	0	3	14
Universiti Teknologi MARA (Main Campus)	3	40	1	3	47
Universiti Teknologi MARA (Terengganu)	0	3	0	3	6
Universiti Teknologi MARA (Perak)	3	12	0	0	15
Universiti Utara Malaysia (UUM)	2	13	2	1	18
Universiti Malaya	2	26	2	3	33
Total sample from 24 public Malaysian universities	49	431	14	60	554

4.3.2.5 Factor analysis and reliability test

In order to further study interrelationships and to identify the strongest cluster of questionnaire items related to clerical workers' perception on conditions for IT training effectiveness, a factor analysis was conducted. Construct validity using factor analysis was used to reduce and summarise data in which redundant items and inappropriate items were deleted (Hair et al., 1998). The study reports only those interrelationships with a correlation coefficient of .60, moderately high, or higher. The factor analysis used a principal component analysis as the extraction method and varimax with Kaiser normalisation rotation method to explain the item variance. Only clusters of questionnaire items organised into components to standard eigenvalue of 1.000 were reported.

Scale reliability using Cronbach's Coefficient Alpha was then used to assess the consistency of homogeneity among items (Cooper and Schindler, 1988). Reliability coefficients were computed for the questionnaire. In assessment of people, researchers recommend a reliability coefficient above .90 for comparisons among individuals and at least .70 for comparison among groups (Fraenkel, Wallen and Sawin, 1999).

4.3.2.6 Descriptive and inferential analyses

SPSS for Windows Version 10.0 was used as the main tool of data analysis. The raw data was the first inputted into the SPSS system and subsequently coded and edited for further analysis. In order to answer the quantitative research questions and to meet the specific research objectives, analysis were made on the sample characteristics of the dependent and independent variables as well as the hypotheses developed using various statistical techniques (refer Table 4.6).

Table 4.6: Techniques of Analysis On The Data

Purpose	Technique of Analysis
Examination of the Characteristics of Dependent and Independent variables	<ul style="list-style-type: none"> • Factor analysis • Reliability test
Examination of the Sample Characteristics	<ul style="list-style-type: none"> • Descriptive statistics
Hypotheses testing on IT competence	<ul style="list-style-type: none"> • Kendall's W • Correlation Analysis • Mann Whitney U and Kruskal Wallis

Quantitative data for close-ended questionnaire items was analysed by descriptive statistics using measures of central tendency to provide basic understanding of the questionnaire items. Impact ratios will be calculated together with graphical representations of the data by frequency tables and cross tabulation tables.

Subsequently, difference of mean ranking for each item assessing IT competence were compared for each demographic variable using Mann Whitney and Kruskal Wallis tests. Finally, respective items for trainer competency, trainee characteristics, organisational system, organisational management, training methodology, facilities, work culture and IT competence were consolidated to become interval data using Terrell's transformation technique (2000). Each variable will be tested for correlation using Pearson correlation.

Both non-parametric and parametric methods will be used for analyses. Non-parametric methods for testing for difference in mean ranking will deploy Mann-Whitney U and Kruskal Wallis tests due to the qualitative nature of the untreated data (i.e., no transformation was conducted and the 5-point scaled items are assumed to be ordinal data). Transformed items will be converted to interval data using Terrell's transformation technique (Terrell, 2000). The seven transformed independent variables are then tested for correlation with the dependent variable, IT competence using a parametric method known as Pearson correlation.

CHAPTER V

FINDINGS

The purpose of this study was to investigate the level of IT competencies and the conditions for training effectiveness among Malaysian university clerical workers using both quantitative and qualitative research methods. In this chapter, findings of the data analysis for the purpose of answering the five research questions will be presented. The qualitative analysis was based on mainly on interview method incorporating an IT competency checklist as well as observation method on a small group of clerical workers. The quantitative analysis followed a logical sequence of methods beginning with the Expert Opinion Assessment and ending with the survey questionnaire. Finally, within the context of triangulation, the findings from the qualitative analysis based on a case study at UTM will be cross-checked with a larger-scale quantitative study conducted at other public universities in Malaysia to ensure generalisation of the findings of this study.

5.1 QUALITATIVE ANALYSIS

5.1.1 RQ1: How Do Clerical Workers Acquire IT Competence in a Malaysian University?

General observations during my tenure at two Malaysian universities indicate that most clerical workers acquire IT competence through informal training. For this study, I made observations on three clerical workers (Ms. X, Ms. Y and Ms. Z) at the Office of Research and Post-Graduate Studies, Faculty of Management and Human Resource Development, UTM for two months in September-October 2003. First of all, the three clerical workers were females and were within the age bracket of 25-27. Secondly, among the three clerical staff, Ms. Y is a trained as a secretary with a diploma, Ms. X is an administrative clerk and has a certificate in office management while Ms. Z is a filing clerk and has only an O-level equivalent qualification (or US high school equivalence). Though the three clerical workers had attended many IT training programs organised by UTM and other organisations, Ms. X and Ms. Z always refer to Ms. Y if they have any "IT problems". If there are any IT problems that they could not solve, they would use the "help" button found in most software to identify possible solutions. The Internet is another source of solutions provider which is occasionally used by the three

clerical workers. If any of the three aforementioned methods fail to provide the desired solution, then they would refer to the outsiders - other clerical workers or the IT manager, as a final option.

The outcome of the interview shows that though most of the clerical workers have undergone formal training organised by UTM and other companies, a majority of the UTM clerical workers acquire IT competence through the informal method. Most acquire new IT skills as they progress with their work. As an example when F couldn't convert a circle into a flower (using Corel draw) she would use the help button found in the software and try to find the necessary commands. According to her, the trial and error method is most effective as any mistakes made would be remembered and causes her to be more competent". D on the other hand would ask her friends whenever she is in a "jam". According to D, "I will refer to another clerical worker as he is an expert on IT in the office. Furthermore, even the managers refer to Shahrul (a computer technician) when they have IT related problems."

So what is wrong with formal training? According to F, "formal training on how to use the Internet was not effective due to the weaknesses of the trainer. The trainer seems to focus only on a few participants in front and sometimes tend to get carried away. There is no point in having a clever trainer who cannot teach effectively. Sometimes the training notes prepared are not relevant to the training conducted causing more confusion at the end of the day." Furthermore, at times the formal training offered does not fulfil the job requirements of the clerical workers, but they had to attend the course as per the directive of their immediate superior. An example would be an accounts clerk F, who wants to attend excel but was told to attend a graphics course Coreldraw. At the end she had to master excel on her own and now she owns sufficient skills and capabilities to draw graphs and tables using excel. J, another accounts clerk, found that basic excel training was helpful for her to apply the new skills to work but had the initiative and "inquisitive" mind to try and learn advanced excel operations on her own by successfully using trial and error methods. She proudly says that she could now develop and apply formula to her excel worksheet.

Is formal training not needed at all? Let's try to sort out the answer to this question in light of the experiences of the workers under research. According to F and D, formal training helps to provide the basic skills. Once a clerical worker masters the necessary tools, he/she can acquire higher level skills through informal methods. According to most of the interviewees, formal training should be practical oriented with notes that are aligned with the lecture or demonstration. According to F, she enjoys some form of assessment (e.g., assignment or project) to "test her ability to acquire or improve her IT skills." According to C, training notes could be referred whenever she couldn't solve any IT related

problems. As such, the first proposition that clerical workers acquire IT competence through formal learning process can be rejected, as both formal and informal training methods are important. Within the context of this study, the formal learning is effective if it could generate interests from the trainees about the capabilities of the software for them to try to improve their competence on their own, i.e., through informal methods.

5.1.1.1 Types of formal IT training attended by clerical workers

The type of formal IT training organised by UTM or other organisations are basically windows-based software training such as word, excel and Internet. Other “popular” IT courses are graphics software such as page maker, Coreldraw and web page design. Specialised courses such as SAS and SPSS are rarely subscribed.

All of the participants attended IT training programs conducted within the campus by the UTM Computer Centre. The Computer Centre usually distributes an IT training calendar to all university staff before the start of the fiscal year so that the faculty, department or unit can identify IT training for their own staff (refer Table B of Annexure) and plan accordingly. Due to the large number of supporting staff i.e., there are 2,205 supporting staff in UTM (refer Table A of Annexure), therefore, the IT training must be well coordinated to ensure optimum number of trainees are provided with proper training. Coupled with UTM's policy of enforcing 40 hours of training for each staff per year, it is not surprising to note that some trainees do not get the desired IT training or are given alternative training that may not be relevant to their work activities. Such is the case of Ms. C and Ms. F, who wanted to attend word and excel respectively but was offered photoshop and CorelDraw instead. Some staff has more opportunities to attend many IT courses due to the evolving job description as in the case of K who was a staff of the Bureau of Innovations and Consultancy (BIC) for 8 years before transferring to the Chemical Engineering Pilot Plant (CEPP). According to K, while at BIC, she had to do almost everything including design work and typesetting for brochures and posters thus she had to take CorelDraw and pagemaker. But now that she had to transfer to CEPP, her work is more focused to administrative duties such as record administration and documentation activities. A few staff had taken “unique” courses. O had attended java, Windows NT and operating system, which unfortunately for her, are not useful in her line of work as a filing clerk at PPIPS. R had taken a course on html out of her own interest.

Categorising the themes uncovered from above, the following contingency matrix that maps formal IT training courses attended by its applicability to the workplace is proposed (refer Table 5.1).

Table 5.1: Formal IT Training Courses By Applicability Contingency Table

Formal IT training courses attended	Applicability at the workplace		
	High	Moderate	Low
	Windows based	Word Excel Internet	Powerpoint Access
	Graphics based		Pagemaker Coreldraw Photoshop
Specialised		Repair and maintenance	Java Html Windows NT SAS Linux

Based on Table 5.1, two significant patterns emerged:

1. Clerical workers have greater application of formal training on windows based software such as words, excel and Microsoft explorer (Internet). Other windows based software such as powerpoint are applied moderately while access (a form of database) has low application.
2. Clerical workers attended graphics courses and specialised courses which are not highly applicable to the workplace.

Sub conclusion 1: A number of courses attended by clerical workers at UTM are not fully applicable to the workplace. Only windows based training in word and excel as well as the Internet, are significantly useful to the trainees. This is due to the nature of the work of clerical workers who perform tasks to support the administrators. Understanding the job specification and conducting proper training needs analysis should be done instead of dictating clerical workers to attend courses which may not be relevant to the work requirements. A lot of training hours and training expenses are lost while trainees do not come out from the training course with the desired skills to support the work environment.

5.1.1.2 Formal training methods undertaken to acquire IT competence

The most widely used formal IT training method used to acquire IT competence by UTM clerical workers is practical based training with a combination of other methods such as demonstration, lectures and notes. Some form of skills assessment acquired by the participants includes examinations and projects are mentioned by some of the respondents. Most of the respondents believed that the aforementioned methods provide a better mechanism to understand and master the software. According to C, "notes with explanation using practical examples make the training session interesting and makes it easy for the trainees to follow the examples given." C's point is shared by O who underwent formal training which is very much practical oriented with a few theoretical inputs. According to Q most of the courses are conducted within one to two days and are at the basic level.

A review of the themes from above resulted in the following contingency matrix that maps the mode of formal IT training courses attended by its popularity at the training site (refer Table 5.2).

Based on Table 5.2, three significant patterns are apparent:

1. Clerical workers have a low level of appreciation for lecture-based training which to them is too theoretical oriented.
2. Clerical workers find formal training which is conducted in a combination mode to be interesting applicable as it makes the training session less boring. Examples of combination mode could comprise of any of these: lecture, notes, practical and demonstration.
3. Clerical workers have highest level of understanding if training is conducted in a practical mode with examples and exercises. Practical based training is perceived as very relevant to the workplace.

Table 5.2: Mode of Formal IT Training Courses By Applicability Contingency Table

Mode of formal IT	Popularity at the training site		
	High	Moderate	Low
	Lecture based		Boring
	Combination	Interesting	
	Practical based	Very applicable	

Sub conclusion 2: Practical based training has the highest level of receptivity by participants. As such trainers must be trained to conduct training in using the practical mode in order to ensure the training programme becomes effective.

5.1.1.3 Most effective formal training methods

The aforementioned findings confirm the previous finding from the previous section that practical based training is the most effective mode for formal training. Practical based training is the most preferred method due to its easy applicability according to F. H favours practical based training as she can apply the skills step-by-step while undergoing training. The same applies to D who said, "practical based training makes mastery of skills easier" while according to N, "lecture followed by practical sessions makes it easy for the participants to follow based on what they see and hear in the training site thus making it easy to practice the new IT skills." According to R, "practical based training involved step-by-step approach makes it easy to see and remember." According to L, "practical based approach is best suited for training for computer repair and maintenance."

The following contingency matrix maps effective formal IT training mode by its popularity at the training site (refer Table 5.3). Accordingly, practical based training is frequently used during formal training and perceived as very applicable.

Table 5.3: Formal IT Training Courses By Frequency Of Usage Contingency Table

	Frequency of Usage	
	Practical based only	Twelve respondents claimed that this method works best for them
	Practical based combined with other methods	Eight respondents claimed that this method works best for them
	Lecture, notes and demonstration	One respondent claimed that this method works best for them

Sub conclusion 3: Practical based training has high level of receptivity by training participants. This finding reaffirms sub conclusion 2. The popularity of practical based training could be traced to the educational background of the clerical workers who are mainly SPM holders (equivalent to O levels).

Furthermore, findings from Table 5.1 showed that windows based (word, excel and Internet) training could easily be taught using practical mode of training.

5.1.1.4 IT competencies acquired based on informal training methods

Internet and most windows application such as word, excel and powerpoint are software which are mastered by the informal method. Some clerical workers such as C learned on her own IT skills to maintain her personal computer from viral attacks. According to her, the recent waves of computer virus attacks had disrupted her work and she had to acquire skills to maintain her computer on her own initiative by downloading and installing anti-virus software into her computer. On the other hand K feels that she could master advanced level pagemaker, excel, word, power point and Internet after taking basic training on the aforementioned courses. The same situation also applies to L. On the other hand, M learned SPSS from her lecturer during her studies.

The following contingency matrix maps IT competence acquired informally by level (refer Table 5.4).

Table 5.4: IT Competence Acquired Informally By Level

IT competencies acquired	Level of mastery		
	Basic	Intermediate	Advance
	Windows based	Access Internet	Word Excel Powerpoint
	Graphics based	AutoCAD	Photoshop Pagemaker Coreldraw
Specialised	Web page design	Software maintenance	SPSS IPAC software

Based on Table 5.4, two significant patterns were identified:

1. Formal training helps to provide the basic skills, once a clerical worker has mastered the necessary tools, they can acquire higher level skills through informal methods.
2. Commonly used application such as windows based software (word, excel and powerpoint) are easier to master informally.

Sub conclusion 4: Formal training provides the basic skills or building blocks to acquire advanced level competency through informal training. Commonly used software are easier to master informally as they are often used at the workplace.

5.1.1.5 Informal training methods undergone to acquire IT competence

A variety of informal methods were used to acquire IT competence. Methods cited by the respondents comprise of the following: self-directed learning by using help functions, experimentation through trial and error, learning through observation (from peers, superiors or outsiders) and learning through mentoring by superiors. K quoted that, "I acquire IT skills due to my personal interests. If I can't solve my computer related problems, then I seek the help of my friends. If my friends cannot solve the problem, I will refer to either the IT executive or the technician. If they cannot solve my problem, only then will I refer to the IT manager. Finally, if nobody can solve my problem, I will refer to the trainer who had taught me before." The same applies to O who believes that, "self interest and work requirements will drive one to be committed in acquiring new skills. The interest will cause one to seek further skills from others if he/she alone cannot acquire the skills." Learning from superiors had been mentioned by one of the participants. According to R the deputy dean (unit head) takes pride in teaching her some of the software functions especially IPAC, software for the PDA. On the other hand S learned new skills informally from lecturers as she works in the Faculty of Computer Science and Information System.

The following contingency matrix maps informal IT training courses used by level at the training site (refer Table 5.5).

Table 5.5: Informal Training Methods Used By Level Contingency Table

Informal training methods used	Level of mastery		
	Basic	Intermediate	Advance
	Self-directed	Specialised	Graphics based Windows based
	Experimentation	Specialised	Graphics based Windows based
	Observation	Specialised	Graphics based Windows based
	Mentoring	Specialised	Graphics based Windows based

Based on Table 5.5, two significant patterns are presented as follows:

1. Advanced level windows based software (word, excel and powerpoint) are easily mastered in any form of informal training method.
2. Basic level of mastery is observed for specialised software.

Sub conclusion 5: Participants' mastery of windows based software is at the advance level due to its regular usage at the workplace. As the saying goes, practice makes perfect. Opportunity to apply newly acquired basic skill will enhance curiosity and result in better understanding of the software function.

5.1.1.6 Most effective informal training method

Self-learning is the most widely used method to informally acquire IT skills. A further assessment of the responses shows that self-learning is made possible due to the availability of help buttons to guide the clerical workers whenever they face difficulties. According to D, "the existence of help buttons and built-in tutorials made reference easy whenever she faces problems in using software. Some of the help buttons are very user friendly with examples given as a guide." According to F and J, self-learning is more fulfilling as they are accounts clerk and always busy with their work. Any mistakes made while trying to master the excel software on their own will make them remember better. As in the word of J, "errors made during self-learning are valuable lessons to be learnt." The informal environments among friends make learning easy as in the case of R who would ask the stenographer, S who is stationed right next to her table.

Table 5.6: Informal Training Methods Used By Frequency Contingency Table

Informal training modes used	Frequency of usage	
	Self-directed	Eight respondents claimed that this method works best for them
	Experimentation	Three respondents claimed that this method works best for them
	Mentoring	Eleven respondents claimed that this method works best for them

The above table illustrates the popularity of the types of informal training modes (refer Table 5.6). Based on Table 5.6, three significant patterns emerged:

1. Mentoring is the most popular mode of informal training to acquire IT skills.
2. Self directed learning is the second most popular mode of informal training to acquire IT skills.
3. Experimentation is the least popular mode of informal training to acquire IT skills.

Sub conclusion 6: Mentoring through lecturers, peers and friends are perceived as important method for informal training as compared to self-directed or experimentation methods. This indicates that Malaysian university clerical workers are not “adventurous” to play around with their computer in order to solve their application problem. Reliance on safe methods by asking friends or superiors for solutions is favoured by the majority of the clerical workers.

5.1.2 RQ2: What is the Current Level of IT Competence of the Malaysian University Clerical Workers?

A checklist (refer Appendix 2A) was used to assess the clerical workers' IT competence level based on the following criteria: General Technology Application (GTA); Communication and Internet (C & I); General Computer Operation (GCO); Word processing (WP); Spreadsheet (SS); database (DB); Graphic (Gr); and Overall IT Competency (Overall). Terrell's transformation technique (2000) was used to convert ordinal data into indices based on the following formula:

Transformed Score = [(actual raw score-lowest possible raw score) / possible raw score range] x 100.
Each item of the checklist must be rescaled so that higher competence corresponds with higher numerical value as follows:

Response choice	Final value
Have not observed	1
Have observed	2
Perform with supervision	3
Perform without supervision	4
Can do and instruct others	5

For example, a clerical worker who answers “Have not observed” to all of the questions in the general technology application domain will have a raw score of 6 (or 1+1+1+1+1+1+1). If another clerical

worker answers, "Can do and instruct others" to all questions in the general technology application domain the raw score will be 30 (or 5+5+5+5+5+5).

With reference to the IT competency checklist in Appendix 2A, an excerpt of clerical worker A's response for competency in general technology application (GTA) is as follows:

	Have Not Observed	Have Observed	Perform With Supervision	Perform Without Supervision	Can Do and Instruct Others
I. General Technology Application					
Individuals should be able to apply general knowledge and skills to:					
A – perform the following tasks:					
1. discriminate between various technologies and their capabilities (e.g., scanning, videoconferencing and teleconferencing)			X		
2. convert from one system to another		X			
3. perform software upgrades		X			
4. use technology to support written and oral presentations		X			
5. compress and expand files (e.g., unzip)		X			
6. search library databases		X			

Therefore clerical A's raw score in general technology application (GTA) is $3+2+2+2+2+2+2 = 13$ while his GTA competency is $(13 - 6) / 24 * 100 = 29.17$ (rounded to two decimal places). Each competence for each clerical workers interviewed are then calculated using the same formula. A detailed breakdown of the interviewed UTM clerical workers' IT competence is shown in Table 5.7.

The details in Table 5.7 confirmed that most of the participants have high levels of competence in word processing (90.89), spreadsheet (85.95) and communication and Internet (77.98). The lowest level of competency is for database (44.56) and general technology application (51.98). The mean competency for all criteria for all participants is 72.20 which can be considered as quite high, thus making it possible to reject the second proposition that the Malaysian university clerical workers' levels of IT competence are below average. Participants with high overall competency level are B, E and G who work as chief clerk, accounts clerk and academic clerk respectively. Interestingly, B works in the Computer Centre, while both E and G work in the Faculty of Science Computer and Information System.

Table 5.7: UTM Clerical Workers' IT Competence

Name	Clerical workers' IT competence level							
	GTA	C&I	GCO	WP	SS	DB	Gr	Overall
A	29.17	52.50	62.50	86.96	70.00	46.43	62.5	63.76
B	83.33	95.00	100.00	100.00	100.00	100.00	87.50	97.47
C	66.67	80.00	95.00	100.00	100.00	0.00	75.00	76.97
D	20.83	60.00	75.00	91.30	90.00	0.00	62.50	62.92
E	100.00	85.00	96.25	100.00	87.50	100.00	100.00	96.07
F	29.17	60.00	86.25	100.00	100.00	0.00	54.17	68.82
G	83.33	95.00	100.00	100.00	100.00	100.00	87.50	97.47
H	12.50	52.50	68.75	75.00	75.00	26.79	0.00	54.21
I	25.00	22.50	61.25	79.35	0.00	0.00	0.00	31.18
J	58.33	80.00	61.25	88.04	92.50	58.93	83.33	75.29
K	45.80	52.50	67.50	100.00	100.00	67.89	62.50	76.12
L	62.50	90.00	100.00	100.00	100.00	50.00	83.33	87.36
M	58.33	85.00	61.25	88.04	92.50	58.93	83.33	75.28
N	33.33	37.50	68.75	95.65	100.00	12.50	58.33	63.76
O	41.67	77.50	73.75	91.30	70.00	14.29	41.67	64.61
P	66.67	62.50	97.50	94.57	100.00	62.50	66.70	83.43
Q	62.50	45.00	42.50	80.43	82.50	50.00	33.33	58.99
R	54.17	80.00	97.50	100.00	95.00	30.36	58.33	79.78
S	66.67	62.50	97.50	94.57	100.00	62.50	66.70	83.43
T	50.00	50.00	45.00	43.48	50.00	44.64	50.00	46.35
U	41.67	20.00	80.00	100.00	100.00	50.00	75.00	73.03
Mean	51.98	64.05	77.98	90.89	85.95	44.56	61.51	72.20

GTA = General Technology Application; C & I = Communication and Internet; GCO = General Computer Operation; WP = Word processing; SS = Spreadsheet; DB = database; Gr = Graphic; Overall* = Overall IT Competency, i.e., Overall = Mean of (GTA + C & I + GCO + WP + SS + DB + Gr)

Note: A value of 0.00 means that the respondent fills in a value of "1" for all the items for a particular skill as in the case of database (DB) for respondents C, D, F and I.

By consolidating the information from Table 5.7, the following table illustrates the competency of clerical workers by software type (refer Table 5.8).

Table 5.8: Competency of Clerical Workers By Software Type Contingency Table

Type clerical staff	Windows based		Others	
	Stenographer/ secretary	High Competence Level	Low Competence Level	
	Clerk	Competent	High Competence Level	

Based on Table 5.8, two significant patterns are apparent:

1. Stenographers and secretaries are more competent than clerks in windows based software such as word, excel and power point.
2. Clerks are more competent than stenographers and secretaries in other software application.

Sub conclusion 7: Stenographers and secretaries are more competent than clerks in windows based software such as word, excel and power point because their job function is to support faculty deans and deputy deans. The nature of their works is routine work functions in windows based software makes them very competent in these areas. However, clerks are more competent than stenographers and secretaries in other software application due to continuous job rotation, multitasking and working in open space as compared to secretaries and stenographers who work in isolation and close proximity to the office of the dean/deputy dean. Frequent job rotation, being more multi-tasking oriented and working in open space created better opportunities for transfer of IT competence through the informal mechanisms.

5.2 QUANTITATIVE ANALYSIS

Prior to addressing to the research questions for the quantitative analysis several critical issues such as the reliability and validity of the sample data need to be addressed first. It is suffice at this juncture to present that the reliability coefficients for both the pilot study and fieldwork are 0.9029 and 0.9756 respectively implying that the data is statistically very reliable (refer Appendix 5). Further to this, the factor analysis was successful and able to generate nine variables which are presented in Appendix 5.

Table 5.9: Demographic Background of Clerical Workers

	Frequency	Percent
Education		
SRP/PMR	13	2.3
SPM	303	54.7
STPM	85	15.3
Diploma	114	20.6
Bachelor	20	3.6
Work Unit		
Chancellory	38	6.9
Registrar	186	33.6
Student Affair	19	3.4
Bursar	76	13.7
Maintenance	3	0.5
Computer	5	0.9
Library	8	1.4
Faculty	122	22.0
Other	97	17.5
Job Classification		
Chief clerk	49	8.8
Clerk	431	77.8
Secretary	14	2.5
Junior secretary	60	10.8
Years Employed		
Less than 5 years	270	48.7
5 - 10 years	121	21.8
more than 10 years	163	29.4
Employment Status		
Permanent	421	76.0
Temporary/part-time/contract	133	24.0
Total	554	100.0

The descriptive analysis on the data collected, illustrated the diverse background of respondents even though they originated from 24 public Malaysian universities. With reference to Table 5.9, it is evident that the majority of the respondents are SPM holders, a qualification which is equivalent to the British O levels (54.7%). Most of the respondents (33.6%) are from the registrar office. As expected, most of the respondents are clerks (77.8%). Finally, a majority of respondents are new employees (48.7%) and have been employed for less than 5 years and are permanent staff (76.0%).

5.2.1 RQ3: What Are the Conditions for Effective Training in Order to Enhance IT Competencies Among Malaysian University Clerical Workers and How Are the Conditions Ranked?

In the first round of the EOA, 25 experts participated in the survey and provided 59 responses (Table 1 of Appendix 1). The 59 responses were synthesised and categorised into seven factors. Subsequent 2nd and 3rd rounds of the EOA produced mean and group rank for each factor (refer

Tables 2 and 3 of Appendix 1). The changes in ranking throughout the latter round are brought about by review of each expert's rational for each factor. The attrition among experts resulted in the decline in response for the second and third rounds to 21 and 13 experts respectively. The list of experts detailing their background is provided in Table 5.10.

Table 5.10: Experts Who Participated in the EOA

Code Name	Experience	Qualification	Organisation	Position
A	9 Years	Master	Kolej University Islam Malaysia	IT Manager
B	8 Years	Master	University Kebangsaan Malaysia	Lecturer
C	18 Years	MBA	Sony Technology Malaysia	Human Resource Director
D	15 Years	BA, MBA	Malaysian Insurance Institute	Head Examinations Dept
E	8 Years	Master	University of Illinois Carbondale	Doctoral Student
F	9 Years	B Engg, MBA	Orisystems Opto Sdn Bhd	CEO
G	7 Years	Bsc, Master	Universiti Teknologi Malaysia	Lecturer
H	13 Years	Bsc, Master	Universiti Teknologi Malaysia	Ex IT manager, Lecturer
I	8 Years	Msc (HRD)(UPM)	Universiti Teknologi Malaysia	Lecturer
J	9 Years	Msc (HRD)(UPM)	Universiti Teknologi Malaysia	Lecturer
K	15 Years	DBA	National Institute of Occupational Safety and Health	Consultant
L	20 Years	B Engg, MBA	Telekom Malaysia	System Engineer
M	25 Years	B Engg	Okawa Mold Engineering Design	Company Chairman
N	16 Years	MBA	National Productivity Centre	Consultant (SMI Industries)
O	11 Years	Master	Universiti Teknologi Malaysia	IT Manager
P	13 Years	Ph D	Universiti Teknologi Malaysia	Ex IT manager, Deputy Dean and Associate Professor
Q	12 Years	MBA	Heriot Watt	Quality Management Consultant
R	14 Years	Diploma	Telekom Malaysia	HR Assistant Manager
S	12 Years	PhD	Universiti Teknologi Malaysia	Head of Department and Associate Professor
T	15 Years	PhD	Universiti Teknologi Malaysia	ex-IT Manager, Head of department and Associate Professor
U	18 Years	B Sc	Telekom Malaysia	HRM Manager
V	10 Years	MMT	Hitachi Cable (Johor) Sdn. Bhd.	Logistic Manager
W	15 Years	MBA	National Productivity Centre	Service Research Manager
X	13 Years	MBA	McCain Foods Asia Pacific	Regional Manager
Y	15 Years	MSc	Shindengen Electric Manufacturing Co. Ltd.	Regional Manager

Due to the multiplicity of rounds conducted, the EOA instrument was considered to be valid as the experts were continuously provided with the outcomes of the previous rounds. Some experts requested that the findings of the whole study be shared, a request which was fulfilled upon completion of this study.

Following the completion of the second and third rounds of the study, the Kendall's Coefficient of Concordance (W) was computed to measure the level of consensus among the experts for the factors proposed. For the second round of the EOA, the Kendall's Coefficients of Concordance and p-value for scored ranking was 0.037 and 0.732 respectively (refer Table 5.11). Since the p-value was

less than 0.05, the findings are deemed to be insignificant implying that the ranking of the 21 experts are not consistent. However, for the third round of the EOA, the Kendall's Coefficients of Concordance and p-value for scored ranking was 0.303 and 0.001 respectively (refer Table 5.12). Therefore, the study was found to be statistically significant ($p\text{-value} < 0.05$) and consistent at the third round.

Table 5.11: Round 2 Survey Results of EOA

VARIABLES	Experts																				Mean	Group Rank	
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T			U
Organisational Management	1	6	1	1	1	7	4	1	4	2	4	4	1	6	6	3	7	1	1	5	1	3.1904	1
Trainee Characteristics	3	1	3	7	3	3	1	6	5	7	1	2	5	3	2	7	2	6	6	1	3	3.6667	2
Trainer Competency	5	3	1	4	5	1	2	5	6	6	6	5	2	4	3	6	5	3	2	2	6	3.9047	3
IT Facilities	4	5	6	6	6	4	5	2	2	4	2	3	7	5	1	4	1	2	4	6	4	3.9524	4
Organisational System	6	7	2	2	2	6	6	3	3	3	3	7	6	1	7	1	4	4	5	3	5	4.0952	5
Training Methodology	2	2	4	3	7	2	3	4	7	5	5	6	3	2	4	5	6	5	3	4	7	4.2381	6
Work Culture	7	4	5	5	4	5	7	7	1	1	7	1	4	7	5	2	3	7	7	7	2	4.6667	7
Kendall's W = 0.037, p-value = 0.732																							

Table 5.12: Round 3 Survey Results of EOA

VARIABLES	Experts													Mean	Group Rank
	A	B	C	D	E	F	G	H	I	J	O	Q	R		
Organisational Management	1	6	1	1	1	7	4	1	4	2	1	3	1	2.5385	1
Trainee Characteristics	2	1	4	5	3	3	1	3	5	3	2	2	2	2.7692	2
IT Facilities	3	5	6	6	2	4	5	2	2	1	4	1	4	3.4615	3
Trainer Competency	5	3	3	3	4	1	2	4	6	6	3	6	3	3.7692	4
Training Methodology	4	2	5	4	5	2	3	6	7	5	6	5	6	4.6154	5
Organisational System	6	7	2	2	6	6	7	5	3	7	5	7	5	5.2308	6
Work Culture	7	4	7	7	7	5	6	7	1	4	7	4	7	5.6154	7
Kendall's W = 0.303, p-value = 0.001															

The outcome from the third round of the EOA will be focused due to its high consistency level. Based on the mean ranking of the variables, the order of ranked importance for variables that influenced IT

competence is as follows: organisational management, trainee characteristics, IT facilities, trainer competency, training methodology, organisational system and work culture. This finding implies that the experts view that organisational management is the most important factor, while work culture is the least important factor, which affect the transfer of IT competence to the workplace. These seven variables and the 59 responses identified from the first round of the EOA (refer Table I of Appendix 1) were considered as important input to develop the survey instrument and to triangulate the aforementioned findings with subsequent correlational analysis.

5.2.2 RQ4: What is the Relationship Between Conditions for Effective Training and IT Competence, and are There Differences in IT Competence and the Conditions for Effective Training Based on the Background of Clerical Workers?

5.2.2.1 Correlational Analysis

Factored attributes will be transformed using Terrell's technique (2000) so that only eight variables representing fifty eight items will be finalised for further analysis. A correlational analysis was performed between IT competence (ITTEF) and the other seven variables (trainer competency, trainee characteristics, organisational system, organisational management, training delivery methodology, IT facilities and work culture).

The data from Table 5.13 confirmed that all seven variables are significantly and positively correlated with IT Competence. The highest Pearson correlation value is 0.529 for organisational management, while the lowest Pearson correlation value is 0.383 for work culture. The correlation analysis showed that the order of correlation from highest to lowest for variables that affected IT competence is as follows: organisational management (0.529), training methodology (0.476), IT facilities (0.470), trainer competency (0.421), work culture (0.383), trainee characteristics (0.364) and organisational system (0.402).

Table 5.13: Correlational Analysis for All Variables

		TCOM	TCHAR	OS	OM	TDM	ITF	WC	ITTEF
TCOM	Pearson Correlation	1.000	.582	.502	.577	.625	.592	.391	.421
	Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000	.000
	N	554	554	554	554	554	554	554	554
TCHAR	Pearson Correlation	.582	1.000	.574	.553	.562	.533	.394	.364
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000
	N	554	554	554	554	554	554	554	554
OS	Pearson Correlation	.502	.574	1.000	.595	.577	.514	.377	.402
	Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000	.000
	N	554	554	554	554	554	554	554	554
OM	Pearson Correlation	.577	.553	.595	1.000	.641	.612	.539	.529
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000
	N	554	554	554	554	554	554	554	554
TDM	Pearson Correlation	.625	.562	.577	.641	1.000	.677	.491	.476
	Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000	.000
	N	554	554	554	554	554	554	554	554
ITF	Pearson Correlation	.592	.533	.514	.612	.677	1.000	.516	.470
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.000
	N	554	554	554	554	554	554	554	554
WC	Pearson Correlation	.391	.394	.377	.539	.491	.516	1.000	.383
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.	.000
	N	554	554	554	554	554	554	554	554
ITTEF	Pearson Correlation	.421	.364	.402	.529	.476	.470	.383	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.
	N	554	554	554	554	554	554	554	554

5.2.2.2 The Mann-Whitney U and Kruskal-Wallis tests

The Mann-Whitney U and Kruskal-Wallis tests are used to test thirty hypotheses on differences in mean ranking of questionnaire items related to IT competence based on demographic background of the respondents (Appendix 6). The Mann-Whitney U tests are conducted for six questionnaire items using five-point scales based on the demographic variable with two categories such as employment status (permanent versus contract staff). Kruskal Wallis tests are applicable for cases when the demographic variables used have more than two categories such as education level, work unit, job classification and years employed. Twenty-four Kruskal Wallis based hypotheses were formulated accordingly. As an example, for the first item, the null hypothesis would be: there is no difference in mean ranking of language used by trainer (English and Malay) based on employment status. The null hypotheses would be rejected if the p-values were found to be lower than 0.05 for all the Mann-

Whitney U and Kruskal-Wallis tests. For this study, p-values that are less than 0.05 will be highlighted.

The significant findings for the Mann-Whitney U and Kruskal-Wallis and its relevant descriptive statistics are as follows (refer Appendix 6):

1. There is difference in mean ranking of *I can feel there is an increase in IT skill after training* based on education level whereby the mean ranking of impact by those PMR qualification is the highest (286.00) while mean ranking of impact by those with a bachelor degree is the lowest (182.73).
2. There is difference in mean ranking of *self-productivity has increased after IT training* based on work unit whereby the mean ranking of impact by those who work in the computer unit is highest (331.30) while mean ranking of impact by those who work in the library is the lowest (172.00).
3. There is difference in mean ranking of *knowledge and skills from IT training has been successfully transferred to the work place* based on work unit whereby the mean ranking of impact by those who work in the computer unit is highest (362.50) while mean ranking of impact by those who work in students affair is the lowest (270.75).
4. There is difference in mean ranking of *self productivity has increased after IT training* based on job classification whereby the mean ranking of impact by those who work as chief clerk is highest (332.87) while mean ranking of impact by those who work as junior secretary is the lowest (187.03).
5. There is difference in mean ranking of *I can feel there is an increase in IT skill after training* based on years employed as a clerical worker whereby the mean ranking of impact by those who work more than 10 years is the highest (258.00) while mean ranking of impact by those who work less than 5 years is the lowest (313.77).
6. There is difference in mean ranking of *I can feel there is an increase in IT knowledge after training* based on years employed as a clerical worker whereby the mean ranking of impact by those who work more than 10 years is the highest (309.29) while mean ranking of impact by those who work less than 5 years is the lowest (257.23).
7. There is difference in mean ranking of *I have acquired positive attitude after IT training* based on years employed as a clerical worker whereby the mean ranking of impact by those who work more than 10 years is the highest (297.10) while mean ranking of impact by those who work less than 5 years is the lowest (261.50).

5.3 TRIANGULATION ANALYSIS

5.3.1 RQ5 (Qualitative Perspective): How Do the Conditions for Training Effectiveness Affect IT Competence of Clerical Workers of a Malaysian University?

Seven sections of semi-structured interview questions were developed to address the aforementioned research question. The questions evolve around the seven factors identified from the outcomes of the Expert Opinion Assessment: trainer competency, trainee characteristics, organisational system, organisational management, training delivery and methodology, IT facilities and work culture. The third proposition that each factor for training effectiveness had the same impact on IT competence can be rejected as based on the following sections, each component has different impacts. However, the qualitative findings failed to identify the degree of impact for each factor.

5.3.1.1 Attributes of competent trainer that determine effectiveness in acquiring IT competence

Most of the participants feel that a trainer should be better than a participant in terms of IT knowledge and skills. The trainer should have good communication skills during training according to T, Q, O, D, C and B. According to B, a good trainer must be willing to share his/her knowledge even after training. The trainer must be accessible and approachable after training for follow-up and consultation. R feels that calls and e-mails could be used to disseminate knowledge by trainer after training. C and M feel that a good set of notes and training materials prepared by the trainer could be used later at the workplace for reference. Most of the participants feel that if the trainer is competent, lessons taught will always be remembered and could be applied to the workplace.

The following table illustrates the attributes for competent trainer by importance (refer Table 5.14). The attributes shown in Table 5.14 brings out two significant patterns:

1. Clerical workers rated highly the pedagogy skills and communication skills of trainers during training.
2. Similarly, clerical workers rated highly the communication skills of trainers and their willingness to conduct follow-up support after training.

Table 5.14: Attributes Of Competent Trainer By Importance Contingency Table

Attributes for competent trainer	Frequency of Importance				
		During training		At workplace	
	ICT skills	Very important	3	Very important	2
	Needs analysis	Very important	2		
	Pedagogy skills	Very important	8	Very important	1
	Teaching material	Very important	2		
	Communication	Very important	6	Very important	6
	Experience	Very important	4	Very important	1
	Personality	Very important	4		
	Preparation	Very important	1	Very important	1
	Encouragement			Very important	2
	Willingness to follow up			Very important	3

Sub conclusion 8: According to clerical workers, the degree of pedagogy and andragogy skills in a trainer reflects his/her competence level. Of slightly lower importance are experience and personality of the trainers. These skills are the foundation to build other skills namely, ICT skills, conducting needs analysis and preparing teaching material. However, after training, clerical workers still communicate with the trainers for assistance when faced with problems at work. Therefore, trainers must be willing to provide after training support to further encourage clerical workers to excel in their newly acquired skills.

5.3.1.2 Attributes of trainee characteristics that determine effectiveness in acquiring IT competence

Most of the interviewees feel that interest is the most important trainee characteristics during training. O elaborates by saying that participants should take the opportunity to ask many questions during training. B feels that trainee should attend course to seek new skills to apply at the work place based on his/her current knowledge and skills. This will help to improve his/her work productivity. At the workplace, most of the respondents feel that they should practice newly acquired skills to ensure that it will not be forgotten. According to O, one must be willing to try, apply and experiment with new skills to the workplace as practice brings perfection. O's perception is also shared by R who feels that newly acquired skills must be practiced immediately otherwise they will be forgotten.

The following table illustrates the required trainee characteristics by importance (refer Table 5.15).

Table 5.15: Attributes Of Trainee Characteristics By Importance Contingency Table

Frequency of Importance					
Trainee characteristics		During training		At workplace	
	Awareness	Very important	2	Very important	1
	Motivation	Very important	1	Very important	2
	Interest	Very important	11	Very important	3
	Commitment	Very important	3	Very important	1
	Knowledge sharing			Very important	3
	Inquisitive	Very important	1	Very important	1
	Initiative	Very important	2	Very important	1
	Preparation	Very important	1		
	Willing to learn/try	Very important	3		
	Willing to apply			Very important	8
	Cooperation	Very important	1	Very important	1
	Possess basic skills	Very important	1	Very important	1

Based on Table 5.15, two significant patterns emerge:

1. Clerical workers rate interest very highly during training. Commitment and willingness to learn or try is rated high.
2. Clerical workers rate willingness to apply newly acquired skills very highly after training. Interest and knowledge sharing is rated high.

Sub conclusion 9: Clerical workers' interests for ICT are considered very important during training. Management should take notice and be aware of clerical workers' interests in particular software and its applicability to their work requirements so that relevant training could be arranged accordingly. At the workplace, trainees rate highly willingness to apply newly acquired skill especially the opportunity to practice and experiment what they had learned from the training site. Management should ensure that the work environment support this positive attribute to ensure optimum returns of training investment.

5.3.1.3 Attributes of organisational system that determine effectiveness in acquiring IT competence

Relevance of training to the workplace from superiors is viewed as important element of organisational system that will determine effectiveness in acquiring IT during and after training. Provision of sufficient IT facilities is viewed as important factors by H, Q and S so that participants

could apply newly acquired skills to the workplace upon completion of training. A, B, D, J, M, T and U feel that IT training must be relevant to work requirement and it will eventually determine effectiveness in acquiring IT after training.

The following table illustrates the attributes of organisational system by importance (refer Table 5.16).

Table 5.16: Attributes Of Organisational System By Importance Contingency Table

Organisational system	Frequency of Importance				
		During training		At workplace	
	Relevance	Very important	7	Very important	8
	Conducive environment			Very important	1
	Improve work productivity			Very important	2
	Promotion opportunities	Very important	2	Very important	2
	Reduced workload	Very important	2		
	Support & encouragement	Very important	2	Very important	5
	IT facilities	Very important	6	Very important	2
	Planning	Very important	2		
	Appraisal related	Very important	1		

Table 5.16 uncovered two significant patterns:

1. Incorporating relevant material from workplace for training is perceived as very important by most interviewees. Second most important attribute is IT facilities.
2. Ensuring that the IT training is related to work requirements is important so that trainees could apply skills acquired during training to the workplace. Second most important attribute at workplace is support and encouragement by management.

Sub conclusion 10: The most important attribute for organisational system is relevance of training programmes during and after training. Management should ensure that training modules incorporate relevant examples from the workplace to ensure practicality of training. Moreover, management should provide continuous support and encouragement to clerical workers after training so that smooth transference of newly acquired skills to the workplace can be fully guaranteed.

5.3.1.4 Attributes of organisational management that determine effectiveness in acquiring IT competence

Management support and opportunity given for training are viewed as important features of organisational management that will determine effectiveness in acquiring IT during training. According to T, management which shows concern and takes interest in training is an important form of support to the participants. U added that support occurs when management monitors staff's progress before and after training, and assesses the training benefits. Management support is also perceived as important for the participants to practice newly acquired skills after training.

Table 5.17 illustrates the attributes of organisational management by importance.

Table 5.17: Attributes Of Organisational Management By Importance Contingency Table

Organisational management	Frequency of Importance			
	During training		At workplace	
	Leadership	Very important 4	Very important	2
	Opportunity to practice	Very important 1	Very important	1
	Choice of training	Very important 1		1
	Management interest	Very important 1		
	Management support	Very important 5	Very important	8
	Training opportunity	Very important 5	Very important	2
	Progress measurement	Very important 1		
	Work environment		Very important	2
	IT infrastructure at work		Very important	3

Data from Table 5.17 highlighted two significant patterns:

1. Management support is the most important attribute for organisational management during training and at the workplace.
2. Opportunity for training is also viewed as equally important attribute for organisational management during training.

Sub conclusion 11: Management support is perceived as a continuous function before, during and after training. This could simply be in the form of verbal encouragement, being concern of their welfare and provision of a more conducive working environment.

5.3.1.5 Attributes of training delivery and methodology that determine effectiveness in acquiring IT competence

Most of the participants believed that practical based training is very effective training method for acquiring IT competence. On the other hand, ensuring relevance of training is viewed by most participants as the most important training method and delivery that will determine effectiveness in acquiring IT after training.

Table 5.18: Attributes Of Training Delivery & Methodology By Importance Contingency Table

	Frequency of Importance			
	During training		At workplace	
Training delivery and methodology	Practical oriented	Very important	12	
	Close monitoring by trainer	Very important	3	Very important
	Contains evaluation	Very important	2	Very important
	Reference notes	Very important	2	Very important
	Needs analysis	Very important	1	
	Andragogy skill of trainer	Very important	1	Very important
	Planning	Very important	1	
	Location	Very important	1	
	Flexible scheduling	Very important	1	
	Ability to recall			Very important
	Relevance of training			Very important
	Management support			Very important
	Opportunity to practice			Very important

Table 5.18 illustrates the attributes of training delivery and methodology by importance. Based on Table 5.18, two significant patterns were identified:

1. Practical oriented training is the most important attribute for training delivery and methodology during training.
2. Close monitoring by trainer and relevance of training are the two most important attributes for training delivery and methodology at the workplace.

Sub conclusion 12: Practical oriented training activities are perceived as important training and delivery methodology attributes during training. This finding repeats the findings from section 5.1.1. Post training monitoring by trainers in the form of follow-ups is perceived as important training and delivery methodology attributes after training. This finding repeats the findings from this section as well as Nadler's (1982) model of training support system.

5.3.1.6 Attributes of IT facilities that determine effectiveness in acquiring IT competence

Sufficiency and properly maintained IT facilities are viewed by most participants as the two most important attributes of IT facilities that will determine effectiveness in acquiring IT during training. IT peripherals, sufficient numbers of computers and compatibility of software from the training site to the workplace are the three most important attributes of IT facilities that will determine effectiveness in acquiring IT during training.

Table 5.19: Attributes of IT Facilities By Importance Contingency Table

	Frequency of Importance			
	During training		At workplace	
IT facilities	Tested/properly maintained	Very important 9	Very important 1	
	Fast processors	Very important 1	Very important 1	
	Sufficient numbers	Very important 10	Very important 7	
	Technical support	Very important 1		
	Back up	Very important 2		
	Compatible software	Very important 2	Very important 4	
	IT peripherals	Very important 2	Very important 10	
	Applicability	Very important 1		
	Network facilities		Very important 1	
	Management support		Very important 1	
	Conducive work environment		Very important 1	

The following table illustrates the attributes of IT facilities by importance (refer Table 5.19). Based on Table 5.19, two significant patterns were discovered:

1. Sufficiency of computers and its accessories and properly maintained IT facilities are the two most important attributes during training.
2. IT peripherals and sufficiency of computers at the workplace are the two most important attributes after training.

Sub conclusion 13: Sufficiency of IT facilities (i.e., computers, accessories and peripheral) are important attributes during and after training. Management should ensure that IT facilities are sufficient and properly maintained as well as availability of back up facilities to ensure that training would not be interrupted.

5.3.1.7 Attributes for work culture that determine effectiveness in acquiring IT competence

Most of the participants feel that teamwork and knowledge sharing are important attributes for work culture that will determine effectiveness in acquiring IT during training and at the workplace. These two attributes are dominant due to family-oriented environment at the workplace.

The following table illustrates the attributes of work culture by importance (refer Table 5.20).

Table 5.20: Attributes Of Work Culture By Importance Contingency Table

	Frequency of Importance			
	During training		At workplace	
Teamwork	Very important	7	Very important	7
Idea/knowledge sharing	Very important	4	Very important	9
Support/encouragement	Very important	2	Very important	3
Assistance	Very important	6	Very important	4
Inquisitive	Very important	1		
Awareness of IT importance	Very important	4		
Maximise IT integration			Very important	1
Conducive work environment			Very important	5
Open discussion			Very important	1

Based on Table 5.20, two significant patterns are highlighted:

1. Teamwork and mutual assistance are the two most important work culture attributes during training.
2. Knowledge sharing and teamwork are the two most important work culture attributes after training.

Sub conclusion 14: Teamwork is the most important work culture attribute during and after training. Teamwork during training will ensure the existence of self-help in the form of assistance from one trainee to the other. At the workplace, knowledge sharing is an important work culture that will enhance teamwork among clerical workers.

5.3.2 RQ5 (Quantitative Perspective): How Do the Conditions for Effective Training Affect IT Competence of Clerical Workers of the Malaysian University?

In order to determine the relative degree of impact clerical workers expressed towards a particular item, a ratio scale was developed which appears in the last columns of Tables 5.21 - 5.28. It was

obtained by dividing the percentage of “maximum impact” by the percentage of “minimum impact” for the particular item. For example, the items listed in Table 5.21 are related to the variable trainer competency. The ratio of 1.0 was used as a dividing point that is, any item with a ratio of more than 1.0 reflects a greater degree of impact with that item (Kerlin, 1992).

Table 5.21: Impact of Trainer’s Competency on Transfer of IT Training to the Workplace

	TRAINER’S COMPETENCY	Maximum impact		Moderate impact		Minimum impact	Impact ratio
1.	Language used by trainer (English and Malay)	25.5	46.2	23.6	4.0	0.7	36.43
2.	Trainer’s professional exposure	26.0	42.6	26.7	4.2	0.5	52.00
3.	Trainer’s knowledge	26.0	42.6	26.7	4.2	0.5	52.00
4.	Trainer’s ICT skills	31.9	42.8	20.0	4.5	0.7	45.57
5.	Trainer’s communication skills	26.4	38.6	29.8	4.0	1.3	20.31
6.	Instructions given by trainer during training	18.6	41.9	33.0	5.8	0.7	26.57
7.	Preparation of training material by trainer	25.6	36.1	29.2	7.6	1.4	18.29

Based on Table 5.21, regarding the impact of trainer’s competency on transfer of IT training to the workplace, Malaysian university clerical workers are highly influenced with such things as *trainer’s knowledge*, *trainer’s professional exposure*, *trainer’s ICT skills*, and *language used by trainer (English and Malay)*. The first two items have remarkably high ratios of 52.00, suggesting substantially greater impact with these indicators than with the remaining items. The lowest impact indicator is *preparation of training material by trainer* with a ratio of 18.29.

Table 5.22: Impact of Trainee Characteristics on Transfer of IT Training to the Workplace

	TRAINEE CHARACTERISTICS	Maximum impact		Moderate impact		Minimum impact	Impact ratio
8.	Trainee’s current IT skills	19.1	42.8	32.7	4.9	0.5	38.20
9.	Trainee’s language/ communication mastery	16.8	42.8	35.6	4.3	0.5	33.60
10.	Understanding of the rationale for training	16.6	46.9	29.6	6.5	0.4	41.50
11.	Trainee’s preparation before training	11.7	35.7	42.2	9.2	1.1	10.64
12.	Trainee’s aptitude (e.g., visualisation skills)	13.0	36.5	42.2	7.6	0.7	18.57
13.	Trainee’s interest towards IT	40.1	38.4	17.5	3.1	0.9	44.56
14.	Trainee’s education background	14.6	37.2	40.4	7.0	0.7	20.86

With reference to the impact of trainee characteristics on transfer of IT training to the workplace, Malaysian university clerical workers are greatly impacted by elements such as *trainee's interest towards IT*, *understanding of the rationale for training*, *trainee's current IT skills* and *trainee's language/communication mastery* (refer Table 5.22). The first two items have remarkably high ratios of 44.56 and 41.50, suggesting greater impact with these indicators than with the remaining items. The lowest impact indicator is *trainee's preparation before training* with a ratio of 10.64.

Table 5.23: Impact of Organisational System on Transfer of IT Training to the Workplace

	ORGANISATIONAL SYSTEM	Maximum impact		Moderate impact		Minimum impact	Impact ratio
15.	Compensation/incentives given after training	12.6	35.0	33.2	14.8	4.3	2.93
16.	Opportunity for promotion	13.7	25.8	35.2	19.3	6.0	2.28
17.	Contributes towards performance appraisal	14.1	35.2	34.8	12.6	3.2	4.41
18.	Immediate organisational benefits after training	10.8	40.4	34.7	10.8	3.2	3.38

Based on Table 5.23, most of the impact ratios are very low. The item *contributes toward performance appraisal* has the highest impact of 4.41. The other items related to organisational system have low impact of less than 10 with the lowest impact indicator is *opportunity for promotion* with a ratio of 2.28.

Table 5.24: Impact of Organisational Management on Transfer of IT Training to the Workplace

	ORGANISATIONAL MANAGEMENT	Maximum impact		Moderate impact		Minimum impact	Impact ratio
19.	Management commitment at work place	20.8	47.1	23.6	6.7	1.8	11.56
20.	Importance of IT training from the university's perspective is made known	24.4	44.2	24.2	5.4	1.8	13.56
21.	IT awareness among management	24.2	48.2	20.0	6.9	0.7	34.57
22.	Openness among management	22.6	43.5	25.6	6.7	1.6	14.13
23.	Support by management	26.2	40.3	24.9	7.0	1.6	16.38
24.	Management effectiveness at work place	17.7	44.2	30.0	6.5	1.6	11.06
25.	Leadership quality	22.0	48.0	21.5	6.9	1.6	13.75
26.	Organisational image towards IT	27.3	44.9	20.2	6.0	1.6	17.06

From data in Table 5.24, Malaysian university clerical workers are greatly impacted by *IT awareness among management* (34.57 impact ratio). The second highest impact ratio is 17.06 for the item *organisational image towards IT*. The other items related to organisational management have low impact of less than seventeen with the lowest impact ratio of 11.06 for *management effectiveness at work place*.

Regarding the impact of training delivery and methodology on transfer of IT training to the workplace, Malaysian university clerical workers are greatly impacted with such things as *demonstration oriented, combination (e.g., lecture and practical), training and teaching delivery (e.g., training instructions)* and *course material* (refer Table 5.25). The first two items have remarkably high ratios of 27.11 and 23.71, suggesting substantially greater impact with these indicators than with the remaining items. The lowest impact indicator is *using notes and manual* with a ratio of 3.96.

Table 5.25: Impact of Training Delivery and Methodology on Transfer of IT Training to the Workplace

	TRAINING DELIVERY AND METHODOLOGY	Maximum impact		Moderate impact		Minimum impact	Impact ratio
27.	Lecture base (chalk and talk)	8.1	38.3	40.3	11.7	1.6	5.06
28.	Demonstration oriented	24.4	40.8	27.3	6.7	0.9	27.11
29.	On the Job Training (OJT)	25.6	35.0	28.0	9.2	2.2	11.64
30.	Using notes and manual	9.9	40.1	38.6	8.8	2.5	3.96
31.	Informal (e.g., learn from peers or self study)	14.1	39.7	35.6	9.2	1.4	10.07
32.	Combination (e.g., lecture and practical)	16.6	38.1	35.6	9.0	0.7	23.71
33.	Training and teaching delivery (e.g., training instructions)	16.8	44.0	31.8	6.5	0.9	18.67
34.	Course material (e.g., notes, CD ROMs etc.)	16.4	38.3	35.9	8.1	1.3	12.62

With regards to the impact of IT facilities on transfer of IT training to the workplace, (refer Table 5.26) Malaysian university clerical workers are greatly impacted with such things as *computer system used at training site, technical support for training, software for training (e.g., windows, Lotus etc)* and *hardware for training (e.g., computer)*. The first two items have remarkably high ratios of 36.14 and 33.60, suggesting substantially greater impact with these indicators than with the remaining items. The lowest impact indicator is *reliability of equipment and peripherals at work place* with a ratio of 5.42.

Table 5.26: Impact of IT Facilities on Transfer of IT Training to the Workplace

	IT FACILITIES	Maximum impact		Moderate impact		Minimum impact	Impact ratio
35.	Hardware for training (e.g., computer)	30.9	39.9	24.7	2.9	1.6	19.31
36.	Software for training (e.g., windows, Lotus etc)	26.7	40.4	26.0	5.6	1.3	20.54
37.	Supporting equipment for training (e.g., LCD, OHP, etc)	20.9	45.1	27.6	5.2	1.1	19.00
38.	Technical support for training	16.8	41.0	36.1	5.6	0.5	33.60
39.	Computer system used at training site	25.3	40.4	27.8	5.8	0.7	36.14
40.	Reliability of equipment and peripherals at training site	24.2	33.9	31.6	6.5	3.8	6.37
41.	Software version at training site	21.8	40.4	29.4	5.2	2.9	7.52
42.	Computers at work place	29.8	41.0	22.7	4.3	2.2	13.55
43.	Software at work place	23.8	42.4	26.5	5.6	1.6	14.88
44.	Technical support at work place	18.4	40.1	31.9	7.6	2.0	9.20
45.	IT systems used at work place	23.3	40.3	27.8	6.0	2.7	8.63
46.	Reliability of equipment and peripherals at work place	23.3	32.9	30.7	8.8	4.3	5.42
47.	Versions of software used at work place	19.3	38.1	31.9	8.3	2.3	8.39

With reference to the impact of work culture on transfer of IT training to the workplace, Malaysian university clerical workers are greatly impacted with such things as *support from colleagues* and *learning/knowledge culture* (refer Table 5.27). The first two items have remarkably high ratios of 47.2 and 20.00, suggesting substantially greater impact with these indicators than with the remaining items. The lowest impact indicator is *working in teams or groups* with a ratio of 18.73.

Table 5.27: Impact of Work Culture on Transfer of IT Training to the Workplace

	WORK CULTURE	Maximum impact		Moderate impact		Minimum impact	Impact ratio
48.	Support from colleagues	23.6	46.8	25.3	3.8	0.5	47.2
49.	Working in teams or groups	20.6	46.8	27.1	4.5	1.1	18.73
50.	Learning/knowledge culture	22.0	46.9	25.5	4.5	1.1	20.00

Finally, with regards to the rating of clerical workers' IT competence, Malaysian university clerical workers strongly agree with such things as *I can feel there is an increase in IT knowledge after training*, *I can feel there is an increase in IT skill after training*, *IT training has been successfully*

transferred to the work place, self productivity has increased after IT training and I have acquired positive attitude after IT training (refer Table 5.28). The first two items have remarkably high ratios of 53.25 and 49.25, suggesting substantial agreement with these indicators than with the remaining items. The lowest rated indicator is *IT training has improved team work effectiveness* with a ratio of 24.22.

Table 5.28: Clerical Workers' IT Competence

	IT COMPETENCE	Strongly Agree	Agree	Agree A Little	Disagree	Strongly Disagree	Impact ratio
51.	I can feel there is an increase in IT skill after training	19.7	64.8	12.6	2.5	0.4	49.25
52.	I can feel there is an increase in IT knowledge after training	21.3	65.0	10.6	2.7	0.4	53.25
53.	I have acquired positive attitude after IT training	15.7	67.7	14.6	1.6	0.4	39.25
54.	Self productivity has increased after IT training	19.9	64.3	13.0	2.3	0.5	39.80
55.	IT training has been successfully transferred to the work place	31.8	55.4	10.1	2.0	0.7	45.43
56.	IT training has improved team work effectiveness	21.8	58.1	17.3	1.8	0.9	24.22

5.4 SUMMARY

The findings uncovered interesting patterns which are pertinent to address the five research questions. Based on the interview of twenty one clerical workers, it is apparent that most clerical workers acquired IT competence based on the informal method. The interview also showed that the 21 Malaysian university clerical workers have high levels of competency index for most IT skills. The EOA uncovered various attributes pertinent to the development of IT competence, which were eventually grouped into seven factors. These factors were found to be positively correlated to IT competence. Finally, the mean ranking for attributes of the seven factors and IT competence were found to differ based on several demographic variables.

The triangulation method showed consistency in both the qualitative and quantitative methods, i.e., both methods support one another. The case study revealed a detailed pattern of how the seven factors affect IT competence based on the interviewees' perceptions during training and at the workplace. The survey was able to rank the impact of each attribute for each of the seven factors. It is interesting to note that most of these attributes had appeared in similar forms using different terminologies during the verbatim transcription of the interview sessions.

These findings make the triangulation approach by Greene et al. (1989) to be applicable for this study whereby the complementary of the research questions are further developed through sequencing of methods and expanded where mixed methods added more breadth and scope to the study.

CHAPTER VI

CONCLUSIONS AND IMPLICATIONS

The purpose of this study was to investigate using both quantitative and qualitative methods, how IT competencies are acquired and what factors are important to facilitate the transfer of IT training in order to enhance IT competencies. The study was also conducted to assess the level of competence among university clerical workers. Finally, the study uncovered the existence of relationship between factors that affect the transfer of IT training and IT competence as well as differences in IT competence based on demographic background of the clerical workers. An improved version of the Finalised Conceptual Framework based on the qualitative and quantitative analyses conducted will be presented.

6.1 CONCLUSIONS

In this section, a review and discussion of the significant findings for each research question is presented. Explanations for the findings are based on the empirical evidence and case study conducted in this study. Five hundred and fifty four respondents and twenty one participants participated in the survey and interview.

6.1.1 How do Clerical Workers of a Malaysian University Acquire IT Competence?

The following proposition was tested out to address the above research question: clerical workers acquire IT competence through formal training process. This proposition can be rejected as findings from the previous chapter indicated that clerical workers acquire IT competence through informal training process particularly self and experiential learning. Gick and McGarry (1992) discovered that errors in learning are a valuable source of information allowing trainees to adjust to mental models, requiring attention of the learner, and aids in information retrieval. However, I would like to point out that the informal training mode functions as a complement to formal training. A clerical worker normally acquires basic skills through formal training and will try to master advanced-level IT skills through informal training.

The aforementioned findings echo the findings of another study by Brookfield (1986) which reported that two characteristics most frequently identified as significant to adult learning are: a) "the adult's autonomy of direction in the act of learning" (p. 25) - what is often referred to as self-direction, and b) "the use of personal experience as a learning resource" (p. 25). The participants of the interview session in this study have typically initiated their own IT competency building system and process this competency internally with little or entirely without, direct input, exchange or feedback from others within their working environment. This is consistent with findings on informal learning conducted in other workplace settings where significant learning happened primarily through individual learning mode (Howe, 1991, Rossi, 1994, Troyan, 1995).

A related study on seven clerical and administrative staff, four computer trainers and two education and training coordinators by Mandefrot (1997) showed that people learn how to compute through peer-support, attending night courses, taking individual mini-training seminars after work, and by asking friends. The findings of this research suggest that people learn how to use computers more through personal struggle with the software. The informal means of learning at the workplace is well established. Mandefrot (1997) concludes that effective use of these informal means of learning still need the support from management.

6.1.2 What is the existing IT Competence Level of the Malaysian University Clerical Workers?

The second proposition was tested out to answer the above research question: Malaysian university clerical workers' level of IT competencies is below average. Problems arose in determining how high is high? After going through most literature on measurement of IT competence, I conclude that there is no established standard to measure IT competence quantitatively. As there is no way to compare the aforementioned index with any established standards, Furthermore, any index of more than 50% is considered to be above average based on the simple rule of thumb. The second proposition can also be rejected as findings from Chapter 5 show that the mean competency for all criteria for all participants is 72.20 which can be considered as quite high. Most of the participants have high levels of competency index for word processing (90.89), spreadsheet (85.95) and communication and Internet (77.98). The only weakness is in the area of database whereby four participants reported the zero level of competency, i.e., they find that database skills are not relevant to their work.

A study on secretarial workers by Jerich (2000) indicated that word processing as well as keyboarding and e-mail are the strongest factors related to the necessary knowledge and skills for secretarial job performance. This is followed by spreadsheet and database software. A related study by Al-Mwadih (1999) showed a high utilisation of computer technology among higher education administrators at the University of Jordan. The study also showed significant relationship between the current utilisation of computer technology among the higher education administrators, and their previous computer training in order to determine the adequate training methods that may enhance their computer skills.

6.1.3 What are the Conditions for Effective Training in Order to Enhance IT Competencies Among Malaysian University Clerical Workers and how are the Conditions Ranked?

Based on research question 3 there is only one hypothesis to be tested using Kendall's coefficient of concordance based on the outcomes of the second and third rounds of the Expert Opinion Assessment (EOA): There is no consistency in response from the experts. In the first round of the EOA, seven conditions for training effectiveness were identified: trainer competency, trainee characteristics, organisational system, organisational management, training methodology, IT facilities and work culture.

Following the completion of the second and third rounds of the study, the Kendall's Coefficient of Concordance (W) was computed to measure the level of consensus among the experts for the factors proposed. For the second round of the EOA, the Kendall's Coefficients of Concordance and p-value for scored ranking was 0.037 and 0.732 respectively (Table 6.2). However, for the third round of the EOA, the Kendall's Coefficients of Concordance and p-value for scored ranking was 0.303 and 0.001 respectively (Table 6.3). Therefore, the study was found to be statistically significant (p -value < 0.01) and consistent at the third round.

Based on Table 6.3, the order of importance for the seven factors are as follows: organisational management, trainee characteristics, IT facilities, trainer competency, training methodology, organisational system and work culture. Based on the outcome of the third round of the EOA, organisational management is the most important factor while work culture is the least important factor.

6.1.4 What is the Relationship Between Conditions for Effective Training and IT Competence, and are there Differences in IT Competence and the Conditions for Effective Training Based on The Background of Clerical Workers?

A correlational analysis was performed between IT competence and the other seven variables: trainer competency, trainee characteristics, organisational system, organisational management, training delivery methodology, IT facilities and work culture. Based on findings from Table 6.27, all seven variables are significantly and positively correlated with IT competence. The highest Pearson correlation value is 0.529 for organisational management, while the lowest Pearson correlation value is 0.383 for work culture. These findings reflect those from 7.1.3.

To address the second part of research question 4, the Mann Whitney U and Kruskal Wallis tests were conducted to test differences of mean ranking on items related to IT competence based on the demographic background of the clerical workers. A study by Jerich (2000) showed that employee perceptions on IT differ by their educational level, work unit, job classification and years of experience in their current jobs. Al-Mwediah's (1999) study found that variables such as years of professional experience at the university, and amount of computer education demonstrate a positive relationship with Jordanian higher administrators' usage of computers.

In this study, the difference in ranking for certain attribute of IT competence is highest for clerical workers with more than ten years work experience. This finding is consistent with those based on a study by Richey (1992) which showed that age has no impact on the generalisation of material learned in a safety training programme. Richey (1992) discovered that workers with high tenure tend to transfer learning to specific work behaviours. Older, long-tenured employees are less likely to participate in any training activities. However, Gist et al. (1988) argued that with new technology, older adults do not learn as much in the same time period. In addition, Foxon (1997) proved that workers with higher average years of employment correlated with lower intent to transfer.

The difference in ranking is also highest for certain attribute of IT competence for clerical workers with SRP qualification. Even though SRP is the lowest academic qualification of clerical workers, this group of employees has better appreciation for IT training. Perhaps, clerical workers with higher qualification feel that they could "job hop" to other organisations easily compared to those with lower academic qualification. Perhaps, those with lower academic qualification feel that they need more job security and are therefore more trainable than those with higher qualifications. This finding

contradicts that of Warr and Bunce (1995) as well as Mathieu et al. (1993) which showed that educational level is significantly correlated with learning achieved.

Finally, the difference in ranking is highest for certain attribute of IT competence for clerical workers working in the computer unit than other work units. This is due to the availability of sufficient IT facilities at the computer unit as compared to other units. With better facilities, clerical workers at the computer unit are bound to have better appreciation for IT training.

6.1.5 How do the Conditions for Effective Training Affect IT Competence of Clerical Workers of the Malaysian University?

The third proposition was tested out: to assess how each condition for effective training affects IT competence of clerical workers of a Malaysian university. This proposition can also be rejected as findings from section 5.3.1 indicate that all the variables: training and delivery method, trainer competency, organisational system and management as well as IT facilities, work culture and trainee characteristics are all equally important but have varying impact on IT competence. Findings from the impact analysis (refer section 5.3.2) which focuses on the items for each variable also identified critical items that have maximum impact that could be used to refine the Finalised Conceptual Model (refer Figure 3.4).

6.2 IMPLICATIONS

In terms of the research context, based on the empirical findings of IT competencies among clerical workers in Malaysian universities, this study has provided more detailed and updated descriptions on the perceptions of clerical workers based on an integrated framework for assessing IT competence. The study also identified more categories of factors that affect the transfer of IT competence as compared with prior studies of IT competence. Therefore, we are able to have a more updated and complete picture of IT competence within this research context. Moreover, with the use of both quantitative and qualitative research methods, the results of this study have a higher degree of consistency that enables us to have a better understanding for not only what levels IT competence are exhibited by the clerical workers, but also the process of competence acquiring and the variables that influence the transfer of IT competence from the training site to the work place.

In addition to the contextual contribution, I identified five implications from the study: (1) model development implications, (2) the development of instruments for measuring IT competence among clerical workers, (3) policy and practical implications, (4) curricular development implications, and professional development implications. These implications need to be addressed to ensure that clerical workers could improve their IT competence with minimum barriers at the training site and workplace.

6.2.1 Model Development Implications

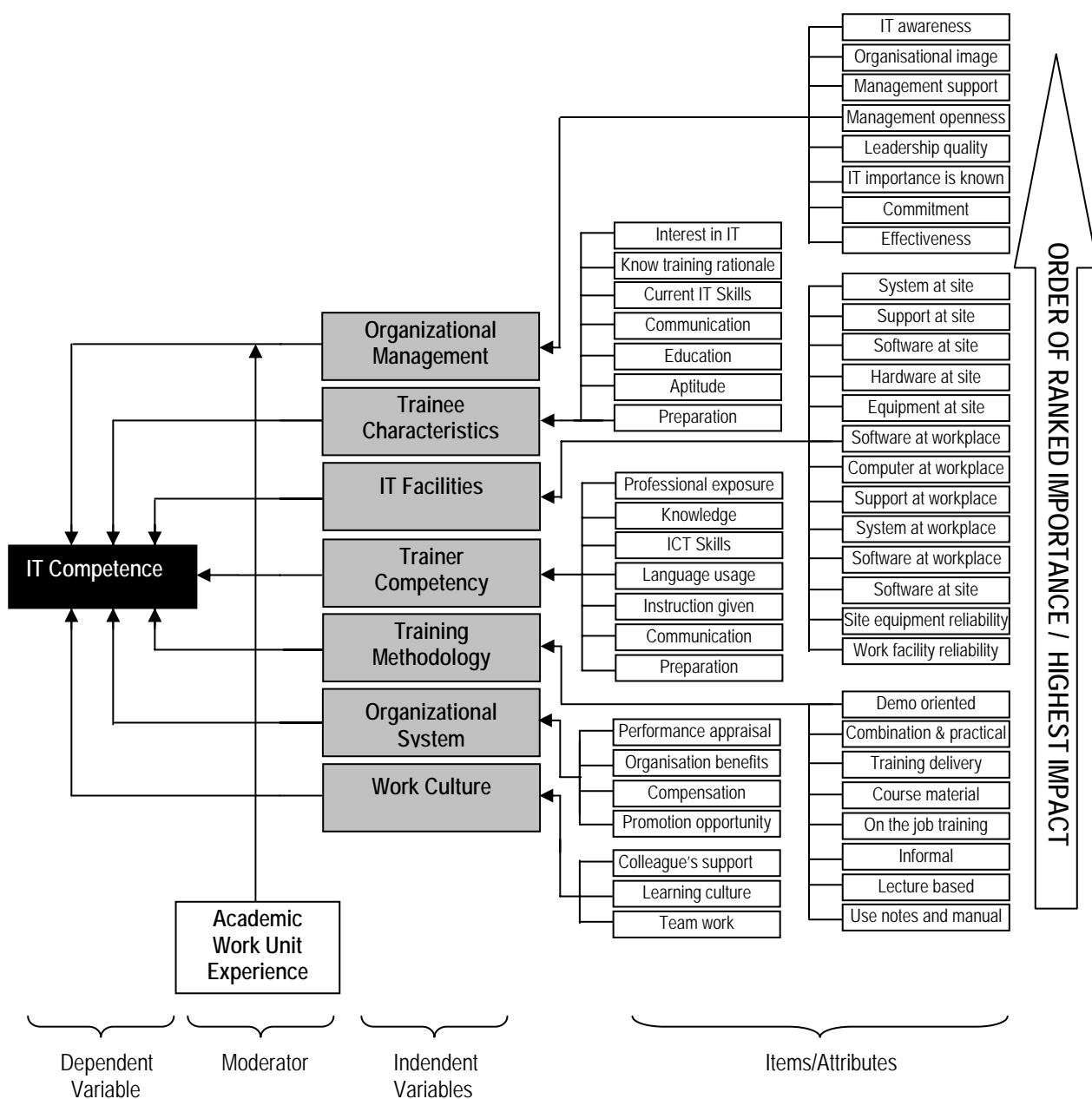
The main contribution of this study is the Revised IT Competence Model which is shown in Figure 6.1. The revised model takes into consideration all the major findings from the quantitative and qualitative analyses. The revised model also ranked from highest to lowest as well as maximum to minimum impact variables and its related items respectively. Though this model is specifically related to IT training effectiveness, it does partially address Tannenbaum and Yukl's (1992) comment on the lack of theory-related research in training effectiveness through a scientific and empirical approach. The rigour in testing of hypotheses and propositions makes this a valid model to assess IT competencies and the conditions for training effectiveness among Malaysian university clerical workers. However, I feel that this model has its shortcomings as it is based on surveys and interviews which are 'snapshots' of perceptions at a particular point of time. Further to this, the rapid evolution of IT infrastructure in the workplace could further affect the applicability of this model beyond this study.

6.2.2 Development of Instruments

A major methodological contribution of the study is the development of a survey instrument and a checklist for assessing the factors that affect the transfer of IT training and measuring IT competencies among clerical workers respectively. Recognising the inadequacy of the existing instruments, I have developed these instruments by modifying the existing instruments for measuring IT competencies with the results from the Expert Opinion Assessment and semi-structured interviews. The questionnaire has been content validated by an expert panel of 3 professors, construct validated through exploratory factor analysis, and criterion validated through the hypothesis testing, where the relationships with other variables in the theoretical model were tested with significant relationships. Moreover, the items in the instrument have shown a high level of reliability.

The checklist has provided a unifying framework to measure IT competencies among university clerical workers. The instrument itself may serve well for identifying the relative strength of different IT competencies in distinctive dimension for not only practicing clerical workers but also potential clerical workers so as to help to identify the areas in which they require further development. While it is developed for measuring competencies in the services sector, it can also be applied to study the competencies of other sectors as well as for other vocations.

FIGURE 6.1: Revised IT Competence Model



6.2.3 Policy and Practical Implications

The present study indicated that university clerical workers were highly motivated towards IT training and they were basically eager for achieving the highest possible competency levels. The internal (psychological) and environmental (organisational) factors were considered pertinent in explaining clerical workers' behaviour towards IT training. The universities should take advantage of the current positive behaviour of clerical workers towards IT training for meeting the ultimate objective for the creation of an effective and productive service. As a matter of policy, whilst IT training needs further emphasis as an important component in the universities' developmental efforts, an educative environment within should also be given greater emphasis (Knowles, 1984). According to Richey (1992) organisational climate coupled with trainee characteristics can account for up to 80% of the knowledge retained after training. Conducive work environment will improve the transfer of IT competence from training to the workplace. Some themes for professional development among clerical workers as well as successful transfer of IT competence emerge from this study. First, IT facilities are important for clerical workers to perform their daily tasks and duties. Second, a positive work culture will result in a more conducive work environment and will in turn nurture the development of clerical workers' IT competence.

Immediate supervisor support is important to transfer process. The findings, that peer support effects transfer of training has implications for the university training unit. While further research is needed in this area, support mechanisms can be developed to enhance peer support. In this study the use of a peer support network did not prove to be significant; however, the concept of providing such a mechanism for peers to interact, share ideas and information may be useful if the network were structured differently. Another idea is to establish peer group meetings after the training is over. This would provide peers the opportunity to share additional information and/or address lingering questions. According to Huezyski and Lewis (1980), being open to suggestions, listens to new ideas, and allowing employees to use new methods are positive supervisor characteristics for transfer. In fact, this is in line with the basic trust of In Search of Excellence as postulated by Peters and Waterman (1982), and it, therefore, should be considered as an important strategy in Malaysian universities' efforts at becoming more IT driven.

The major practical implications of the study are as follows:

1. University clerical workers have many IT related needs. Some of the needs can be fulfilled through IT training programmes and the others can be met through other activities. The

- understanding of the employees' needs is important in designing specific programmes and activities for the purpose of achieving greater productivity of the organisations.
2. University clerical workers' interest towards IT training are not confined to knowledge and skills related to the job only. They are also interested in cognitive, intellectual, ethical and social development. A sound strategy in designing in-service training programmes is needed in ensuring that the university clerical workers can fulfil these needs.
 3. Since all categories of university clerical workers are highly motivated towards IT training, steps need to be taken to ensure that all categories of university clerical workers have equal opportunities to participate in in-service training. According to Martocchio (1992), trainees receiving a description of training as 'opportunity' resulted in increased confidence in operating a personal computer and increased learning.
 4. University clerical workers have expectancies and goals to be achieved by participating in IT training. Therefore, there is a need for university training units to ensure that their employees' expectancies and goals are met from attending a particular training programme.
 5. Since university clerical workers' expectancies and goals are important in their participation in IT training, there is a need to formalise the goal-setting procedures and the follow-up programmes in ensuring the "transfer of training" to work situation can take place.
 6. There is a need for universities to take all possible measures to improve and sustain the current positive perception towards IT training amongst its employees. This is important because such a positive perception is a great "asset" to the institution in its efforts to bring about change and development to its staff.
 7. The significance of management support and its effect on transfer provides strong support for implementation of processes that will facilitate training programs. In the study, the importance of motivation by the university management enhanced the application of knowledge and skills. A technique that could be utilised includes requiring trainees to meet regularly with their management to discuss action plans and on-the-job application of skills. Another technique that could be used involves structuring pre-training course sessions for key management personnel, where they could learn about the content of training courses being provided for their direct reports and plan for actions they could take to support trainees throughout the training programme.
 8. Examine civil service job classification guidelines in conjunction with secretarial job performance needs, role and responsibilities. Due to high technology demands within work environments, identify the extent to which there is a gap between employee qualifications and duties across job classification levels with today's higher education work environment.

9. It is recommended that formal pedagogical training should be provided for the IT trainers in order to provide qualified, formally-trained instructors to implement relevant and appropriate education, training, and professional development services for clerical workers. Trainers should also continuously examine and keep abreast of modern office technologies.

6.2.4 Curricular Development Implications

Clerical workers' perceptions about IT competence confirmed that informal training methods are more "favourable" than formal training methods. However, informal training and formal training are complementary to each other as most clerical workers undergo formal training first to understand the basic functions of any software before trying out on their own. As such management should examine existing curriculum efforts in relationship to employee job performance needs. Attention needs to be given to the continuation of feedback mechanisms such as focus groups to determine specific job relevant knowledge skills for job performance. Management should explore training techniques and instructional strategies that can be used to maximise the degree to which classroom learning matches and concepts practiced relate to varying "real life" situations on the job. For example, the use of practice sessions that provide opportunities to apply software programme concepts to specific job tasks. The challenge of these endeavours is the ability to specialise training when specific job relevant knowledge and skill requirements vary among individuals and their work units. This task is challenging in a higher education environment where specific knowledge and skills required will obviously vary according to the needs of campus work units. However, this information could assist in developing programs that fulfil job performance needs, increases employee participation in these programs as well as increases the chances that newly acquired knowledge and skills will be utilised on the job. Difficulties in enrolment for training and busy workload are the major contributory factors. Most clerical workers expressed interest in an expansion of short programme activities including refresher courses or short workshops on specific topics which are more focused.

Some specific features for IT training desired by the clerical workers are:

1. It needs to be practical and useful to the participants.
2. There are specific competencies to be learned in the training.
3. It should utilise a hands-on approach.
4. Small group, individualised instruction or one-on-one coaching is more efficient.
5. Have sufficient equipment (of the same type used on the job) ready to be used.
6. Participants should be rewarded and/or receive recognition for their participation.

7. Provide evaluation and feedback; demonstration of acquired skill should be the primary criterion for evaluating effectiveness.
8. Provide follow-up support.

Several key themes seem to emerge from the findings, especially when looking at the strong factors related to job performance needs. First, clerical workers within all job classification levels have a high dependency on the use of technology to do their work. This includes use of an array of equipment, computer software, e-mail and Internet. Second, clerical workers perceive that a higher level than basic technological knowledge and skill level is required to perform their jobs and additional technology is important to their career advancement. The findings point out that, in terms of software application programs, word processing and spreadsheet as well as communication and Internet are important IT competencies that must be mastered. Third, both quantitative and qualitative data indicate that a key barrier to their development is time to practice and time to attend IT training courses.

Many respondents indicated that the IT training programs are offered at the busiest times of the semester and/or offered only once a semester. Management should examine course time schedules in conjunction with heavy workloads due to beginning or ending of semester, administrative activities such as budget reporting and student registration processes. The chances for increasing the number of training participants can be guaranteed to a greater extent, if the training courses are initiated at time in which the workers have comparatively lesser workload. For example, management should explore the existence of system utilisation statistics available for on-line university administrative systems that administrative assistants are using such as the on-line registration system. This information may provide indicators of peak work periods during the semester as well as the times during the day that on-line administrative systems have the heaviest use. It is recommended to the experts when designing and developing curricula for the office technology needs of clerical workers, that education and training be provided for all staff in office technology systems, microcomputer applications, specifically, uses of Internet, World Wide Web, database, spreadsheets of Lotus and Excel, computer graphics, word processing package of Microsoft Word, Desktop Publishing, and Windows.

These themes invite exploration into curricular programs that can provide ideas with the ways in which to use technology to save time and consolidate job tasks as well as manage and organise vast amount of information. This could include, but not limited to, how to (a) organise, link together and merge files, (b) decide which application programme is best to use for the task, for example, how one

decides between developing a word processing table embedded with calculations or to use a spreadsheet, (c) use or modify templates to simplify work, (d) use software application programme macros as a way to manage identical material or tasks efficiently, (e) organise and cross reference computer files, or (f) narrow search topics within Internet search engines.

6.2.5 Professional Development Implications

It is apparent that technology has a major impact on work related activities and employee's professional development. Some themes for professional development among clerical workers for the successful transfer of IT competence emerged from this study. First, a large percentage of the respondents are SPM holders, though some have college diplomas and degrees - an indicator of the dearth of employment opportunities in Malaysia. Most of the respondents are permanent staff, new employees, have been employed for less than 5 years and are permanent staff. These findings are due to the fact that most of the twenty one universities in Malaysia are new establishments. Therefore, it is understandable that clerical workers desire counselling or academic advice for their professional development as well as advice on how to utilise their talent for their professional development. It is also important to note that an important incentive for attending professional development programs based on the findings of this study was an increased eligibility for promotion. Counselling or guidance into what courses to attend for advancement was part of this incentive. Second, clerical workers indicated that (a) the freedom to try new ways to complete job tasks, (b) ample opportunity to practice newly acquired IT knowledge and skills, (c) organisational and management support for training and development, (d) trainee and management open communication, and (e) peer support, were items that clerical workers believe conducive to the development of job related IT competence. Moreover, in terms of support for the transfer of IT competence from the training site to the workplace, clerical workers request for regularly scheduled evaluations centred on encouragement, guidance and feedback would be helpful and morale boosting to them as employees. It is important to note that if clerical workers believe these items are important, and if opportunity exists, they will most likely engage in these activities. However, the findings from this study suggest that these opportunities do not often exist. The greatest barrier to the development of IT competence in the training site and workplace is time. This included time to practice, train or experiment with newly acquired skills. The second noted barrier to enhancement of IT competence was management support. Clerical workers are sent for IT training without any monitoring or appraisal on the relevance of the training programme. Some are sent for training which

may not be relevant to their job specification. Others indicated that they could not apply newly acquired skills as the software versions used at the training site and workplace are different or that may not be available. Some of the clerical workers feel that management support for IT training is just lip service.

6.3 FUTURE RESEARCH

I have identified three areas where follow-up research base on this study could be conducted. The three areas are to conduct comparative studies of factors and IT competencies, use of structural equation modelling and develop typology of clerical workers through job description.

6.3.1 Comparative Studies of Factors Affecting IT Competencies

In this study, the sample was chosen from the public universities in Malaysia which have shown significant differences in terms of IT competencies based on demographic background. Further comparative works may be conducted across different industries and cultures. Comparisons among different industries can help us to understand the requirements of different IT competencies across different industries, so that more focused research attention or training can be made. A possible study can be done at the private higher education institutions in Malaysia, which together with the public universities have the potential to develop in the educational hub of Malaysia. On the other hand, cross-cultural comparisons can provide our understanding on the influences of the socio-cultural contexts on the formation of IT competencies. For example, applying the conceptual model to the manufacturing sector or another public institution will add further understanding in the impacts of these external influences as the core business and orientation may differ from that of a public university.

6.3.2 Use of Structural Equation Modelling

I believe that it is desirable to apply structural equation modelling techniques for future research alongside the conceptual model including confirmatory factor analysis and path analysis. As Hair et al. (1998) suggested, these techniques are distinguished by, firstly, their ability to estimate multiple

interrelated dependence relationships through series of structural equation than separate equations, and secondly, their ability to represent unobserved concepts in these relationships and account for measurement errors in the estimation process. These advantages allow further research for estimating the conceptual model as a whole. By using structural equation modelling, it is also easier to estimate the goodness-of-fit for different alternative models, so that a "better-fitted" one can be identified. Further, confirmatory factor analysis can be applied to the competency instrument to provide further support for modifications or confirmation of the factor pattern within the instruments.

6.3.3 Typology of Clerical Workers Through Job Description

By classifying the clerical workers into different categories, it is possible to offer them more focused training and assistance. Most of the prior classifications of the clerical workers have been made with reference to their job classification like senior stenographer, stenographer, chief clerk and clerk. However, there are variations in terms of job specification. For example, within the category of clerk there are academic clerk, administrative clerk and accounts clerk. Each category has different focus and requires specialised training to fit their job functions to ensure relevancy of training to the work requirement.

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EXPERT OPINION ASSESSMENT DOCUMENTATION

ROUND 1

*EXPERT OPINION ASSESSMENT TO IDENTIFY CONDITIONS FOR IT TRAINING
EFFECTIVENESS AMONG CLERICAL STAFF AT HIGHER EDUCATION INSTITUTIONS*

Dear Sir/Madam

We have identified you as a member of the panel expert for our Expert Opinion Assessment entitled IT competencies and the conditions for training effectiveness: the performance of Malaysian university clerical workers in facing organisational changes. We would appreciate if you could list known factors that could affect the transfer of IT training among clerical staff at Higher Education Institutions. There will be several rounds of follow-ups to solicit your feedback of the responses obtained from other experts.

Please answer the following question and return to me by e-mail by 22nd June, 2003. For the purposes of this study the term "Conditions for IT Training Effectiveness" is to be used in a broad sense. Please feel free to be creative, as we believe the factors can be intrinsic and extrinsic in nature. We wish to emphasise that your participation is entirely voluntary and you do not have to respond to every item or question. Your responses will remain anonymous and confidentiality will be maintained. Also we plan to distribute to each of you a copy of the executive summary of the results.

Thank you for agreeing to participate in this study.



Amran Md. Rasli
amran@ruc.dk

Round One Question:

List as many conditions for IT training effectiveness that affect the performance of clerical staff at Higher Education Institutions. Remember to use the term "Conditions for IT Training Effectiveness" in a broad sense.

ROUND 2

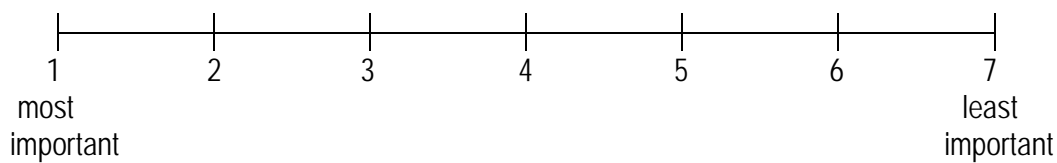
EXPERT OPINION ASSESSMENT TO IDENTIFY CONDITIONS FOR IT TRAINING EFFECTIVENESS AMONG CLERICAL STAFF AT HIGHER EDUCATION INSTITUTIONS

Dear Sir/Madam

Thank you for all of the creative ideas that you sent in response to the round one question. For those of you who did not contribute any responses, we would like you to continue to be a part of the study by responding to round two. Please respond as soon as possible to round two, but no later than 15th July, 2003. If this letter arrives by e-mail remember my e-mail is amran@ruc.dk. If you are receiving a fax, my fax number is 607-5566911, which is a shared fax so please include my name on the header sheet.

In the second round we have synthesised the data from round one (Refer Table 1) and we are requesting you to answer the following questions:

Please rank the factors identified that could affect the transfer of IT training towards professional development of clerical staff at Higher Education Institutions. Remember your answer is your expert opinion as there are no right or wrong answers. Please use the following number to rank your answers. You should use each number only once for each factor.




Please fill in your ranking for each factor from 1 to 7, based on the above scale. Each number should be used only once.

Factor 1: Trainee characteristics (refer Table 1)	<input type="text"/>
Factor 2: Trainer competency (refer Table 1)	<input type="text"/>
Factor 3: Work culture (refer Table 1)	<input type="text"/>
Factor 4: Organisational system (refer Table 1)	<input type="text"/>
Factor 5: Organisational management (refer Table 1)	<input type="text"/>
Factor 6: Training methodology (refer Table 1)	<input type="text"/>
Factor 7: IT facilities (refer Table 1)	<input type="text"/>

Comments:

Thank you for your continuous support in this study.



Amran Md. Rasli
amran@ruc.dk

TABLE 1: CONSOLIDATION OF ROUND 1 EXPERT OPINION ASSESSMENT FINDINGS

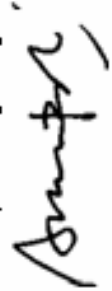
Trainer Competency	Trainee Characteristics	Organisational System	Organisational Management	Training Delivery and Methodology	IT Facilities	Work Culture
Language proficiency Professional exposure Knowledge ICT skills Communication Instruction Preparation	Self efficacy IT awareness Locus of control Current IT skills Language proficiency Rationale Preparation Aptitude Interest Education background	Compensation and incentives Work performance Clarity of work instructions Job description Justification for IT training Career advancement Performance appraisal Immediate benefit Career development Group productivity	Management commitment IT awareness Openness Management support Management effectiveness Leadership Organisational image	Training contents Modular Lecture Demonstration OJT Notes and manual Informal Combination Training delivery Course material Practical oriented Class size Duration of training	Hardware Software Equipment support Computer availability Software availability Technical support User friendly Reliability of technology Software relevance	Peer support Team work Learning organisation
7 items	10 items	10 items	7 items	13 items	9 items	3 items

RESPONSE SHEET FORMAT (ROUND 2)

EXPERT OPINION ASSESSMENT TO IDENTIFY CONDITIONS FOR IT TRAINING EFFECTIVENESS AMONG CLERICAL STAFF AT HIGHER EDUCATION INSTITUTIONS

Enclosed you will find the results of the round 2 survey. Also included is a comparison of your responses and the results. For those items that you are in disagreement please consider your response. You can either indicate that you wish to change to the response or cite reasons why you feel your response is more accurate. This process will help us to include a minority opinion for the data set. Again we wish to emphasise that your participation is entirely voluntary and you do not have to respond to every item or question. Your responses will remain anonymous and confidentiality will be maintained. Please note that your panel name is **F**.

Thank you for agreeing to participate in this study.



Amran Md. Rasli
m-amran@utm.my or amran561@hotmail.com

Round 2 Survey Results:

FACTORS (REFER TABLE 1)	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	Mean	Group Rank
Trainee Characteristics	3	1	3	7	3	3	1	6	5	7	1	2	5	3	2	7	2	6	6	1	3	3.6667	2
Trainer Competency	5	3	1	4	5	7	2	5	6	6	6	5	2	4	3	6	5	3	2	2	6	3.9047	3
Work Culture	7	4	5	5	4	6	7	7	1	1	7	1	4	7	5	2	3	7	7	7	2	4.6667	7
Organisational System	6	7	2	2	2	6	6	3	3	3	3	7	6	1	7	1	4	4	5	3	5	4.0952	5
Organisational Management	1	6	1	1	1	7	4	1	4	2	4	4	1	6	6	3	7	1	1	5	1	3.1904	1
Training Methodology	2	2	4	3	7	2	3	4	7	5	5	6	3	2	4	5	6	5	3	4	7	4.2381	6
IT Facilities	4	5	6	6	6	4	5	2	2	4	2	3	7	5	1	4	1	2	4	6	4	3.9524	4

Please note that the **italicised and boldfaced** column in **red** is your ranking of factors from round 2

TABLE 1: CONSOLIDATION OF ROUND 1 EXPERT OPINION ASSESSMENT FINDINGS

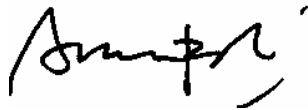
Trainer Competency	Trainee Characteristics	Organisational System	Organisational Management	Training Delivery and Methodology	IT Facilities	Work Culture
Language proficiency Professional exposure Knowledge ICT skills Communication Instruction Preparation	Self efficacy IT awareness, Locus of control Current IT skills Language proficiency Rationale Preparation Aptitude Interest Education background	Compensation & incentives Work performance Clarity of work instructions Job description Justification for IT training Career advancement Performance appraisal Immediate benefit Career development Group productivity	Management commitment IT awareness Openness Management support Management effectiveness Leadership Organisational image	Training need analysis Modular Lecture Demonstration On-the-Job Training Notes & manual Informal Combination Training delivery Course material Practical oriented Class size Duration of training	Hardware Software Equipment support Computer availability Software availability Technical support User friendly Reliability of technology Software relevance	Peer support Team work Learning organisation

ROUND 3

EXPERT OPINION ASSESSMENT TO IDENTIFY CONDITIONS FOR IT TRAINING EFFECTIVENESS AMONG CLERICAL STAFF AT HIGHER EDUCATION INSTITUTIONS

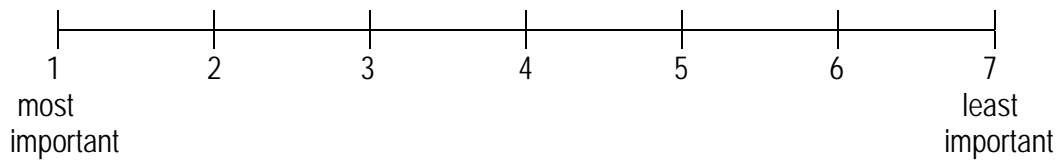
Again we would like to thank you for taking time from your busy schedule to assist us with this research. In round one many excellent suggestions were presented. In round two you were asked to rank the factors identified that could affect the transfer of IT training towards professional development of clerical staff at Higher Education Institutions. In this round (round three) you are being provided the results of round two and your responses. In some of the areas your response was different from the consensus opinion. Please consider your answers and decide whether you wish to agree with the consensus or maintain your original response. If you wish to agree with the consensus please indicate by identifying the factors and your new response. If you wish to support your original response please do so by providing your comments. Remember your responses are voluntary and strict confidentiality will be maintained. Please return this letter by 20th August, 2003.

Thank you for your assistance in this study.



Amran Md. Rasli
amran@ruc.dk

Please rank the factors identified that could affect the transfer of IT training towards professional development of clerical staff at Higher Education Institutions. Remember your answer is your expert opinion as there are no right or wrong answers. Please use the following numbers to rank your answers. You should use each number only **once** for each factor.



Please fill in your new ranking for each factor from 1 to 7, based on the above scale. Each number should be used only once.

FACTORS (REFER TABLE 1)	Group Rank*	Your Previous Rank	Your New Rank	Reasons
Trainee Characteristics	2	3		
Trainer Competency	3	1		
Work Culture	7	5		
Organisational System	5	6		
Organisational Management	1	7		
Training Methodology	6	2		
IT Facilities	4	4		

* Refer last column of table from page 1.

RESPONSE SHEET FORMAT (ROUND 3)***EXPERT OPINION ASSESSMENT TO IDENTIFY CONDITIONS FOR IT TRAINING
EFFECTIVENESS AMONG CLERICAL STAFF AT HIGHER EDUCATION INSTITUTIONS***

FACTORS (REFER TABLE 1)	A	B	C	D	E	F	G	H	I	J	O	Q	R	Mean	Group Rank
Trainee Characteristics	2	1	4	5	3	3	1	3	5	3	2	2	2	2.7692	2
Trainer Competency	5	3	3	3	4	1	2	4	6	6	3	6	3	3.7692	4
Work Environment	7	4	7	7	7	5	6	7	1	4	7	4	7	5.6154	7
Organisational System	6	7	2	2	6	6	7	5	3	7	5	7	5	5.2308	6
Organisational Management	1	6	1	1	1	7	4	1	4	2	1	3	1	2.5385	1
Training Methodology	4	2	5	4	5	2	3	6	7	5	6	5	6	4.6154	5
IT Facilities	3	5	6	6	2	4	5	2	2	1	4	1	4	3.4615	3

SEMI STRUCTURED INTERVIEW

***Direction** (to be read to the respondent): Good morning/evening. This interview is intended to obtain feedback from clerical staff on IT training, IT competency levels, new IT competencies and organisational change. You have been chosen to participate in this interview which is a part of a research sponsored by the IRPA secretariat under the Ministry of Science, Technology and Environment. For your information, this interview will be tape recorded to facilitate transcribing of this conversation. All information obtained from the interview will be treated as strictly CONFIDENTIAL. No information shall be disclosed in any manner that will identify the identity of the respondent or the department. We hope that you will respond as honestly and sincerely to each of the questions based on your true feelings and experiences. Please provide feedbacks to all questions and elaborate accordingly. Thank you.*

1. How long have you worked at:
 - UTM?
 - Elsewhere?
2. What is:
 - your scope of work?
 - your daily routine?
3. Have you attended any formal* or informal* training to improve your IT competence?
4. What type of formal training on IT which is organised by UTM (refer training calendar) or **other organisations** have you attended?
5. What formal training methods have you undergone to acquire IT competence?
6. Based on your experience, what type of formal training method is most effective? Why?
7. What IT competencies have you acquired based on informal training methods?
8. What informal training methods have you undergone to acquire IT competence?
9. Based on your experience, what type of informal training method is most effective? Why?
10. Based on your experience, what are the attributes for **competent trainer** that will determine effectiveness in acquiring IT during training? Why?

* Formal IT training is defined as structured training, informal IT training is spontaneous in nature where competence is acquired by self or by interaction with friends and others

11. Based on your experience, what are the attributes of **trainee characteristics** that will determine effectiveness in acquiring IT during training? Why?
12. Based on your experience, what are the attributes for **organisational system** that will determine effectiveness in acquiring IT during training? Why?
13. Based on your experience, what are the attributes for **organisational management** that will determine effectiveness in acquiring IT during training? Why?
14. Based on your experience, what are the attributes for **training delivery and methodology** that will determine effectiveness in acquiring IT during training? Why?
15. Based on your experience, what are the attributes for **IT facilities** that will determine effectiveness in acquiring IT during training? Why?
16. Based on your experience, what are the attributes for **work culture** that will determine effectiveness in acquiring IT during training? Why?
17. What are the attributes for **competent trainer** that will determine effectiveness in transfer of IT training to the work place? Why?
18. What are the attributes of **trainee characteristics** that will determine effectiveness in transfer of IT training to the work place? Why?
19. What are the attributes for **organisational system** that will determine effectiveness in transfer of IT training to the work place? Why?
20. What are the attributes for **organisational management** that will determine effectiveness in transfer of IT training to the work place? Why?
21. What are the attributes for **training delivery and methodology** that will determine effectiveness in transfer of IT training to the work place? Why?
22. What are the attributes for **IT facilities** that will determine effectiveness in transfer of IT training to the work place? Why?
23. What are the attributes for **work culture** that will determine effectiveness in transfer of IT training to the work place? Why?
24. Critical Incidents in IT Training
 - (a) Based on any IT training that you had undertaken in the past, please describe any situation or event that greatly improves your IT skills and knowledge. Please elaborate.

- (b) Based on any IT training that you had undertaken in the past, please describe any situation or event that greatly impedes your IT skills and knowledge. Please elaborate.
25. What is your current IT competency level? Please fill in the competency checklist.
26. Please provide your personal background with regards to your full name, age, work experience and work unit.
27. **CLOSING REMARK:** Are there any other comments that you would like to share with us?

THANK YOU FOR PARTICIPATING IN THIS INTERVIEW

Information Technology Competency Checklist
Adapted from Minnesota Information Technology Competency List (1997)

	Have Not Observed	Have Observed	Perform With Supervision	Perform Without Supervision	Can Do and Instruct Others
I. General Technology Application					
Individuals should be able to apply general knowledge and skills to:					
A – perform the following tasks:					
1. discriminate between various technologies and their capabilities (e.g., scanning, videoconferencing and teleconferencing)					
2. convert from one system to another					
3. perform software upgrades					
4. use technology to support written and oral presentations					
5. compress and expand files (e.g., unzip)					
6. search library databases					
II. Communication and Internet					
Individuals should be able to use e-mail and the Internet to communicate and locate information. This would include the ability to:					
A – use e-mail to:					
1. send and receive e-mail messages					
2. enclose and recover documents attached to e-mail messages					
B – use the Internet to:					
1. access the Internet with a browser					
2. navigate the Web by use of links and URL addresses					
3. use search engines to locate desired information					
4. download and print desired items from the Internet					
5. access and contribute to chat rooms and newsgroup					
6. create World Wide Web pages					
7. use a Web Publishing tool					

	Have Not Observed	Have Observed	Perform With Supervision	Perform Without Supervision	Can Do and Instruct Others
8. organise and moderate a synchronous computer conference using chat tool					
III. General computer operations:					
A – perform elementary tasks such as:					
1. perform the boot process					
2. perform virus protection & scan					
3. install software from disk or CR-ROM					
4. create folders and subdirectories					
5. create and use filenames and extensions					
6. search for files and directories					
7. print selected pages					
8. find answers to questions using on-line HELP feature					
9. create page setup (e.g., page orientation)					
B – manipulate files include such tasks as:					
1. retrieve files					
2. copy, move and delete files					
3. create back-up files					
4. use auto-save					
5. organise files in subdirectories/folders					
6. import and export files					
C – perform disk operations such as:					
1. format diskettes					
2. copy diskettes/CD					
3. write-protect diskettes					
D – access a network:					
1. Access network printer					
2. Access intranet					
IV. Word Processing					
Individuals should be able to create a document on the computer using a word processing programme. This would include:					
A – the ability to:					
1. enter text					

	Have Not Observed	Have Observed	Perform With Supervision	Perform Without Supervision	Can Do and Instruct Others
2. select object (e.g., text, graphics)					
3. save document files					
4. print document files					
5. use document preview option					
B – perform formatting task such as:					
1. select and change fonts					
2. select and change styles (e.g., italics)					
3. select and change font sizes					
4. set line spacing (e.g., double space)					
5. set paragraph alignment (justified)					
6. set paragraph indentation					
7. create itemised lists (e.g., numbers and bullets)					
8. set margins and tabs					
9. insert page breaks					
10. create tables					
11. insert page numbers					
C – perform editing tasks such as:					
1. cut, copy and paste selected object					
2. insert and delete selected object					
3. make correction and use spell check					
4. make corrections with grammar check					
5. use thesaurus					
D – create references and citations such as:					
1. footnotes and endnotes					
2. insert headers and footers					
V. Spreadsheets:					
Individuals should be able to create a worksheet on the computer using a spreadsheet software programme. This would include the ability to:					
A – perform data entry tasks such as:					
1. enter labels, values and headings					
2. enter formulas using arithmetic operators and/or built-in functions					

	Have Not Observed	Have Observed	Perform With Supervision	Perform Without Supervision	Can Do and Instruct Others
3. create charts and graphs from cell contents					
B – perform editing tasks such as:					
1. cut, copy and paste cell contents					
2. delete cell contents					
3. insert and delete rows and columns					
C – perform formatting tasks such as:					
1. set fonts, font sizes and styles					
2. apply appropriate formats for cell contents (e.g., currency, percent, etc)					
3. align cell contents (e.g., justify, left, right, centre)					
4. set and change row and column width and height					
VI. Databases					
Individuals should be able to create and manipulate a database using database management software. This would include the ability to:					
A – identify and enter database structures including such tasks as:					
1. entering the field name, the field size and data type					
2. indicate the primary key					
3. Indicate default values					
4. Import data from other format into database format					
B – enter the database data, including such tasks as:					
1. enter data into fields and records					
C – modify the database contents, including such tasks as:					
1. change the structure of the database					
2. change the record contents					
3. insert and delete fields					
4. insert and delete records					
D – manipulate the database including such tasks as:					
1. sort the records in the database					

	Have Not Observed	Have Observed	Perform With Supervision	Perform Without Supervision	Can Do and Instruct Others
2. perform queries and searches on the record					
3. link related tables in the database					
4. create reports from the data					
5. create mailing labels from the data					
VII. Graphics:					
Individuals should be able to create and manipulate graphics files. This would include ability to perform tasks such as:					
1. use clip art					
2. capture a pre-existing image by scanning					
3. capture a pre-existing image from video input					
4. create an image using graphics programme					
5. use font style and size					
6. use colour, space and layout					

TEMUDUGA SEPARA STRUKTUR

Arahan (perlu dibaca kepada responden): Assalamualaikum wbkt. Temuduga ini bertujuan untuk mendapat maklumbalas staf perkeranian terhadap latihan IT, tahap ketrampilan IT, ketrampilan IT baru dan perubahan organisasi. Saudara/i merupakan staf perkeranian yang dipilih untuk menjayakan temuduga ini yang merupakan sebahagian daripada kajian yang dibiayai oleh secretariat IRPA di bawah Kementerian Sains, Teknologi dan Alam Sekitar. Untuk makluman saudar/i segala perbualan ini akan dirakam untuk memudahkan pencatatan maklumbalas yang diberikan. Semua maklumbalas yang diperolehi daripada kajian ini akan DIRAHSIAKAN. Identiti individu ataupun jabatan tidak akan didedahkan melalui kajian ini. Adalah diharap saudara/i dapat memberi maklumbalas yang jujur dan ikhlas terhadap soalan-soalan yang dikemukakan. Terima kasih.

1. Berapa lamakah anda telah berkhidmat:
 - Di UTM?
 - Di tempat lain?
2. Apakah:
 - Skop atau bidang kerja anda?
 - Aktiviti harian anda?
3. Penemuduga dikehendaki memberi penerangan tentang latihan formal dan latihan informal seperti berikut: latihan *formal* ialah kursus-kursus IT yang berstruktur, berjadual, ada penganjur dan mungkin diberi sijil manakala latihan *informal* ialah kaedah belajar IT secara spontan, bersendirian/dengan kawan-kawan/ rakan sekerja/ahli keluarga.
 - Adakah anda pernah menghadiri/mempelajari kemahiran IT secara formal dan informal?
 - Adakah anda pernah mengikuti program latihan IT di luar UTM? Nyatakan jenis kursus dan nama penganjur latihan.
- 3 Apakah kursus atau program IT yang telah dipelajari melalui *latihan formal* yang diuruskan oleh UTM?
- 4 Apakah kaedah *latihan formal* yang digunakan untuk mempelajari kursus/program tersebut?

- 5 Di sepanjang pengalaman anda, apakah kaedah latihan (formal) IT yang paling berkesan? Mengapa?
- 6 Apakah program *latihan informal* IT yang telah dipelajari secara sendiri/bantuan rakan-rakan diluar daripada kursus seperti ditempat kerja/rumah.
- 7 Apakah kaedah *latihan informal* yang digunakan untuk mempelajari program tersebut?
- 8 Disepanjang pengalaman anda, apakah kaedah latihan (informal) IT yang paling berkesan? Mengapa?
- 9 Pada pengalaman anda apakah faktor **kecekapan penceramah** yang menentukan keberkesanan mendapatkan kemahiran IT semasa latihan? Bagaimana?
- 10 Pada pengalaman anda apakah faktor **pelatih** yang dapat menentukan keberkesanan untuk mendapatkan kemahiran IT semasa latihan? Bagaimana?
- 11 Pada pengalaman anda apakah faktor **sistem organisasi** yang dapat menentukan keberkesanan untuk mendapatkan kemahiran IT semasa latihan? Bagaimana?
- 12 Pada pengalaman anda apakah faktor **pihak pengurusan** yang dapat menentukan keberkesanan untuk mendapatkan kemahiran IT semasa latihan? Bagaimana?
- 13 Pada pengalaman anda apakah faktor **pengendalian dan kaedah latihan** yang dapat menentukan keberkesanan untuk mendapatkan kemahiran IT semasa latihan? Bagaimana?
- 14 Pada pengalaman anda apakah faktor **kemudahan komputer** yang dapat menentukan keberkesanan untuk mendapatkan kemahiran IT semasa latihan? Bagaimana?
- 15 Pada pengalaman anda apakah faktor **budaya kerja** yang dapat menentukan keberkesanan untuk mendapatkan kemahiran IT semasa latihan? Bagaimana?
- 16 Apakah faktor **kecekapan penceramah** yang membantu keberkesanan penggunaan/pemindahan kemahiran IT yang dipelajari di tempat kerja? Bagaimana?
- 17 Apakah faktor **pelatih** yang membantu keberkesanan penggunaan/pemindahan kemahiran IT yang dipelajari di tempat kerja? Bagaimana?
- 18 Apakah faktor **sistem organisasi** yang membantu keberkesanan penggunaan/pemindahan kemahiran IT yang dipelajari di tempat kerja? Bagaimana?
- 19 Apakah faktor **pihak pengurusan** yang membantu keberkesanan penggunaan/pemindahan kemahiran IT yang dipelajari di tempat kerja? Bagaimana?

- 20 Apakah faktor **pengendalian dan kaedah latihan** yang membantu keberkesanan penggunaan/pemindahan kemahiran IT yang dipelajari di tempat kerja? Bagaimana?
- 21 Apakah faktor **kemudahan komputer** yang membantu keberkesanan penggunaan/pemindahan kemahiran IT yang dipelajari di tempat kerja? Bagaimana?
- 22 Apakah faktor **budaya kerja** yang membantu keberkesanan penggunaan/pemindahan kemahiran IT yang dipelajari di tempat kerja? Bagaimana?
- 23 Insiden Kritikal dalam Latihan IT
- Berdasarkan mana-mana latihan IT yang pernah anda ikuti, nyatakan situasi/peristiwayang paling mempengaruhi peningkatan kemahiran IT anda. Berikan sebab.
 - Berdasarkan mana-mana latihan IT yang pernah anda ikuti, nyatakan situasi/peristiwa yang paling tidak meningkatkan kemahiran IT anda. Berikan sebab.
- 24 Apakah tahap kemahiran anda dalam menggunakan komputer? Sila isikan senarai semak yang disediakan.
- 25 Sila berikan latarbelakang anda seperti berikut:
- Nama penuh
 - Umur
 - Pengalaman kerja
 - Unit
- 26 **PENUTUP:** Maklumat tambahan yang ingin diberikan, komen tambahan sebelum temuduga ditamatkan

TERIMA KASIH DI ATAS BANTUAN YANG TELAH DIBERIKAN

Senarai Semak Tentang Kecekapan Teknologi Maklumat
Diadaptasi Daripada Senarai Kecekapan Teknologi Maklumat Minnesota (1997)

Arahan: Sila tandakan (✓) di ruang yang bersesuaian

	Tidak Boleh Melakukan Langsung	Boleh Melakukan Dengan Penuh Penyeliaan	Boleh Melakukan Dengan Sedikit Penyeliaan	Boleh Melakukan Tanpa Penyeliaan Langsung	Boleh Melakukan dan Boleh Mengajar Orang Lain
I. APLIKASI UMUM TEKNOLOGI					
Setiap individu perlu tahu mengaplikasikan pengetahuan dan kemahiran-kemahiran teknologi secara umum untuk:					
A – melaksanakan tugas-tugas berikut:					
1. Membezakan di antara pelbagai teknologi dan kegunaannya (cth: <i>scanning, videoconferencing dan teleconferencing</i>)					
2. Membuat pertukaran dari satu sistem ke sistem yang lain					
3. Meng <i>upgrade Software</i>					
4. Menggunakan teknologi untuk menyokong pembentangan lisan dan penulisan					
5. Memampat dan mengekstrak fail (cth : <i>unzip</i>)					
6. Mencari maklumat melalui pengkalan data perpustakaan					
II. KOMUNIKASI DAN INTERNET					
Setiap individu perlu tahu menggunakan e-mail untuk berkomunikasi dan mencari maklumat. Ia melibatkan kebolehan untuk:					
A – menggunakan e-mail untuk:					
1. Menghantar dan menerima mesej melalui e-mail					
2. Membuat dan menerima <i>attachment</i> melalui e-mail					
B – menggunakan Internet untuk:					
1. Mengakses Internet dengan <i>browser</i>					
2. Melayari laman web dengan menggunakan alamat rangkaian dan URL					

	Tidak Boleh Melakukan Langsung	Boleh Melakukan Dengan Penuh Penyeliaan	Boleh Melakukan Dengan Sedikit Penyeliaan	Boleh Melakukan Tanpa Penyeliaan Langsung	Boleh Melakukan dan Boleh Mengajar Orang Lain
3. Menggunakan enjin carian untuk mencari maklumat yang dikehendaki					
4. Men <i>download</i> dan mencetak item-item dari Internet					
5. Mengkases dan menyertai <i>chat rooms</i> dan <i>newsgroup</i>					
6. Membina laman web					
7. Menggunakan <i>Web Publishing Tool</i>					
8. Mengatur dan mengawal satu persidangan komputer secara serentak menggunakan <i>chat tool</i>					
III. Operasi umum komputer:					
A – melaksanakan tugas-tugas asas seperti:					
1. Melaksanakan proses penyimpanan					
2. Melaksanakan proses <i>scan</i> dan perlindungan virus					
3. Meng <i>install software</i> dari <i>disk</i> atau CR-ROM					
4. Membuat <i>folder</i> dan <i>subdirectories</i>					
5. Membuat serta menggunakan nama fail dan sambungannya					
6. Mencari fail dan <i>directory</i>					
7. Mencetak halaman yang dipilih					
8. Mencari jawapan bagi sebarang kemusykilan menggunakan <i>HELP</i> secara <i>online</i>					
9. Membuat <i>page setup</i> (cth: <i>page orientation</i>)					
B – manipulasi fail termasuk tugas-tugas seperti berikut:					
1. Mendapatkan semula fail					
2. <i>copy, move</i> dan <i>delete</i> fail					
3. membuat fail <i>back-up</i>					
4. Menggunakan <i>auto-save</i>					

	Tidak Boleh Melakukan Langsung	Boleh Melakukan Dengan Penuh Penyeliaan	Boleh Melakukan Dengan Sedikit Penyeliaan	Boleh Melakukan Tanpa Penyeliaan Langsung	Boleh Melakukan dan Boleh Mengajar Orang Lain
5. Menyusun fail dalam <i>subdirectories/folder</i>					
6. Mengimport dan mengeksport fail					
C – melaksanakan operasi-operasi <i>disk</i> seperti:					
1. Memformat disket					
2. <i>Copy</i> disket/CD					
3. <i>Write-protect</i> disket					
D – Akses sesuatu rangkaian					
1. Mengakses rangkaian <i>printer</i>					
2. Mengakses <i>intranet</i>					
IV. WORD PROCESSING					
Setiap individu perlu tahu mencipta satu dokumen di dalam komputer menggunakan program <i>word processing</i> . Ia melibatkan:					
A – kebolehan untuk:					
1. Memasukkan teks					
2. Memilih objek (cth: teks, grafik)					
3. Menyimpan fail dokumen					
4. Mencetak fail dokumen					
5. Menggunakan pilihan <i>preview</i> dokumen					
B – melaksanakan tugas memformat seperti:					
1. Memilih dan menukar jenis tulisan					
2. Memilih dan menukar stail tulisan (cth: <i>italics</i>)					
3. Memilih dan menukar saiz tulisan					
4. Menetapkan jarak barisan (cth: <i>double spacing</i>)					
5. Menetapkan susunan perenggan (<i>justified</i>)					
6. Menetapkan jarak permulaan perenggan					
7. Membuat <i>itemised lists</i> (cth: <i>numbers</i> dan <i>bullets</i>)					
8. Menetapkan <i>margins</i> dan <i>tabs</i>					
9. Memasukkan pemisah halaman					

	Tidak Boleh Melakukan Langsung	Boleh Melakukan Dengan Penuh Penyeliaan	Boleh Melakukan Dengan Sedikit Penyeliaan	Boleh Melakukan Tanpa Penyeliaan Langsung	Boleh Melakukan dan Boleh Mengajar Orang Lain
10. Membuat jadual					
11. Memasukkan nombor muka surat					
C – melaksanakan tugas-tugas mengedit seperti berikut:					
1. <i>Cut, copy</i> dan <i>paste</i> objek yang dipilih					
2. Memasuk dan memadam objek yang dipilih					
3. Membuat pembetulan dan menggunakan penyemak ejaan					
4. Membuat pembetulan dan menggunakan penyemak tatabahasa					
5. Menggunakan <i>thesaurus</i>					
D – membuat rujukan dan petikan :					
1. Nota kaki dan <i>endnote</i>					
2. Memasukkan <i>header</i> dan <i>footer</i>					
V. Spreadsheets :					
Setiap individu perlu tahu membuat satu lembaran kerja di dalam komputer menggunakan program <i>spreadsheet software</i> . Ini termasuk kebolehan untuk:					
A – melaksanakan tugas-tugas memasukkan data seperti:					
1. Memasukkan label, nilai dan tajuk					
2. Memasukkan formula menggunakan operator aritmetik dan/atau <i>built-in functions</i>					
3. Membuat carta dan graf daripada kandungan sel					
B – melaksanakan tugas-tugas mengedit seperti:					
1. <i>Cut, copy</i> dan <i>paste</i> kandungan sel					
2. Memadam kandungan sel					
3. Memasuk serta memadam barisan dan kolum					
C – melaksanakan tugas-tugas memformat seperti:					
1. Menetapkan jenis, saiz dan stail tulisan					

	Tidak Boleh Melakukan Langsung	Boleh Melakukan Dengan Penuh Penyeliaan	Boleh Melakukan Dengan Sedikit Penyeliaan	Boleh Melakukan Tanpa Penyeliaan Langsung	Boleh Melakukan dan Boleh Mengajar Orang Lain
2. Membuat carta dan graf daripada kandungan sel					
B – melaksanakan tugas-tugas mengedit seperti:					
1. <i>Cut, copy</i> dan <i>paste</i> kandungan sel					
2. Memadam kandungan sel					
3. Memasuk serta memadam barisan dan kolum					
C – melaksanakan tugas-tugas memformat seperti:					
1. Menetapkan jenis, saiz dan stail tulisan					
2. Menggunakan format yang sesuai untuk kandungan sel (cth : matawang, peratus dan sebagainya)					
3. Mensejajarkan kandungan sel (cth : <i>justify</i> , kiri, kanan, tengah)					
4. Menetapkan serta mengubah keluasan dan ketinggian baris serta kolum					
VI. PANGKALAN DATA					
Setiap individu perlu tahu mencipta dan memanipulasi sesuatu pangkalan data menggunakan <i>software</i> pengurusan pangkalan data. Ini termasuk kebolehan untuk:					
A – mengenalpasti dan memasukkan struktur pangkalan data termasuk tugas-tugas seperti berikut:					
1. Memasukkan nama lapangan, saiz lapangan serta jenis data					
2. Menunjukkan kekunci utama					
3. Menunjukkan <i>default values</i>					
4. Mengimport data daripada format lain ke format pangkalan data					
B – memasukkan data pangkalan data, termasuk tugas-tugas seperti berikut:					
1. Memasukkan data ke dalam lapangan dan rekod					

	Tidak Boleh Melakukan Langsung	Boleh Melakukan Dengan Penuh Penyeliaan	Boleh Melakukan Dengan Sedikit Penyeliaan	Boleh Melakukan Tanpa Penyeliaan Langsung	Boleh Melakukan dan Boleh Mengajar Orang Lain
C – mengubahsuai kandungan pangkalan data termasuk tugas-tugas berikut:					
1. Mengubah struktur pangkalan data					
2. Mengubah kandungan rekod					
3. Memasukkan dan memadam lapangan					
4. Memasukkan dan memadam rekod					
D – memanipulasi pangkalan data termasuk tugas-tugas seperti berikut:					
1. Mengasingkan rekod di dalam pangkalan data mengikut jenis					
2. Membuat pertanyaan dan pencarian ke atas rekod					
3. Menghubungkan jadual yang berkaitan di dalam pangkalan data					
4. Membuat laporan daripada data					
5. Membuat <i>mailing labels</i> daripada data					
VII. Grafik:					
Setiap individu perlu tahu membuat dan memanipulasi fail grafik. Ia melibatkan kebolehan untuk melaksanakan tugas-tugas seperti berikut:					
1. Menggunakan <i>clip art</i>					
2. Menangkap <i>pre-existing image</i> melalui <i>scanning</i>					
3. Menangkap <i>pre-existing image</i> daripada input video					
4. Mencipta imej menggunakan program grafik					
5. Menggunakan saiz dan stail tulisan					
6. Menggunakan warna, ruang dan <i>layout</i>					

GROUPING OF RECURRING THEMES AND PATTERNS

Type of formal IT training attended by clerical workers

Name	Formal IT Training Courses Attended
A	MS Office, pagemaker and html.
B	Window 95, computer repair and printer maintenance and word.
C	Photoshop, excel.
D	Page maker, SAS, excel, word.
E	Excel, powerpoint, photoshop and printer repair.
F	Web page design, page maker, Coreldraw.
G	Word and excel.
H	Word, excel, staff webmail.
I	MS Office (word, powerpoint and excel).
J	Powerpoint, word and excel.
K	Pagemaker, excel, CorelDraw, word 98, powerpoint, linux and Internet.
L	Power point, photo shop, Internet, computer repair and printer maintenance.
M	Frontpage and computer repair and printer maintenance.
N	Microsoft word, excel, powerpoint, adobe pagemaker, and Coreldraw.
O	Excel, word, java, windows NT, Operating system, Windows 2000.
P	Excel, powerpoint, word and access.
Q	Pagemaker.
R	Pagemaker, photoshop, powerpoint, windows 2000, excel, word and html.
S	Word star and page maker.
T	Windows
U	Word

Formal training methods have you undergone to acquire IT competence

Name	Formal IT Training Methods Used to Acquire IT Competence
A	Lecture and practical.
B	Lecture followed by examples.
C	Notes and explanation and practical followed by project work.
D	Practical based, demonstration.
E	Notes and practical.
F	Practical with notes and examinations or projects.
G	Lecture followed by practical.
H	Lecture followed by practical.
I	Lecture and practical.
J	Lecture and note with demonstration and practical.
K	Practical based with many projects.
L	Teaching module with practical.
M	Lecture and hands-on.
N	Lecture and practical with notes and exercises.
O	Notes followed by elaboration by trainer. A little theory with more practical.
P	Theory and practical.
Q	Theory with practical.
R	Theory, practical, demonstration, lecture and practical.
S	Teaching module with practical work.
T	Lecture with practical
U	Lecture on basic commands with examples and exercises

Most effective formal training methods

Name	Most effective formal training methods
A	Practical based.
B	Lecture with complete notes and demonstration.
C	Practical.
D	Practical based training.
E	Practical based.
F	Practical based training.
G	Hands-on approach.
H	Lecture followed by practical.
I	Practical.
J	Notes with demonstration and practical.
K	Lecture with practical.
L	Practical based.
M	Practical based.
N	Lecture followed by practical training.
O	Theory followed by practical.
P	Practical and work related.
Q	Practical based training.
R	Practical based training.
S	Teaching module with practical work.
T	Lecture with practical.
U	Lecture with practical.

IT competencies acquired based on informal training methods

Name	IT competencies acquired using informal training methods
A	Web page design.
B	Windows operation.
C	Internet, virus scanning and basic software maintenance.
D	Word and Internet.
E	MS word and windows application.
F	Internet and excel.
G	Pagemaker.
H	Word, excel and Internet.
I	Word (advanced level).
J	Internet and advanced excel operations.
K	Advanced level pagemaker, excel, word, power point and Internet.
L	Advanced level pagemaker, excel, word, power point, photo shop and Internet.
M	SPSS.
N	Word and excel.
O	Homepage design and AutoCAD.
P	Advanced excel, powerpoint, word and access.
Q	Database.
R	Advanced photoshop, Internet and IPAC software for PDA.
S	Word, powerpoint, excel, pagemaker and Internet.
T	Excel, word and photoshop.
U	Advanced word, excel and powerpoint.

Informal IT training methods used to acquire IT competence

Name	Informal training methods used to acquire IT competence
A	Constant practice.
B	Self-learning, from friends and through books.
C	Learning alone, learning from peers.
D	Use help button. Refer to friends who are "experts".
E	Constant practice on the PC.
F	Trial and error. Refer to close friends.
G	Refer to friends at office.
H	Self-learning (help button). Ask friends who have taken formal IT training already.
I	Referring to manuals.
J	Learning from experimentation and trial and error.
K	Self-learning, through friends, IT executives, technicians and IT manager.
L	Through friends and co-workers.
M	Self-learning and through lecturers.
N	Ask friends and understand their response or assistance.
O	Ask others and try to practice continuously.
P	Ask others and practice.
Q	Self-learning.
R	Ask friends, superiors and self-experimentation using <i>help</i> buttons and tutorials.
S	Learn from lecturers and self-learning.
T	Refer to friends.
U	Ask friends when faced with IT related problems.

Most effective informal training method

Name	Most effective informal training method
A	Practice and experiment.
B	Learning from friends.
C	Learning from peers (friends).
D	Self-learning due to busy work schedule.
E	Practice continuously.
F	Self-learning.
G	Learning from peers.
H	Self-learning based on work situation.
I	Self-learning and practice.
J	Trail and error.
K	Self-learning through trial and error.
L	Learning from friends.
M	Self-learning.
N	Ask others and practice continuously.
O	Ask and learn from friends or peers.
P	Direct approach by asking those who are more knowledgeable.
Q	Self-learning.
R	Ask friends and peers.
S	Learning from lecturers.
T	Ask and learn from friends or peers.
U	Ask and learn from friends or peers.

Attributes for competent trainer that will determine effectiveness in acquiring IT during training and at the workplace

Name	Trainer Competency	
	During training	At workplace
A	ICT skills.	Follow-up support after training.
B	Understand the needs of trainees and know how to assess their weaknesses and current level of competencies. Ability to conduct courses using easily understood languages by starting with basic concepts. Monitoring of exercise individually and ensure all participants have equal understanding before progressing to new topics.	Trainer must be accessible after training for follow-up and consultation.
C	Quality notes, trainer's knowledge, good communication (non-monotonous), and continuous evaluation during training. Not static.	Notes and training materials prepared could be used later at the workplace.
D	Ability to conduct lecture that can be easily understood using relevant examples. Good communication skills.	Good communication skills.
E	Skilled in using the computer.	Skilled in using the computer.
F	Lecture must be aligned with notes to avoid confusion. Pedagogical skill is more important than knowledge.	Notes prepared must be suitable with the level of knowledge and skills of the participants.
G	Trainer must know participants' needs and conduct relevant training at acceptable pace.	Notes prepared are relevant to the workplace.
H	Openness of trainer. Questions asked will be responded.	Trainer's experience and expertise.
I	Skilled and experienced in conducting training.	Trainer's preparation before training. Reference notes could be used later.
J	Lecture style, voice clarity, body language	Elaborations using examples and tips

	and method for clarification.	given can be used at the workplace.
K	Experienced and more knowledgeable than the participants.	Encouragement given after completion of training.
L	Trainer must be competent and skilled in the area taught.	Skilled trainer would encourage participants' IT skills to be enhanced at the workplace.
M	Clarity of instruction and language used by trainer.	Applicability of teaching notes to the workplace.
N	Step-by-step approach followed by checks on participant's progress or understanding.	Properly conducted training will be remembered and could be transferred easily to the workplace.
O	Two way interaction between the trainee and the trainer.	Ability to relate work problems with training programme taken.
P	Knowledgeable and experienced in hands-on learning approach.	Knowing what is related to the workplace to improve productivity.
Q	Ability to explain clearly during training.	Trainer's encouragement to share knowledge at the workplace.
R	Knowledgeable and experienced in the area lectured.	Willingness to provide support after training through calls and e-mails.
S	Trainer has little impact on trainee's IT skills.	Ability to provide basic skill to be applied at the workplace.
T	Wide experience and communicative skills. Friendly and able to apply different techniques during training to prevent session from becoming boring.	Delivery skills.
U	Clarity in delivery. Ability to interact with participants. Preparation of lecture before training.	Ability to conduct training efficiently.

Attributes for trainee characteristics that will determine effectiveness in acquiring IT during training and at the workplace

Name	Trainee Characteristic	
	During training	At workplace
A	Awareness on the importance of IT (IT literate).	Motivation.
B	Trainee should attend course to seek new skills to apply at the work place based on his/her current knowledge and skills.	Interest.
C	Interest and commitment.	Sharing of knowledge during work especially after training session.
D	Possess initiative and interest as well as perseverance.	Possess own initiative and good relationship with friends.
E	Must possess basic IT skills.	Interest to apply newly acquired skills.
F	Always try your best during assignment and ask questions during training.	Always refer to training notes and diskettes.
G	Positive attitude and willingness to cooperate.	Efficient and inquisitive.
H	Time management.	Ability to apply newly acquired skills at the workplace.
I	Awareness on the importance of IT training.	Knowledge and IT literacy level.
J	Interest and preparation before training.	Always practice and try out the new software so that skills will not be forgotten.
K	Interest and commitment.	Willingness to share knowledge at work. Workers should cooperate with each other.
L	Strong interest to learn.	Committed to practice new skills at the workplace.
M	Interest.	Willingness to apply new skills at the workplace.
N	Interest and work requirements.	Interest, hardworking and practice what had been learned.
O	Participants must have interest and be	Willingness to share with others

	serious during training (not for fun). Participants should seize opportunity to ask many questions during training.	knowledge gained from training. Must be willing to try, apply and experiment with new skills to the workplace.
P	Willingness to learn new things to improve work.	Willingness to apply new skills at the workplace.
Q	Strong interest, proactive attitude before training and possess basic skills.	Sharing of new knowledge and skills at the workplace.
R	Commitment and positive attitude.	Willingness to try new skills at the workplace immediately after training.
S	Strong interest and willingness to learn.	Make it a habit to apply new skills at the workplace.
T	Desire to learn. Inquisitive mentality. Early preparation before training.	Attitude to self improve.
U	Interest in the course attended.	Awareness of training needs and its relevance to work.

Attributes for organisational system that will determine effectiveness in acquiring IT during training and at the workplace

Name	Organisational System	
	During training	At workplace
A	Opportunity for promotion.	IT Training must be relevant to work requirement.
B	Understanding that IT is practical skills that need to be applied into the work place.	IT courses must be relevant to the career and work requirement.
C	Support by lower work load.	Improved work productivity and dissemination of information.
D	Support for training.	Availability of complete IT facilities.
E	Importance of IT training for career development.	Organisation emphasises on work done.
F	Provision of replacement staff during training.	Conducive work environment.
G	Knowledge of IT systems (e.g., AIMS). Awareness of importance of IT.	Ensure staff becomes knowledgeable in IT.
H	Latest IT facilities, equipment and software.	Encouragement and support for training. Provision of IT facilities.
I	Importance of IT courses for career development.	Importance of IT courses for career development.
J	Scheduled training for staff.	Relevance of training to workplace.
K	Planned training activities must be relevant to work requirements.	Quality of IT system and facilities at the workplace. Freedom to practice new skills at the workplace.
L	Wide application of IT is made known.	Encouragement and support for effort made.
M	Encouragement and support from superiors.	Work related (relevance of training to workplace).
N	Follow instructions of superiors. Training must be work related.	Superior's appreciation of good work done.
O	Training must be work related and job specification.	IT training is beneficial to the workplace in the long run.

P	Emphasise that work system and scope of work needs IT skills.	Provision of IT training which are related to work and required by staff.
Q	Provision of sufficient IT facilities.	Encouragement and support for effort made.
R	Training must be related with appraisal scheme.	Superior's encouragement to try and experiment with new software.
S	Provision of sufficient IT facilities and aware of latest IT development.	Encouragement and support for effort made.
T	Organisation should focus on individual IT weaknesses and plan training accordingly.	Awareness of the importance of IT competence.
U	Identification of relevant training and provide incentives for training.	Identification of competent trainer.

Attributes for organisational management that will determine effectiveness in acquiring IT during training and at the workplace

Name	Organisational Management	
	During training	At workplace
A	IT awareness and literacy of top management.	Provision of IT training for staff.
B	Staff must be given opportunity to practice newly acquired skills from training to the work place.	Work system must be able to accommodate newly acquired skills. Management must be aware of skills acquired.
C	Freedom to choose IT training.	Freedom to choose IT training.
D	Awareness on training importance.	Provision of conducive environment.
E	Openness of leader and manager.	Support and encouragement given by management.
F	Management interest on training.	Schedule for fair allocation for training.
G	Management support to upgrade IT skills.	Constant upgrading of system to promote efficiency.
H	Management support.	Management support
I	Organisation prioritise IT training at the workplace	Management support.
J	Awareness of the importance of IT.	Availability of sufficient and relevant IT infrastructures at the workplace.
K	Equal opportunity for training for all.	Moral support by management.
L	Management support.	Continuous support.
M	Management support.	Efficiency of management system.
N	Management support and encouragement.	Availability of sufficient and relevant IT infrastructures at the workplace.
O	Provision of opportunity and support for training.	Management places priority for IT training.
P	Provide opportunity for staff to upgrade their IT competence.	Support and encouragement.
Q	Provide opportunity for staff training.	Support and encouragement.

R	Management support and encouragement for training.	IT leadership demonstrated by superior.
S	Provide opportunity for training programs relevant to work.	Provide moral support and make available IT facilities at workplace.
T	Management shows concern and takes interest in training (intangible incentive).	Support and encouragement.
U	Management monitor's staff progress before and after training and assess training benefits.	Management provides opportunities to practice at the workplace.

Attributes for training delivery and methodology that will determine effectiveness in acquiring IT during training and at the workplace

Name	Training Delivery and Methodology	
	During training	At workplace
A	Training is supported by demonstration and guidance.	Training and teaching techniques (including directions).
B	Basics must be clearly explained followed by exercises to test trainee's understanding and close monitoring by trainer. Lecture notes and exercises must be the same for all trainees. Courses must be interactive (two way communication). Once completed, courses must be evaluated.	Well structured training will result in enhancement of interest and transfer of knowledge and skills provided that management is interested and concerned. Training must also be related to the work requirements.
C	Availability of quality reference notes. Demonstration on the capability of software before training. More allocation of time for training.	Practical based using projects.
D	Lecture and demonstration with practice and monitoring.	Practical based.
E	Combination of various methods.	Combination of various methods
F	Practical based	Practical based.
G	Trainer must be able to assess current IT skills of participants.	Practical based.
H	Notes and practical based.	Immediate practice at workplace after training.
I	Training is demonstration oriented.	Training material (books, notes and CD-ROM) is made available.
J	Courses should be conducted in the morning. Lecture followed by demonstration. Trainees need lots of practice and trainer should monitor continuously.	Training which are relevant to the office requirements.
K	Effective notes. Good andragogy skills.	Refer to notes and diskettes from training.

L	Trainer must be competent and skilled in IT.	Opportunity to practice newly acquired skills at the workplace.
M	50% theory and 50% practical.	Openness of management in training.
N	Notes and practical sessions are properly planned.	Ability to recall what was learned from training.
O	Notes and practical sessions are properly planned.	Refer to notes and diskettes from training.
P	Planning for effectiveness in training delivery.	Applicability of training to the workplace.
Q	Suitable location (venue) for training.	Training must be work related.
R	More emphasis on practical than theory.	Systematic training.
S	Flexible scheduling of courses. Staff can choose courses relevant to them. Courses have complete modules.	Training which are relevant to the office requirements.
T	Clarity of delivery. Willingness to assist slow learner and multiple methods used for training.	Effective communication.
U	Lecture followed by practical with feedback.	Ability to recall what was learned from training.

Attributes for IT facilities that will determine effectiveness in acquiring IT during training and at the workplace

Name	IT Facilities	
	During training	At workplace
A	Properly maintained IT facilities (computer does not hang).	Same versions of software at training site and work place.
B	Computers must have fast processors to avoid boredom of participants. Each trainee must be equipped with a computer. Technical support should be made available during training.	Sufficiency of 'high speed' computers installed with the latest version of software. The working environment should also be conducive.
C	Sufficient backup of PC in case of breakdown. PCs should be tested and maintained prior to training.	Relevant software is available at the workplace. Cannot practice photoshop after training as the software is not available at the workplace.
D	Compatible software at training and workplace. This will ensure minimal problems in application.	Every staff is equipped with updated PC (Pentium 4) and shared printers. Latest software is used at the workplace.
E	Availability of sufficient IT facilities.	Compatible software at training and workplace.
F	Similar software at training site and workplace. Computers are sufficient at the training site.	Management's concern by allocating funds for PC upgrades and peripherals.
G	Computers are sufficient at the training site (each participant have own PC).	Availability of complete IT system and peripherals.
H	PC must be properly maintained to prevent breakdown during training. Computers sometimes 'hang' during training.	Sufficient PCs and peripherals are available at the workplace.
I	Availability of software and hardware at the training site.	IT usage is uninterrupted.
J	PC must be properly maintained to prevent breakdown during training.	Software and PC peripherals (e.g., printers) are available. Latest software must be made available.

K	IT peripherals (e.g., LCD and color printers) are sufficient and software are up-to-date (e.g., windows 2000).	Equipments at current workplace (CEPP) are not as advances or sufficient as previous workplace (BIC).
L	IT facilities must be sufficient at training site.	IT facilities must be sufficient at workplace.
M	Computers must be sufficient and maintained before training.	Each staff has own PC. Avoid computer sharing.
N	Computers must be sufficient and maintained before training. Computers shouldn't 'hang' during training.	Sophisticated IT system and sufficient facilities
O	Properly maintained IT facilities at training site	Each staff has own PC. Avoid computer sharing.
P	Applicability of training modules to the workplace.	Sophisticated IT system and sufficient facilities.
Q	Sufficient IT facilities. Each trainee must have own PC.	Sufficient IT facilities which are trouble free.
R	Computers must be sufficient and maintained before training. Computers shouldn't 'hang' during training forcing participants to share. Back up computers must be made available.	Sufficient IT facilities. Network facilities should be improved as most information are now being shared.
S	Good IT facilities are available.	Sufficient IT facilities which are trouble free and virus free.
T	Properly maintained IT facilities to ensure uninterrupted session.	Sufficient IT facilities.
U	IT facilities must be sufficient to ensure equal access by participants.	Sufficient IT facilities.

Attributes for work culture that will determine effectiveness in acquiring IT during training and at the workplace

Name	Work Culture	
	During training	At workplace
A	Teamwork, idea and knowledge sharing.	Teamwork and open discussion.
B	Support and assistance by participants during training.	Work culture is not really applicable as each staff has different work specification. Therefore knowledge sharing is minimal.
C	Continuously seek for knowledge by asking questions during training. This will improve self competency.	Close knit working friendship at work. This will create a relaxed work environment which is conducive for transfer of competencies.
D	Teamwork during project work. This will promote informal learning.	Cooperation among workers. This will promote family-oriented environment.
E	Teamwork.	Knowledge and learning culture
F	Assist slow learner who faced problems during training.	Close cooperation among peers.
G	Awareness on the importance of IT competence.	Informal and formal learning are always on-going.
H	Awareness of IT. Fearless attitude towards changes brought by IT (no technophobia).	Knowledge sharing among co-workers. Trained personnel will provide guidance to untrained personnel.
I	Teamwork.	Knowledge acquisition and sharing at the workplace.
J	Knowledge sharing among participants where fast learners will guide the slow learners.	Family-oriented environment at the workplace where everyone is willing to help each other and management is staff friendly.
K	Knowledge sharing among participants where fast learners will assist the slow learners.	Cooperation among office workers. Everyone help each other when in difficulties.
L	Emphasis on the need of IT at the workplace.	Encourage the use of IT.

M	Teamwork and knowledge sharing during training exercises.	Family-like work environment.
N	Good interaction among participants will encourage sharing of knowledge and skills.	Teamwork and knowledge sharing.
O	Positive attitude and desire to seek new knowledge and skills even if training may not be relevant now but could be relevant later.	Knowledge sharing among colleagues where staff who had finished training will informally train others.
P	Helping each other out during exercises and projects.	Teamwork and knowledge sharing.
Q	Encourage the use of IT.	Encourage the use of IT.
R	Good interaction among participants will encourage sharing of knowledge and skills. Contacts made could be used after training.	Teamwork and knowledge sharing. Family-oriented environment at the workplace.
S	Encourage the use of IT and keep abreast of latest development.	Maximise the integration of IT utilisation.
T	Helping each other out during exercises and projects.	Peer support and teamwork.
U	Experienced and fast learner will assist other participants.	Knowledge sharing but depends on the scope of work.

CONTACT SHEET

Site:

Contact Date:

Today's Date:

1. What were the main issues or themes in this contact?

2. Summarise the information obtained (or failed to obtain) on each of the target questions posed during this contact.

3. Anything else that is salient, interesting, illuminating or important in this contact?

4. What behaviours were observed during this contact?

15 July, 2003

Dear Sir/Madam,

I would like to invite you to participate in a survey to obtain your perceptions of factors that affect the transfer of IT training for your professional development. The attached survey questionnaire and information obtained from this survey will be kept anonymous and completely confidential. All questionnaires will remain with the researcher. Only findings in aggregate form will be submitted to the relevant authorities. The identification number on the questionnaire will be used for follow-up purposes only, so that reminder requests are sent only to those who have not returned their questionnaires and to cut fieldwork costs.

Your participation in this survey is completely voluntary, and you are free to withdraw at any time and for any reason. You are also free to decline to answer any questions you do not wish to answer. A copy of the final will be housed in the university library.

I would like to convey our appreciation for your cooperation in completing this questionnaire. If you have any questions about this research project, please call me at 07-5531891 or 017-7710535 or e-mail at amran@ruc.dk.

Thank you in advance for your participation and assistance with this project. Your input is much appreciated.

Sincerely yours



Amran b. Md. Rasli

Department of Social Sciences
Roskilde University
PO Box 260, DK-4000 Roskilde, Denmark

Directions: Please respond to each question by circling one number on the 1 to 5 point scale for each item.

On a scale of 1 to 5, where 1 = maximum impact (i.e., 80-100% of IT knowledge and skills are transferred after training) and 5 = minimum impact (i.e., 0-20% of IT knowledge and skills are transferred after training), to what extent do the following factors influence the transfer of IT training to your workplace?

To what extent do the following factors influence the transfer of IT training to your workplace?	Maximum impact (80-100%)		Moderate impact (40-60%)		Minimum impact (0-20%)
TRAINER'S COMPETENCY					
1. Language used by trainer (English and Malay)	1	2	3	4	5
2. Trainer's professional exposure	1	2	3	4	5
3. Trainer's knowledge	1	2	3	4	5
4. Trainer's Information and Communication Technology (ICT) skills	1	2	3	4	5
5. Trainer's communication skills	1	2	3	4	5
6. Instructions given by trainer during training	1	2	3	4	5
7. Preparation of training material by trainer	1	2	3	4	5
TRAINEE CHARACTERISTICS					
8. Trainee's attitude (e.g., commitment, confidence and openness)	1	2	3	4	5
9. Trainee's awareness of IT literacy	1	2	3	4	5
10. Trainee's motivation	1	2	3	4	5
11. Trainee's current IT skills	1	2	3	4	5
12. Trainee's language/communication mastery	1	2	3	4	5
13. Understanding of the rationale for training	1	2	3	4	5
14. Trainee's preparation before training	1	2	3	4	5
15. Trainee's aptitude (e.g., visualisation skills)	1	2	3	4	5
16. Trainee's interest towards IT	1	2	3	4	5
17. Trainee's education background	1	2	3	4	5
ORGANISATIONAL SYSTEM					
18. Compensation/incentives given after training	1	2	3	4	5
19. Work is performance oriented	1	2	3	4	5
20. Clear work instructions given	1	2	3	4	5
21. Job description is relevant to IT training	1	2	3	4	5
22. Opportunity for promotion	1	2	3	4	5

	To what extent do the following factors influence the transfer of IT training to your workplace?	Maximum impact (80-100%)		Moderate impact (40-60%)		Minimum impact (0-20%)
23.	Contributes towards performance appraisal	1	2	3	4	5
24.	Immediate organisational benefits after training	1	2	3	4	5
25.	Understanding of the importance of IT training for career development	1	2	3	4	5
ORGANISATIONAL MANAGEMENT						
26.	Management commitment at work place	1	2	3	4	5
27.	Importance of IT training from the university's perspective is made known					
28.	IT awareness among management	1	2	3	4	5
29.	Openness among management	1	2	3	4	5
30.	Support by management	1	2	3	4	5
31.	Management effectiveness at work place	1	2	3	4	5
32.	Leadership quality	1	2	3	4	5
33.	Organisational image towards IT	1	2	3	4	5
TRAINING DELIVERY AND METHODOLOGY						
34.	Training contents	1	2	3	4	5
35.	Modular base (e.g.: word, excel, Internet etc.)	1	2	3	4	5
36.	Lecture base (chalk and talk)	1	2	3	4	5
37.	Demonstration oriented	1	2	3	4	5
38.	On the Job Training (OJT)	1	2	3	4	5
39.	Using notes and manual	1	2	3	4	5
40.	Informal (e.g.: learn from peers or self study)	1	2	3	4	5
41.	Combination (e.g.: lecture and practical)	1	2	3	4	5
42.	Training and teaching delivery (e.g.: training instructions)	1	2	3	4	5
43.	Course material (e.g.: notes, CD ROMs etc.)	1	2	3	4	5
44.	Practical oriented (i.e., workplace applicability)	1	2	3	4	5
45.	Class size during training	1	2	3	4	5

To what extent do the following factors influence the transfer of IT training to your workplace?		Maximum impact (80-100%)		Moderate impact (40-60%)		Minimum impact (0-20%)
IT FACILITIES						
46.	Hardware for training (e.g., computer)	1	2	3	4	5
47.	Software for training (e.g.: windows, Lotus etc)	1	2	3	4	5
48.	Supporting equipment for training (e.g.: LCD, OHP, etc)	1	2	3	4	5
49.	Technical support for training	1	2	3	4	5
50.	Computer system used at training site	1	2	3	4	5
51.	Reliability of equipment and peripherals at training site	1	2	3	4	5
52.	Software version at training site	1	2	3	4	5
53.	Computers at work place	1	2	3	4	5
54.	Software at work place	1	2	3	4	5
55.	Technical support at work place	1	2	3	4	5
56.	IT systems used at work place	1	2	3	4	5
57.	Reliability of equipment and peripherals	1	2	3	4	5
58.	Versions of software used	1	2	3	4	5
WORK CULTURE						
59.	Support from colleagues	1	2	3	4	5
60.	Working in teams or groups	1	2	3	4	5
61.	Learning/knowledge culture	1	2	3	4	5
To what extent do you rate the following IT competence factors?		Strongly Agree	Agree	Agree a Little	Disagree	Strongly Disagree
IT COMPETENCE						
62.	I can feel there is an increase in IT skill after training	1	2	3	4	5
63.	I can feel there is an increase in IT knowledge after training	1	2	3	4	5
64.	I have acquired positive attitude after IT training	1	2	3	4	5
65.	Self productivity has increased after IT training	1	2	3	4	5
66.	IT training has been successfully transferred to the work place	1	2	3	4	5
67.	IT training has improved team work effectiveness	1	2	3	4	5

Other comments:

DEMOGRAPHIC INFORMATION

Directions:

Please tick ☒ in the relevant boxes.

68. What is the highest level of education you have completed?

SPM.....	<input type="checkbox"/>	
STPM	<input type="checkbox"/>	
Diploma	<input type="checkbox"/>	Area:
Bachelor's degree	<input type="checkbox"/>	Area:
Other (PLEASE SPECIFY)	<input type="checkbox"/>

69. In which work unit are you employed at the University?

Chancellory.....	<input type="checkbox"/>	Maintenance Office	<input type="checkbox"/>
Registrar's Office	<input type="checkbox"/>	Computer Centre	<input type="checkbox"/>
Students' Affair Office	<input type="checkbox"/>	Library	<input type="checkbox"/>
Bursar's Office	<input type="checkbox"/>	Faculty	<input type="checkbox"/>
Clinic/hospital.....	<input type="checkbox"/>	Other (PLEASE SPECIFY)	<input type="checkbox"/>

70. What is your job classification?

Clerk	<input type="checkbox"/>	Senior Stenographer.....	<input type="checkbox"/>
Chief Clerk	<input type="checkbox"/>	Stenographer	<input type="checkbox"/>

71. How many years have you been a clerical worker?

Less than 5 years.....	<input type="checkbox"/>
5 – 10 years	<input type="checkbox"/>
More than 10 years	<input type="checkbox"/>

72. Employment status.

Permanent.....	<input type="checkbox"/>	Contract	<input type="checkbox"/>
----------------	--------------------------	----------------	--------------------------

Thank you for your assistance
Amran bin Md. Rasli
Department of Social Sciences
Roskilde University
PO Box 260, DK-4000 Roskilde, Denmark

15hb. Julai 2003

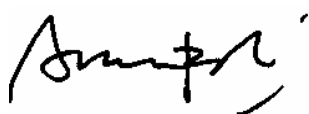
Saudara/i yang dihormati

Solaseselidik ini adalah berkaitan dengan kajian mengenai persepsi staf perkeranian terhadap faktor-faktor yang diperlukan untuk pembangunan latihan dan profesional yang berkaitan dengan teknologi maklumat (IT). Kajian ini penting untuk mendapatkan maklumbalas bagi pihak pengurusan yang bertanggungjawab mengenai dasar-dasar latihan dan peningkatan produktiviti yang berkaitan dengan IT di universiti-universiti tempatan.

Semua data yang diperolehi daripada kajian ini akan DIRAHSIAKAN. Analisis data akan dibuat secara berkumpulan. Identiti individu ataupun jabatan tidak akan didedahkan melalui kajian ini. Adalah diharapkan saudara/i dapat membaca dengan teliti setiap kenyataan yang diberikan dalam soalselidik ini dan memberikan maklumbalas dengan ikhlas dan setepat yang mungkin. Sila jawab dengan menuruti segala panduan yang diberikan pada setiap bahagian.

Kami ingin mengucapkan setinggi-tinggi terima kasih di atas kerjasama dan kesabaran saudara/i dalam mengisi borang soalselidik ini. Sila kembalikan borang soalselidik ini kepada pembantu lapangan/penyelidik kami. Sekiranya saudara/i mempunyai sebarang pertanyaan tentang kajian ini sila hubungi saya di talian 07-5531891 atau 017-7710535. Saudara/i juga boleh mengemukakan sebarang soalan melaui e-mel kepada saya melalui amran@ruc.dk. Terima kasih sekali lagi di atas penglibatan dan bantuan yang telah diberikan untuk menjayakan projek ini. Segala input yang diberikan amat dihargai.

Yang ikhlas



Amran Md. Rasli

Arahan: Bulatkan skala 1 hingga 5.

1 = Sangat mempengaruhi keberkesanan latihan IT di mana 80-100% ketrampilan IT dipindahkan ke tempat kerja (SM)

2 = Mempengaruhi keberkesanan latihan latihan IT di mana 60-80% ketrampilan IT dipindahkan ke tempat kerja (M)

3 = Sederhana mempengaruhi keberkesanan latihan IT di mana ketrampilan IT dipindahkan ke tempat kerja (SED)

4 = Kurang mempengaruhi keberkesanan latihan IT di mana 20-40% ketrampilan IT dipindahkan ke tempat kerja (KM)

5 = Sangat kurang mempengaruhi keberkesanan latihan IT di mana 0-20% ketrampilan IT dipindahkan ke tempat kerja (SKM)

Bagaimanakah faktor berikut mempengaruhi keberkesanan latihan komputer di tempat kerja		SM 80-100% impak	M	SED 40-60% impak	KM	SKM 0-20% impak
KECEKAPAN PENCERAMAH						
1	Kualiti bahasa yang digunakan (samada bahasa Inggeris atau bahasa Melayu)	1	2	3	4	5
2	Kecekapan atau pengalaman penceramah mengendalikan kursus	1	2	3	4	5
3	Pengetahuan penceramah	1	2	3	4	5
4	Kemahiran komputer penceramah dalam ICT (Information Communication Technology)	1	2	3	4	5
5	Kemahiran komunikasi penceramah	1	2	3	4	5
6	Arahan penceramah semasa menyampaikan kursus	1	2	3	4	5
7	Persediaan bahan kursus oleh penceramah	1	2	3	4	5
PERWATAKAN PELATIH						
8	Sikap anda terhadap latihan komputer (komitmen, keyakinan, keterbukaan)	1	2	3	4	5
9	Kesedaran anda terhadap kepentingan latihan komputer (celik komputer)	1	2	3	4	5
10	Motivasi anda semasa mengikuti kursus	1	2	3	4	5
11	Kemahiran anda menggunakan komputer	1	2	3	4	5
12	Penguasaan bahasa anda	1	2	3	4	5
13	Kefahaman anda terhadap objektif / tujuan latihan komputer	1	2	3	4	5
14	Persediaan anda sebelum mengikuti kursus	1	2	3	4	5
15	Kebolehan visualisasi anda (mampu menggambarkan perkara yang diterangkan oleh fasilitator)	1	2	3	4	5
16	Minat anda terhadap latihan komputer	1	2	3	4	5
17	Tahap pendidikan dan pengetahuan anda	1	2	3	4	5
SISTEM ORGANISASI						
18	Ganjaran dan insentif yang diberi kepada anda selepas mengikuti latihan	1	2	3	4	5
19	Organisasi menitikberatkan hasil kerja anda	1	2	3	4	5
20	Arahan tugas yang diberi oleh ketua anda	1	2	3	4	5
21	Latihan komputer sesuai dengan senarai tugas anda	1	2	3	4	5
22	Peluang kenaikan pangkat selepas anda mengikuti latihan komputer	1	2	3	4	5

	Bagaimanakah faktor berikut mempengaruhi keberkesanan latihan komputer di tempat kerja	SM 80-100% impak	M	SED 40-60% impak	KM	SKM 0-20% impak
23	Menyebabkan markah penilai prestasi anda lebih baik	1	2	3	4	5
24	Faedah segera yang diperolehi oleh universiti selepas anda mengikuti latihan	1	2	3	4	5
25	Kepentingan kursus komputer kepada kemajuan kerjaya	1	2	3	4	5
PIHAK PENGURUSAN						
26	Komitmen ketua / pengurusan anda	1	2	3	4	5
27	Kepentingan organisasi memberi latihan komputer di tempat kerja anda	1	2	3	4	5
28	Kesedaran komputer (celik komputer) ketua/pengurusan	1	2	3	4	5
29	Sikap keterbukaan ketua/pengurusan anda	1	2	3	4	5
30	Galakan ketua/pengurusan anda	1	2	3	4	5
31	Kecekapan ketua/pengurusan di tempat kerja anda	1	2	3	4	5
32	Kualiti kepimpinan ketua anda	1	2	3	4	5
33	Imej organisasi yang mementingkan penggunaan komputer	1	2	3	4	5
PENGENDALIAN DAN KAEDAH LATIHAN						
34	Isi kandungan latihan yang diikuti	1	2	3	4	5
35	Latihan mengikut modul (cth: word, excel, power point, Internet dll)	1	2	3	4	5
36	Latihan berbentuk kuliah (ceramah)	1	2	3	4	5
37	Latihan menggunakan demonstrasi (tunjuk ajar)	1	2	3	4	5
38	Latihan sambil bekerja (On The Job Training)	1	2	3	4	5
39	Latihan menggunakan nota atau bahan bercetak	1	2	3	4	5
40	Latihan tidak formal (cth: tunjuk ajar rakan sekerja, belajar sendiri)	1	2	3	4	5
41	Kombinasi pelbagai kaedah penyampaian latihan (cth: ceramah dan praktikal)	1	2	3	4	5
42	Cara latihan dan pengajaran (termasuk arahan latihan)	1	2	3	4	5
43	Bahan-bahan kursus (cth: nota, buku, CD ROM dll)	1	2	3	4	5
44	Kursus yang praktikal (yang boleh diaplikasi di tempat kerja)	1	2	3	4	5
45	Bilangan peserta bagi setiap latihan (saiz kelas)	1	2	3	4	5
KEMUDAHAN KOMPUTER						
46	Kemudahan komputer (hardware/komputer) di tempat latihan	1	2	3	4	5
47	Perisian (cth: Windows 2000, Lotus dll) di tempat latihan	1	2	3	4	5

	Bagaimanakah faktor berikut mempengaruhi keberkesanan latihan komputer di tempat kerja	SM 80-100% impak	M	SED 40-60% impak	KM	SKM 0-20% impak
48	Kemudahan sokongan (cth: OHP, LCD dll) di tempat latihan	1	2	3	4	5
49	Sokongan teknikal (cth: penyelenggaraan) di tempat latihan	1	2	3	4	5
50	Sistem komputer (cth: network) yang digunakan di tempat latihan	1	2	3	4	5
51	Teknologi komputer yang boleh digunakan tanpa gangguan (tidak <i>hang/shut down</i>) di tempat latihan	1	2	3	4	5
52	Versi perisian (cth: Windows 2000, Windows Millennium, Windows XP) yang digunakan di tempat latihan	1	2	3	4	5
53	Kemudahan komputer (hardware/komputer) di tempat kerja	1	2	3	4	5
54	Perisian (cth: Windows 2000, Lotus dll) di tempat kerja	1	2	3	4	5
55	Sokongan teknikal (cth: penyelenggaraan) di tempat kerja	1	2	3	4	5
56	Sistem komputer (cth: network) yang digunakan di tempat kerja	1	2	3	4	5
57	Teknologi komputer yang boleh digunakan tanpa gangguan (tidak <i>hang/shut down</i>) di tempat kerja	1	2	3	4	5
58	Versi perisian (cth: Windows XP) yang digunakan di tempat kerja	1	2	3	4	5

BUDAYA KERJA

59	Sokongan daripada rakan-rakan sekerja anda	1	2	3	4	5
60	Bekerja secara berkumpulan di tempat kerja anda	1	2	3	4	5
61	Budaya ilmu / pembelajaran di tempat kerja anda	1	2	3	4	5

Nyatakan persetujuan anda terhadap kenyataan-kenyataan berikut.

Sangat Setuju Setuju Kurang setuju Tidak setuju Sangat tidak setuju

KEBERKESANAN LATIHAN KOMPUTER

62	Kemahiran komputer saya meningkat setelah mengikuti latihan komputer	1	2	3	4	5
63	Ilmu komputer saya meningkat setelah mengikuti latihan komputer	1	2	3	4	5
64	Sikap saya bertambah positif setelah mengikuti latihan komputer	1	2	3	4	5
65	Produktiviti kerja saya semakin meningkat setelah mengikuti latihan komputer	1	2	3	4	5
66	Ilmu dan kemahiran daripada latihan komputer dapat dipraktikkan di tempat kerja	1	2	3	4	5
67	Latihan IT telah meningkatkan keberkesanan kerja secara berpasukian	1	2	3	4	5

Lain-lain komen:

I. MAKLUMAT DEMOGRAFI

Arahan: Tandakan ☒ di kotak yang bersesuaian.

68. Apakah tahap pendidikan tertinggi anda?

SRP/PMR.....	<input type="checkbox"/>
SPM.....	<input type="checkbox"/>
STPM	<input type="checkbox"/>
Diploma	<input type="checkbox"/>
Ijazah sarjana muda	<input type="checkbox"/>
Lain-lain (NYATAKAN)	<input type="checkbox"/>

Bidang: _____

Bidang: _____

69. Nyatakan unit di mana anda bertugas.

Canselori	<input type="checkbox"/>
Pejabat pendaftar	<input type="checkbox"/>
Pejabat HEP	<input type="checkbox"/>
Pejabat bendahari	<input type="checkbox"/>
Klinik/hospital.....	<input type="checkbox"/>

Pejabat penyenggaraan	<input type="checkbox"/>
Pusat komputer	<input type="checkbox"/>
Perpustakaan	<input type="checkbox"/>
Fakulti	<input type="checkbox"/>
Lain-lain (NYATAKAN).....	<input type="checkbox"/>

70. Apakah perjawatan anda?

Ketua Kerani (N22).....	<input type="checkbox"/>
Kerani (N17).....	<input type="checkbox"/>

Jurutrengkas Kanan (N22).....	<input type="checkbox"/>
Jurutrengkas (N17).....	<input type="checkbox"/>

71. Berapa tahunkah anda menjawat jawatan sekarang di organisasi ini?

Kurang dari 5 tahun.....	<input type="checkbox"/>
5 – 10 tahun	<input type="checkbox"/>
Lebih dari 10 tahun	<input type="checkbox"/>

72. Status perkhidmatan jawatan sekarang?

Tetap.....	<input type="checkbox"/>
------------	--------------------------

Tidak tetap (Sementara/sambilan/kontrak dll).....	<input type="checkbox"/>
---	--------------------------

Terima kasih di atas bantuan anda
Amran bin Md. Rasli
 Fakulti Pengurusan dan Pembangunan Sumber Manusia
 Universiti Teknologi Malaysia, 81310 UTM Skudai, Johor Bahru

RELIABILITY TEST AND FACTOR ANALYSIS

Preliminary Reliability Analysis

A preliminary reliability analysis was conducted based on the pilot study on 13 respondents. The overall Cronbach alpha value of 0.9029 for the 67 items representing 8 variables (refer Table A6.1). According to Nunnally (1978) an alpha value of more than 0.7 is considered desirable. The high Cronbach alpha value (close to 1) from this pilot study indicates that the instrument has a high reliability index and could be used for the study.

Table A6.1: Reliability Analysis on Pilot Data

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)				
Item-total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
ITF46	142.1538	345.9744	.3696	.9012
ITF47	142.2308	349.6923	.4024	.9011
ITF48	142.0000	355.5000	.1518	.9030
ITF49	142.0000	362.0000	-.2369	.9040
ITF50	142.2308	349.6923	.4024	.9011
ITF51	141.8462	352.4744	.1546	.9039
ITF52	141.9231	353.4103	.1792	.9030
ITF53	142.0000	347.0000	.4241	.9007
ITF54	142.0000	345.6667	.4721	.9003
ITF55	141.6154	354.5897	.1933	.9026
ITF56	142.0000	348.5000	.3703	.9012
ITF57	141.6154	353.7564	.1226	.9043
ITF58	141.8462	345.9744	.5537	.8999
ITTEF62	141.9231	357.7436	.1079	.9030
ITTEF63	141.9231	357.7436	.1079	.9030
ITTEF64	141.8462	360.6410	-.0698	.9041
ITTEF65	142.0000	354.0000	.2144	.9025
ITTEF66	142.1538	346.9744	.4471	.9005
ITTEF67	141.7692	365.5256	-.2439	.9062
OM26	141.6154	342.9231	.5784	.8993
OM27	141.9231	339.9103	.7351	.8981
OM28	141.8462	341.6410	.7402	.8984
OM29	141.7692	350.0256	.3522	.9014
OM30	142.0000	344.3333	.6240	.8993
OM31	141.6923	341.2308	.4252	.9006
OM32	141.8462	336.9744	.5217	.8993
OM33	141.8462	344.8077	.3266	.9019
OS18	140.9231	369.0769	-.2946	.9082
OS19	141.7692	343.0256	.5365	.8996
OS20	141.5385	352.4359	.2272	.9025
OS21	142.0000	342.1667	.4675	.9001
OS22	141.2308	351.0256	.1937	.9034
OS23	141.4615	349.7692	.1868	.9041
OS24	141.0769	355.9103	.0723	.9047

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)
(C O N T I N U A T I O N)

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
OS25	142.1538	346.6410	.4597	.9004
TCHAR10	142.0000	349.8333	.5146	.9007
TCHAR11	142.0000	345.6667	.5668	.8998
TCHAR12	141.7692	352.0256	.2738	.9020
TCHAR13	141.4615	342.7692	.6697	.8989
TCHAR14	141.6923	347.0641	.3375	.9016
TCHAR15	141.5385	345.7692	.4628	.9003
TCHAR16	142.3846	343.7564	.8083	.8987
TCHAR17	141.3846	347.7564	.3378	.9015
TCHAR8	142.2308	350.3590	.3737	.9013
TCHAR9	142.0769	337.5769	.8505	.8972
TCOM1	142.0769	347.7436	.3748	.9011
TCOM2	141.9231	347.7436	.5341	.9002
TCOM3	142.0769	349.9103	.4510	.9009
TCOM4	142.1538	347.4744	.5257	.9002
TCOM5	141.7692	347.1923	.3936	.9010
TCOM6	141.9231	354.5769	.1409	.9034
TCOM7	141.8462	358.3077	.0099	.9053
TDM34	142.0769	348.7436	.5081	.9005
TDM35	141.9231	345.5769	.4392	.9005
TDM36	141.6923	354.0641	.1539	.9033
TDM37	142.0769	340.7436	.6155	.8988
TDM38	141.9231	336.5769	.7455	.8974
TDM39	141.6923	344.3974	.6665	.8992
TDM40	141.6923	345.0641	.5193	.8999
TDM41	141.6154	351.2564	.3353	.9016
TDM42	141.9231	344.7436	.5459	.8997
TDM43	141.6154	351.7564	.3139	.9017
TDM44	142.0769	346.7436	.6063	.8998
TDM45	141.4615	353.7692	.1071	.9049
WC59	141.6923	358.7308	.0215	.9038
WC60	141.7692	354.3590	.1518	.9033
WC61	141.7692	363.5256	-.1684	.9056

Reliability Coefficients

N of Cases = 13.0

N of Items = 67

Alpha = .9029

Scale Reliability of Sampling Frame

As shown in Table 6.9, the reported Cronbach Alpha value for the sampling frame is 0.9756 which is higher than the acceptable value of 0.7 as suggested by Nunnally (1978), indicating a high value of reliability for the variables used. The improved Cronbach Alpha value from 0.9029 (refer Table A6.1) for the pilot study of 13 respondents to 0.9756 (refer Table A6.2) from the fieldwork on 554 respondents

illustrate the effectiveness of personally administered questionnaire which avoided missing values thus ensuring higher reliability. As such, all 67 items are usable for factor analysis.

Table A6.2: Reliability Analysis on Collected Data

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A)				
Item-total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
ITF46	150.4815	1343.1817	.6641	.9752
ITF47	150.3856	1340.6588	.6926	.9751
ITF48	150.3303	1344.5728	.6796	.9751
ITF49	150.2103	1348.9316	.6277	.9752
ITF50	150.3727	1342.1603	.6947	.9751
ITF51	150.2159	1340.1178	.6227	.9753
ITF52	150.2638	1338.8563	.6953	.9751
ITF53	150.4465	1340.1071	.6811	.9751
ITF54	150.3450	1340.9325	.6956	.9751
ITF55	150.1882	1342.6595	.6563	.9752
ITF56	150.2878	1340.9780	.6551	.9752
ITF57	150.1513	1339.1453	.6143	.9753
ITF58	150.1753	1341.0358	.6602	.9752
ITTEF62	150.5351	1363.0441	.4921	.9755
ITTEF63	150.5701	1361.7317	.5165	.9754
ITTEF64	150.4963	1364.8456	.4888	.9755
ITTEF65	150.5332	1362.6597	.4927	.9755
ITTEF66	150.6845	1360.8966	.4912	.9755
ITTEF67	150.5111	1360.5239	.4965	.9755
OM26	150.3137	1341.7610	.6811	.9751
OM27	150.3690	1341.4606	.6802	.9751
OM28	150.4188	1345.0904	.6608	.9752
OM29	150.3155	1343.6581	.6425	.9752
OM30	150.3598	1340.7853	.6657	.9752
OM31	150.2288	1346.8792	.6203	.9753
OM32	150.3542	1346.0111	.6221	.9752
OM33	150.4317	1342.6118	.6641	.9752
OS18	149.9004	1355.6795	.4190	.9757
OS19	150.2472	1344.6781	.6279	.9752
OS20	150.2823	1351.9368	.5941	.9753
OS21	150.5055	1345.8438	.6281	.9752
OS22	149.7509	1352.0321	.4335	.9757
OS23	149.9742	1346.2840	.5614	.9754
OS24	149.9760	1349.9162	.5426	.9754
OS25	150.6218	1345.9473	.6178	.9753
TCHAR10	150.4668	1350.3935	.6167	.9753
TCHAR11	150.2804	1355.6329	.5151	.9754
TCHAR12	150.2417	1355.3296	.5364	.9754
TCHAR13	150.2565	1352.6827	.5725	.9753
TCHAR14	150.0074	1356.4916	.4907	.9755
TCHAR15	150.0609	1353.4325	.5489	.9754
TCHAR16	150.6679	1350.1224	.5873	.9753
TCHAR17	150.1070	1354.4358	.5290	.9754
TCHAR8	150.6181	1346.8280	.6488	.9752
TCHAR9	150.7159	1350.0152	.5896	.9753
TCOM1	150.4446	1353.8925	.5408	.9754

R E L I A B I L I T Y A N A L Y S I S - S C A L E (A L P H A) (C O N T I N U A T I O N)				
Item-total Statistics				
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item- Total Correlation	Alpha if Item Deleted
TCOM2	150.4317	1349.1811	.6114	.9753
TCOM3	150.6125	1346.3265	.6608	.9752
TCOM4	150.5443	1345.4722	.6550	.9752
TCOM5	150.3819	1347.2199	.6053	.9753
TCOM6	150.2546	1349.9277	.5983	.9753
TCOM7	150.3063	1344.5086	.6078	.9753
TDM34	150.3063	1342.3977	.7206	.9751
TDM35	150.3450	1341.4020	.6949	.9751
TDM36	149.9280	1359.0687	.4476	.9756
TDM37	150.3450	1342.3077	.6762	.9751
TDM38	150.2657	1336.8609	.6776	.9751
TDM39	149.9852	1352.4508	.5353	.9754
TDM40	150.0775	1355.4653	.4843	.9755
TDM41	150.1384	1343.9679	.6643	.9752
TDM42	150.2269	1341.9207	.7256	.9751
TDM43	150.1384	1343.8644	.6611	.9752
TDM44	150.3247	1341.9831	.7234	.9751
TDM45	150.0867	1347.9130	.5911	.9753
WC59	150.4225	1355.4755	.5327	.9754
WC60	150.3413	1354.2474	.5341	.9754
WC61	150.3745	1352.3456	.5620	.9754
Reliability Coefficients				
N of Cases =		542.0	N of Items = 67	
Alpha =		.9756		

EXPLORATORY FACTOR ANALYSIS

For factor validity, an exploratory factor analysis was performed on the data to determine the desired explanatory concepts. According to Petty (1995), "factor analysis is a technique for achieving parsimony by identifying the smallest number of descriptive terms to explain the maximum amount of common variance in a component matrix" (p. 46). A principals-component analysis was the chosen extraction method. Varimax with Kaiser Normalisation was applied prior to factor rotation, thus keeping factors with an eigenvalue of one or greater. This procedure was chosen to eliminate error variance (Tinsley and Tinsley, 1987).

Within the context of this study, the exploratory factor analysis was used to determine the level of agreement or disagreement between factors identified by the panel of experts based on the EOA and the components produced by the factor analysis. The exploratory factor analysis serves to further determine the number of attributes for the following variables: (1) trainer competency; (2) trainee characteristics; (3) organisational system; (4) organisational management; (5) training methodology; (6) facilities; (7) work

culture; (8) IT competence; which are reflected in the loading patterns of the individual items on the attributes. Moreover, the resultant standardised factor scores of the 67 questionnaire items that used the five-point scale can be used in subsequent analysis. This would be explained in the relevant sections. For these 67 items, as there are only 554 cases in the sample, which are sufficiently large for conducting a single factor analysis using varimax rotation method with Kaiser normalisation and principal component analysis. The results are shown in Tables 6.10 – 6.13. While there are some cross-loadings on the loading patterns, in general the loading patterns correspond with the pre-determined sets of item groupings. In the factor analyses, factors were extracted when the eigenvalues are greater than 1. The factors extracted have explained almost 67% of the total variance, meaning that they are satisfactory solutions.

Measure of Sampling Adequacy

The high value of 0.964 for the Kaiser-Meyer-Olkin Measure of Sampling Adequacy indicates that the proportion of variance in the variables be caused by underlying factors thus allowing for the application of factor analysis. This is supported by the Bartlett's test of sphericity value of 0.00 that is less than 0.05 thus proving that the analysis is significant (Table A6.3).

Table A6.3: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.960
Bartlett's Test of Sphericity	Approx. Chi-Square	23102.100
	df	1653
	Sig.	.000

Table A6.4 shows the proportion of variance accounted for in each item by the rest of the other items. Since all of the values obtained are more than 0.4, the extraction communalities using principal component analysis for this solution are acceptable. The principal component analysis also recommended only 58 items should be used out of the original 67 items.

Table A6.4: Communalities

No.	Item	Initial	Extraction
1	Language used by trainer (English and Malay)	1.000	.467
2	Trainer's professional exposure	1.000	.697
3	Trainer's knowledge	1.000	.752
4	Trainer's Information and Communication Technology (ICT) skills	1.000	.702
5	Trainer's communication skills	1.000	.698
6	Instructions given by trainer during training	1.000	.654
7	Preparation of training material by trainer	1.000	.630
8	Trainee's current IT skills	1.000	.567
9	Trainee's language/communication mastery	1.000	.593
10	Understanding of the rationale for training	1.000	.603
11	Trainee's preparation before training	1.000	.528
12	Trainee's aptitude (e.g.: visualisation skills)	1.000	.569

13	Trainee's interest towards IT	1.000	.538
14	Trainee's education background	1.000	.648
15	Compensation/incentives given after training	1.000	.500
16	Work is performance oriented	1.000	.561
17	Clear work instructions given	1.000	.497
18	Opportunity for promotion	1.000	.719
19	Contributes towards performance appraisal	1.000	.733
20	Immediate organisational benefits after training	1.000	.581
21	Management commitment at work place	1.000	.663
22	Importance of IT training from the university's perspective is made known	1.000	.649
23	IT awareness among management	1.000	.661
24	Openness among management	1.000	.697
25	Support by management	1.000	.757
26	Management effectiveness at work place	1.000	.717
27	Leadership quality	1.000	.690
28	Organisational image towards IT	1.000	.589
29	Lecture base training (chalk and talk)	1.000	.527
30	Demonstration oriented	1.000	.610
31	On Job Training (OJT)	1.000	.627
32	Using notes and manual	1.000	.650
33	Informal (e.g.: learn from peers or self study)	1.000	.424
34	Combination (e.g.: lecture and practical)	1.000	.631
35	Training and teaching delivery (e.g.: training instructions)	1.000	.699
36	Course material (e.g.: notes, CD ROMs etc.)	1.000	.606
37	Hardware for training (e.g. computer)	1.000	.743
38	Software for training (e.g.: windows, Lotus etc)	1.000	.794
39	Supporting equipment for training (e.g.: LCD, OHP, etc)	1.000	.752
40	Technical support (e.g. maintenance) at training site	1.000	.687
41	Computer system (e.g. networking) at training site	1.000	.731
42	Reliability of equipment and peripherals at training site	1.000	.640
43	Versions of software used at training site	1.000	.682
44	Computers at work place	1.000	.718
45	Software at work place	1.000	.753
46	Technical support at work place	1.000	.712
47	IT systems used at work place	1.000	.784
48	Reliability of equipment and peripherals at work place	1.000	.748
49	Versions of software used at work place	1.000	.672
50	Support from colleagues	1.000	.789
51	Working in teams or groups	1.000	.782
52	Learning/knowledge culture	1.000	.825
53	I can feel there is an increase in IT skill after training	1.000	.683
54	I can feel there is an increase in IT knowledge after training	1.000	.716
55	I have acquired positive attitude after IT training	1.000	.731
56	Self productivity has increased after IT training	1.000	.762
57	Knowledge and skills from IT training has been successfully transferred to the work place	1.000	.649
58	IT training has improved team work effectiveness	1.000	.632

Based on Table A6.5, the leftmost section shows the variance explained by the initial solution. Only nine factors in the initial solution have eigenvalues greater than 1. Together, they account for 66.24% of the variability in the original variables. This suggests that nine latent influences are associated, but there remains room for a lot of unexplained variation. The second section of this table shows the variance explained by the extracted factors before rotation. The cumulative variability explained by these nine factors in the extracted solution is also 66.24% a value no different from the initial solution. Thus, none of

the variation explained by the initial solution is lost due to latent factors implying that the suitability of methods for extraction.

Table A6.5: Extraction Method Using Principal Axis Factoring – Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	22.267	38.391	38.391	22.267	38.391	38.391	6.748	11.634	11.634
2	3.121	5.381	43.772	3.121	5.381	43.772	5.219	8.998	20.632
3	2.930	5.051	48.823	2.930	5.051	48.823	5.136	8.855	29.487
4	2.236	3.856	52.679	2.236	3.856	52.679	4.663	8.040	37.526
5	1.989	3.429	56.108	1.989	3.429	56.108	4.371	7.536	45.062
6	1.745	3.009	59.116	1.745	3.009	59.116	3.859	6.653	51.716
7	1.619	2.791	61.907	1.619	2.791	61.907	3.220	5.551	57.266
8	1.427	2.461	64.368	1.427	2.461	64.368	2.607	4.495	61.761
9	1.086	1.872	66.240	1.086	1.872	66.240	2.598	4.479	66.240
10	.964	1.662	67.902						
11	.873	1.505	69.407						
12	.825	1.423	70.830						
13	.774	1.334	72.164						
14	.740	1.276	73.440						
15	.674	1.161	74.601						
16	.664	1.145	75.746						
17	.631	1.088	76.834						
18	.590	1.017	77.851						
19	.575	.991	78.841						
20	.550	.948	79.789						
21	.538	.927	80.717						
22	.521	.898	81.614						
23	.500	.863	82.477						
24	.483	.832	83.309						
25	.478	.824	84.133						
26	.470	.811	84.944						
27	.456	.786	85.730						
28	.443	.763	86.493						
29	.436	.751	87.244						
30	.421	.725	87.970						
31	.398	.686	88.656						
32	.378	.652	89.308						
33	.366	.631	89.939						
34	.359	.620	90.559						
35	.348	.601	91.159						
36	.334	.576	91.735						
37	.323	.557	92.292						
38	.299	.516	92.808						
39	.293	.506	93.314						
40	.284	.490	93.803						
41	.269	.464	94.267						
42	.256	.442	94.709						
43	.249	.429	95.138						
44	.241	.416	95.554						
45	.237	.408	95.962						
46	.228	.394	96.356						
47	.213	.368	96.724						
48	.209	.361	97.085						
49	.204	.351	97.436						
50	.197	.339	97.775						
51	.190	.327	98.102						
52	.183	.315	98.418						
53	.175	.302	98.720						
54	.171	.294	99.014						
55	.154	.266	99.280						
56	.152	.261	99.542						
57	.141	.243	99.785						
58	.125	.215	100.000						

Extraction Method: Principal Component Analysis.

Using Rotated Factor Matrix to Group the Variables

Fifty six of the original 67 items are loaded into nine factors (refer Table A6.6). Eleven items were excluded. These nine factors are compared with the original eight variables identified initially (refer Table 6.4). The first factor can be classified as trainer's competency and evolves around the following seven items: language used by trainer (English and Malay); trainer's professional exposure; trainer's knowledge; trainer's Information and Communication Technology (ICT) skills; trainer's communication skills; Instructions given by trainer during training; and preparation of training material by trainer.

Table A6.6: Rotated Factor Matrix - Varimax with Kaiser Normalisation

No.	ITEM	COMPONENT								
		1	2	3	4	5	6	7	8	9
1	Language used by trainer (English and Malay)			.557						
2	Trainer's professional exposure			.743						
3	Trainer's knowledge			.761						
4	Trainer's ICT skills			.712						
5	Trainer's communication skills			.749						
6	Instructions given by trainer during training			.699						
7	Preparation of training material by trainer			.668						
8	Trainee's attitude (e.g.: commitment, confidence and openness)									
9	Trainee's awareness of IT literacy									
10	Trainee's motivation									
11	Trainee's current IT skills				.667					
12	Trainee's language/communication mastery				.685					
13	Understanding of the rationale for training				.675					
14	Trainee's preparation before training				.629					
15	Trainee's aptitude (e.g.: visualisation skills)				.663					
16	Trainee's interest towards IT				.575					
17	Trainee's education background				.725					
18	Compensation/incentives given after training							.594		
19	Work is performance oriented									
20	Clear work instruction given									
21	Opportunity for promotion							.803		
22	Contributes towards performance appraisal							.756		
23	Job description is relevant to IT training									
24	Immediate organisational benefits after training							.599		
25	Understanding of the importance of IT training for career development									
26	Management commitment at work place		.597							
27	Importance of IT training is made known		.619							
28	IT awareness among management		.657							
29	Openness among management		.721							
30	Support by management		.749							
31	Management effectiveness at work place		.755							
32	Leadership quality		.714							
33	Organisational image towards IT		.566							
34	Lecture base training (chalk and talk)						.623			
35	Demonstration oriented						.539			
36	Training contents									
37	Modular base (e.g.: word, excel, Internet etc)									
38	On Job Training (OJT)						.524			
39	Using notes and manual						.715			

Table 6.8: Rotated Factor Matrix - Varimax with Kaiser Normalisation (Continued)

40	Informal (e.g.: learn from peers or self study)						.537			
41	Combination (e.g.: lecture and practical)						.584			
42	Training & teaching delivery (e.g.: training instruction)						.582			
43	Course material (e.g.: notes, CD ROMs etc.)						.546			
44	Practical oriented (i.e., workplace applicability)									
45	Class size during training									
46	Hardware for training (e.g. computer)									.601
47	Software for training (e.g.: windows, Lotus etc)									.657
48	Supporting equipment for training (e.g.: LCD, OHP)									.613
49	Technical support (e.g., maintenance) at training site									.574
50	Computer system (e.g., networking) at training site									.527
51	Reliability of equipment and peripherals at training site	.665								
52	Versions of software used at training site	.655								
53	Computers at work place	.700								
54	Software at work place	.745								
55	Technical support at work place	.737								
56	IT systems used at work place	.804								
57	Reliability of equipment and peripherals at work place	.787								
58	Versions of software used at work place	.699								
59	Support from colleagues								.799	
60	Working in teams or groups								.783	
61	Learning/knowledge culture								.798	
62	I can feel there is an increase in IT skill after training					.742				
63	I can feel there is an increase in IT knowledge after training					.774				
64	I have acquired positive attitude after IT training					.805				
65	Self productivity has increased after IT training					.823				
66	Knowledge and skills from IT training have been successfully transferred to the work place					.725				
67	IT training has improved team work effectiveness					.676				

The second factor can be classified as trainee characteristics and consists of the following seven items: trainee's current IT skills; trainee's language/communication mastery; understanding of the rationale for training; trainee's preparation before training; trainee's aptitude (e.g.: visualisation skills); trainee's interest towards IT; and trainee's education background. Three items from the original listing are considered as redundant and are recommended to be excluded from the analysis: trainee's attitude, trainee's awareness of IT literacy; trainee's motivation.

The third factor can be classified as organisational management and comprises of the following items: management commitment at work place; importance of IT training from the university's perspective is made known; IT awareness among management; openness among management; support by management; management effectiveness at work place; leadership quality; and organisational image towards IT.

The fourth factor consists of four components: compensation/incentives given after training, opportunity for promotion, contribute towards performance appraisal and immediate organisational benefits after training. The components can be classified as organisational system as per the original classification.

The following four items are recommended to be excluded: work is performance oriented, clear work instructions given, job description is relevant to IT training and understanding of the importance of IT training for career development.

The fifth factor can be categorised as training and delivery method and comprises of the following items: lecture base training (chalk and talk); demonstration oriented; On Job Training (OJT); using notes and manual; informal (e.g.: learn from peers or self study); combination (e.g.: lecture and practical); training and teaching delivery (e.g.: training instructions); and course material (e.g.: notes, CD ROMs etc.). Four items recommended to be omitted are practical oriented, class size, training contents and modular base.

The sixth factor consists of five components: hardware for training (e.g., computer); software for training (e.g.: windows, Lotus etc); supporting equipment for training (e.g.: LCD, OHP, etc); technical support (e.g., maintenance) at training site; and computer system (e.g., networking) at training site. The seventh factor consist of eight components: reliability of equipment and peripherals at training site; versions of software used at training site; computers at work place; software at work place; technical support at work place; IT systems used at work place; reliability of equipment and peripherals at work place; and versions of software used at work place. Factors 6 and 7 were consolidated as IT facilities as per the original classification (refer to techniques used by Wan Jusoh, 1999). No items were recommended to be omitted.

The eighth factor can be classified as culture and consists of the following three items: support from colleagues; working in teams or groups; and learning/knowledge culture. No items were recommended to be excluded.

The ninth factor can be classified as IT competence and consists of the following six items: I can feel there is an increase in IT skill after training; I can feel there is an increase in IT knowledge after training; I have acquired positive attitude after IT training; self productivity has increased after IT training; knowledge and skills from IT training has been successfully transferred to the work place; and IT training has improved team work effectiveness.

SPSS OUTPUT

Mann-Whitney U Tests by Employment Status

	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
I can feel there is an increase in IT skill after training	27740.000	116571.000	-.188	.851
I can feel there is an increase in IT knowledge after training	27847.000	116678.000	-.110	.912
I have acquired positive attitude after IT training	27150.500	115981.500	-.636	.525
Self productivity has increased after IT training	26807.000	115638.000	-.868	.385
Knowledge and skills from IT training has been successfully transferred to the work place	25775.500	114606.500	-1.546	.122
IT training has improved team work effectiveness	26704.500	115535.500	-.904	.366

Mann-Whitney U Test Descriptive Statistics

	Employment status	N	Mean Rank	Sum of Ranks
I can feel there is an increase in IT skill after training	permanent	421	276.89	116571.01
	temporary, part-time or contract	133	279.43	37164.00
	Total	554		
I can feel there is an increase in IT knowledge after training	permanent	421	277.14	116678.00
	temporary, part-time or contract	133	278.62	37057.00
	Total	554		
I have acquired positive attitude after IT training	permanent	421	275.49	115981.51
	temporary, part-time or contract	133	283.86	37753.50
	Total	554		
Self productivity has increased after IT training	permanent	421	274.67	115638.00
	temporary, part-time or contract	133	286.44	38097.00
	Total	554		
Knowledge and skills from IT training has been successfully transferred to the work place	permanent	421	272.22	114606.50
	temporary, part-time or contract	133	294.20	39128.50
	Total	554		
IT training has improved team work effectiveness	permanent	421	274.43	115535.50
	temporary, part-time or contract	133	287.21	38199.50
	Total	554		

Kruskal Wallis Test by Education Level

	Chi-Square	df	Asymp. Sig.
I can feel there is an increase in IT skill after training	12.166	5	.033
I can feel there is an increase in IT knowledge after training	3.917	5	.561
I have acquired positive attitude after IT training	4.396	5	.494
Self productivity has increased after IT training	3.542	5	.617
Knowledge and skills from IT training has been successfully transferred to the work place	2.381	5	.794
IT training has improved team work effectiveness	1.225	5	.942

Kruskal-Wallis Test Descriptive Statistics

	Highest level of education	N	Mean Rank
I can feel there is an increase in IT skill after training	SRP/PMR	13	286.00
	SPM	303	283.80
	STPM	85	284.52
	Diploma	114	277.47
	Bachelor	20	182.73
	Other	19	239.74
	Total	554	
I can feel there is an increase in IT knowledge after training	SRP/PMR	13	273.31
	SPM	303	280.53
	STPM	85	287.21
	Diploma	114	274.63
	Bachelor	20	225.32
	Other	19	260.76
	Total	554	
I have acquired positive attitude after IT training	SRP/PMR	13	239.23
	SPM	303	282.23
	STPM	85	281.11
	Diploma	114	263.18
	Bachelor	20	311.00
	Other	19	262.68
	Total	554	
Self productivity has increased after IT training	SRP/PMR	13	287.38
	SPM	303	278.19
	STPM	85	286.15
	Diploma	114	268.67
	Bachelor	20	310.35
	Other	19	239.45
	Total	554	
Knowledge and skills from IT training has been successfully transferred to the work place	SRP/PMR	13	316.15
	SPM	303	276.29
	STPM	85	286.02
	Diploma	114	278.17
	Bachelor	20	253.23
	Other	19	253.74
	Total	554	
IT training has improved team work effectiveness	SRP/PMR	13	264.50
	SPM	303	282.20
	STPM	85	277.10
	Diploma	114	272.50
	Bachelor	20	253.70
	Other	19	268.21
	Total	554	

Kruskal-Wallis Tests by Work Unit

	Chi-Square	df	Asymp. Sig.
I can feel there is an increase in IT skill after training	4.105	7	.768
I can feel there is an increase in IT knowledge after training	8.090	7	.325
I have acquired positive attitude after IT training	8.138	7	.321
Self productivity has increased after IT training	25.308	7	.001
Knowledge and skills from IT training has been successfully transferred to the work place	17.715	7	.013
IT training has improved team work effectiveness	13.207	7	.067

Kruskal-Wallis Test Descriptive Statistics

	Work unit	N	Mean Rank
I can feel there is an increase in IT skill after training	Chancellory	38	269.28
	Registrar	186	287.93
	Student Affair	19	238.71
	Bursar	76	286.30
	Maintenance	3	289.00
	Computer	5	285.10
	Library	8	228.06
	Faculty	122	274.23
	Other	97	268.87
I can feel there is an increase in IT knowledge after training	Chancellory	38	287.20
	Registrar	186	280.43
	Student Affair	19	219.92
	Bursar	76	296.51
	Maintenance	3	298.50
	Computer	5	340.40
	Library	8	208.88
	Faculty	122	278.52
	Other	97	264.96
	Total	554	
I have acquired positive attitude after IT training	Chancellory	38	312.17
	Registrar	186	278.74
	Student Affair	19	238.37
	Bursar	76	284.04
	Maintenance	3	198.00
	Computer	5	320.60
	Library	8	217.25
	Faculty	122	285.06
	Other	97	259.78
Self productivity has increased after IT training	Chancellory	38	309.86
	Registrar	186	259.83
	Student Affair	19	201.66
	Bursar	76	313.02
	Maintenance	3	210.83
	Computer	5	331.30
	Library	8	172.00
	Faculty	122	293.95
	Other	97	273.03
Knowledge and skills from IT training has been successfully transferred to the work place	Chancellory	38	326.38
	Registrar	186	271.83
	Student Affair	19	187.03
	Bursar	76	277.13
	Maintenance	3	249.50
	Computer	5	362.50
	Library	8	201.75
	Faculty	122	293.25
	Other	97	270.15
IT training has improved team work effectiveness	Chancellory	38	311.34
	Registrar	186	266.21
	Student Affair	19	211.89
	Bursar	76	290.14
	Maintenance	3	208.67
	Computer	5	378.20
	Library	8	227.13
	Faculty	122	289.04
	Other	97	275.41
	Total	554	

Kruskal-Wallis Tests by Job Classification

	Chi-Square	df	Asymp. Sig.
I can feel there is an increase in IT skill after training	3.667	3	.300
I can feel there is an increase in IT knowledge after training	7.725	3	.052
I have acquired positive attitude after IT training	5.027	3	.170
Self productivity has increased after IT training	9.069	3	.028
Knowledge and skills from IT training has been successfully transferred to the work place	2.313	3	.510
IT training has improved team work effectiveness	2.483	3	.478

Kruskal-Wallis Test Descriptive Statistics

	Job classification	N	Mean Rank
I can feel there is an increase in IT skill after training	Chief clerk	49	306.58
	Clerk	431	272.10
	Secretary	14	301.54
	Junior secretary	60	286.96
	Total	554	
I can feel there is an increase in IT knowledge after training	Chief clerk	49	321.78
	Clerk	431	270.05
	Secretary	14	311.36
	Junior secretary	60	286.99
	Total	554	
I have acquired positive attitude after IT training	Chief clerk	49	305.17
	Clerk	431	270.90
	Secretary	14	307.57
	Junior secretary	60	295.29
	Total	554	
Self productivity has increased after IT training	Chief clerk	49	332.87
	Clerk	431	272.24
	Secretary	14	285.79
	Junior secretary	60	268.10
	Total	554	
Knowledge and skills from IT training has been successfully transferred to the work place	Chief clerk	49	293.85
	Clerk	431	277.22
	Secretary	14	308.46
	Junior secretary	60	258.94
	Total	554	
IT training has improved team work effectiveness	Chief clerk	49	305.65
	Clerk	431	274.59
	Secretary	14	296.54
	Junior secretary	60	270.94
	Total	554	

Kruskal-Wallis Tests by Years employed as a clerical worker

	Chi-Square	df	Asymp. Sig.
I can feel there is an increase in IT skill after training	17.419	2	.000
I can feel there is an increase in IT knowledge after training	15.090	2	.001
I have acquired positive attitude after IT training	8.127	2	.017
Self productivity has increased after IT training	5.679	2	.058
Knowledge and skills from IT training has been successfully transferred to the work place	3.438	2	.179
IT training has improved team work effectiveness	3.560	2	.169

Kruskal-Wallis Test Descriptive Statistics

	Years employed as a clerical worker	N	Mean Rank
I can feel there is an increase in IT skill after training	less than 5 years	270	258.00
	5 - 10 years	121	272.15
	more than 10 years	163	313.77
	Total	554	
I can feel there is an increase in IT knowledge after training	less than 5 years	270	257.23
	5 - 10 years	121	279.90
	more than 10 years	163	309.29
	Total	554	
I have acquired positive attitude after IT training	less than 5 years	270	261.50
	5 - 10 years	121	286.80
	more than 10 years	163	297.10
	Total	554	
Self productivity has increased after IT training	less than 5 years	270	263.86
	5 - 10 years	121	284.55
	more than 10 years	163	294.87
	Total	554	
Knowledge and skills from IT training has been successfully transferred to the work place	less than 5 years	270	267.53
	5 - 10 years	121	277.77
	more than 10 years	163	293.81
	Total	554	
IT training has improved team work effectiveness	less than 5 years	270	266.65
	5 - 10 years	121	280.96
	more than 10 years	163	292.90
	Total	554	

UTM in Brief

The early 1900s saw the opening of the Federation of Malay States and the Straits Settlement as economic centres especially in the tin industry. Rapid construction of cart-roads and railway lines was undertaken to replace the navigated rivers between 10 to 15 miles from the Straits of Malacca. To meet the needs, a philanthropist bestowed a grant of \$30,000.00 for the establishment of a technical school in Kuala Lumpur. Thus commence the establishment of Universiti Teknologi Malaysia as a technological institution.

This institution of higher learning started in 1904 as a class for technical studies at Kuala Lumpur City Council Building. In 1906, the class became the Technical School, was located at the Batu Lane Malay School. It was later moved to the Museum Building in Bukit Nanas. In 1925, the Public Works Department opened the Technical School at Jalan Brickfield (Jalan Tun Sambanthan), Kuala Lumpur, to train technical staff of Public Works Department and the Survey and Land Offices. In 1930, the Kuala Lumpur Technical School was further expanded a new site in High Street, i.e., the present Jalan Bandar.

Another milestone was reached in 1967 when the Planning Committee for the Higher Learning decided to upgrade the Technical College to the level of institution of technology with university status from 1969 onward. However, it was only on the 14th of March 1972, that the decision was implemented with the establishment of Institut Teknologi Kebangsaan (National Institute of Technology) under Section 6(1) of the University and College Act, 1971. On the 1st of April 1975, the journey from school to university was completed when the institution finally became "Universiti Teknologi Malaysia".

Leadership at UTM

Tan Sri Ainudin Wahid was elected as the first Vice Chancellor of UTM. His immediate task was to revamp the engineering faculty and introduce new programs that resulted in the formation of four new faculties: civil engineering, electrical engineering, mechanical engineering and science. 1977 saw UTM's first batch of bachelor degree graduates entering the job market. UTM began to expand and the need for a bigger campus inevitably arose. Tan Sri Ainudin realised that the main campus has to be relocated and Skudai was identified as the most logical location.

By the early 1980s, the Skudai campus commenced construction. Even though UTM was partially completed, by 1985, two faculties: Built Environment and Geoinformation Science and Engineering were relocated to Skudai. By 1988, the ten faculties were already operational in Skudai thus resulting in the elevation of the Skudai Campus as the main campus of UTM. By 1990, Dato' Prof. Dr. Muhammad Ridzuan bin Haji Salleh was appointed as UTM's second Vice Chancellor. Dato' Ridzuan, being a corporate man, brought an enterprising culture to UTM and initiated various joint programs with external organisations resulting in the formation of various notable institutions such as Institut Teknologi Tun Hussein Onn (now KUTTHO), Akademi Tentera Malaysia (ATMA) and Akademi Laut Malaysia (ALAM). Other significant contributions from Dato' Ridzuan were the formation of Uni-Technologies Sdn. Bhd., a company designated for commercialisation of research and other profit oriented activities as well as the

Technovation Park, an entity for the incubation of local techno-entrepreneurs and enhancement of local technology advancement through research and development activities.

Dato' Ridzuan's entrepreneurial spirit was unfortunately short-lived. He was replaced by Tan Sri Datuk Dr. Ahmad Zaharudin Idrus by 1994. Perhaps Tan Sri Zaharudin's major contribution was to prepare the foundations for UTM to be a 'world-class university' by coining the term "Discovery University" after achieving the Prime Minister's Quality Award in 1999. Tan Sri Zaharudin also recognised that the industrial sector, as the main contributor to economic development, is an important catalyst in developing an industrial nation. Accordingly, Tan Sri Zaharudin initiated links with the industries through "University-Industry Technology Advancement Program" (UNITAP) aimed at developing technologies that would increase the competitive edge of the country's industrial sector. Under the leadership of Tan Sri Zaharudin, UTM was able to open a branch campus in Kuantan by 1998. As of now, UTM has 2 campuses, namely the 1,222-hectare main campus in Skudai, Johor located about 18 kilometers from the city of Johor Bahru and an 18-hectare branch campus, is situated at Jalan Semarak, Kuala Lumpur. The 400-hectare branch campus at Kuantan, Pahang had been converted to an independent University College as of February 2002.

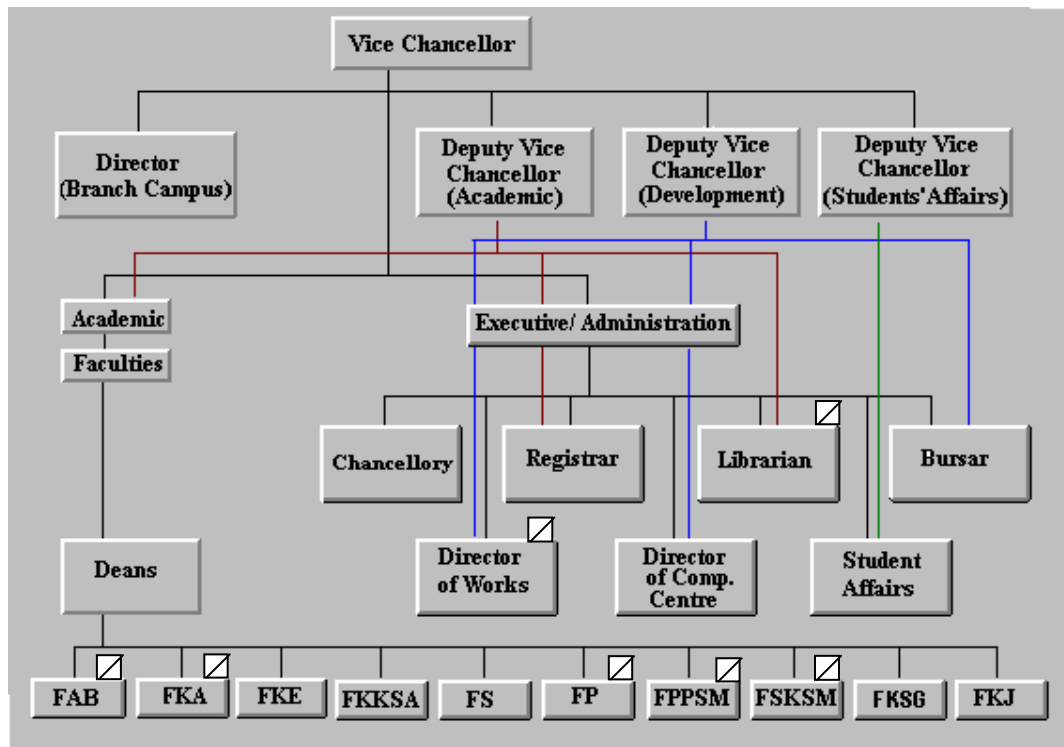
In 2001, Datuk Prof. Ir. Dr. Mohd. Zulkifli Tan Sri Ghazali became UTM's first homegrown Vice Chancellor. Currently, Datuk Zulkifli has focussed on human resource development and quality management as key agendas for UTM to be a world-class university. As of now, several units were able to attain the prestigious ISO 9001 certification (refer Figure A).

Staff Composition and Training Programme at UTM

Total staff of UTM as of December 2000 is 3,726 of which 2,205 are supporting staff and 1,521 are academic staff (refer Table A). These statistics however do not include about 53 staff on secondment to other institutions. It is very obvious that majority of staff at the non-academic divisions are supporting staff and visa versa. However, supporting staff at the faculties are wide ranging and comprises from faculty registrar, assistant registrar, dean's personal assistant, clerks and office boys/dispatch. The faculty dean, deputy deans and heads of departments are academic staff who are replaced every 2-3 years on a rotational basis. The structure of a "typical" is shown in Figure B.

Training activities at UTM currently favours academicians by creating many qualification upgrading and training programs as well as allowing them to attend short courses internally and externally. As a commitment for continuous training and development activities, on 26 August 1999 based on the Administrative Circular No 16/99, UTM imposed a staff training and development policy which makes it mandatory for all staff to undergo training for a minimum of 40 hours every year. For non-academicians, there are few opportunities for qualification upgrading but many internal short courses are made available (refer Table B). Training activities are coordinated by the Registrar's Office and are given proper budget by the end of every fiscal year.

Figure A: Organisational Structure of University Teknologi Malaysia



Source: Chancellery, February 2001

Note: FSKSM - Faculty of Computer Science and Information System

FKE - Faculty of Electrical Engineering

FKKSA - Faculty of Chemical and Natural Resource Engineering

FAB - Faculty of Build Environment

FKA - Faculty of Civil Engineering

FKJ - Faculty of Mechanical Engineering

FS - Faculty of Science

FPPSM - Faculty of Management and Human Resource Development

FP - Faculty of Education

FU(FKSG) - Faculty of Geoinformation Science and Engineering

☐ : Attained ISO 9002 status

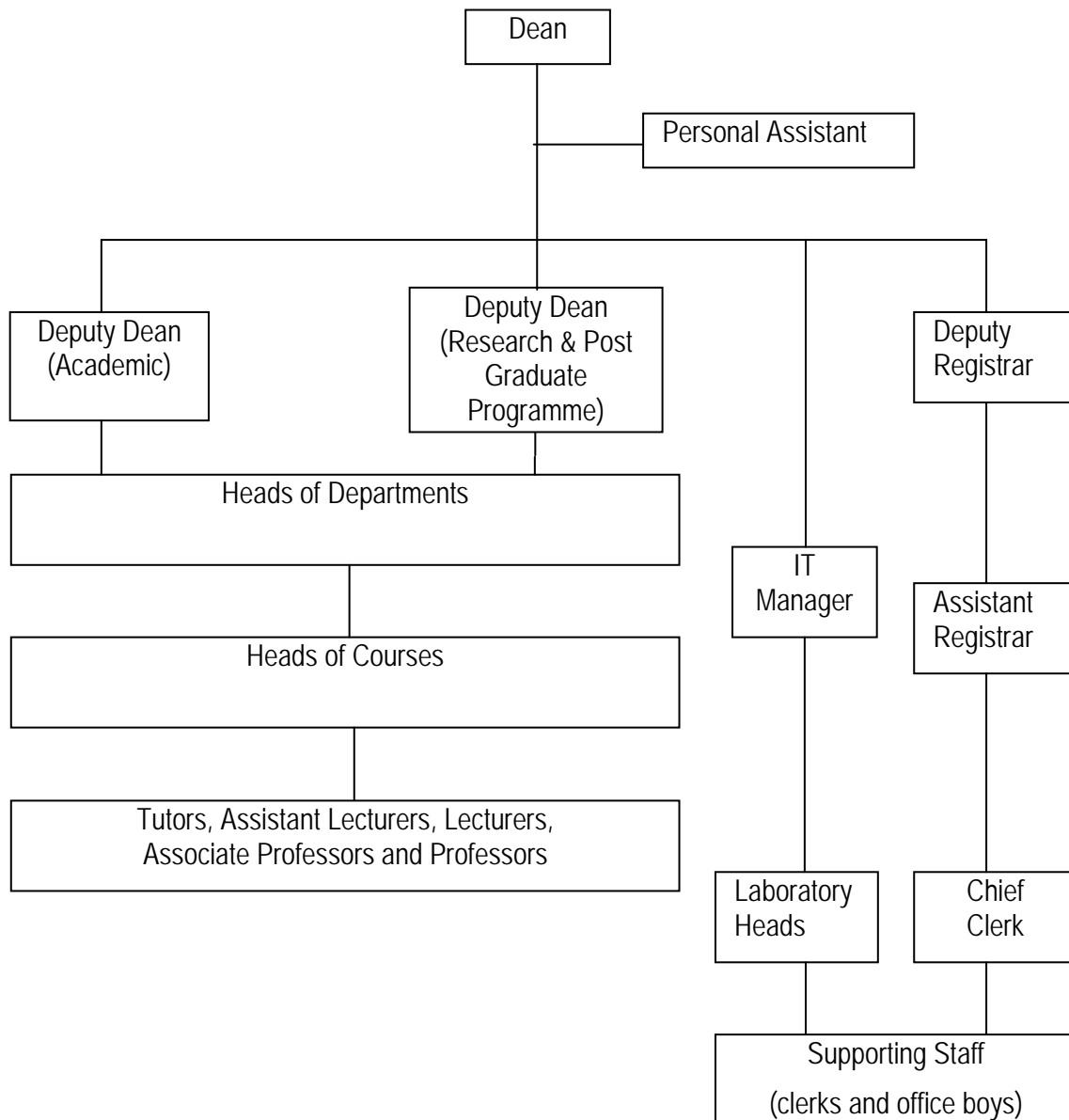
UTM training programs are divided into 3 levels: basic, intermediate and advanced based on the duration of employment of the respective employee (UTM, 1999). For new employees, training programs at the basic level is aimed at (a) acquisition of skills related to work ethics, self-management and communication; (b) appreciation of the organisational system and work related skills; and (c) understanding of the vision and mission of the university. For 'confirmed' employees, training programs at the intermediate level is aimed at (a) enhancing staff's communication skills; (b) upgrade existing skill to perform tasks effectively; and (c) enhance staff management ability. Finally for senior staff, training programs are designed to (a) promote self-confidence; (b) effective management and administrative skills; and (c) head a unit effectively. IT training programs are quite popular among clerical staff and are repeated frequently throughout an academic year (refer Table B).

Table A: UTM Staff by Faculty/Division

Faculty/Division	Support Staff	Academic Staff
Chancellery	235	9
Office of the Registrar	259	0
Office of the Bursar	112	0
Library	148	0
Office of Development	357	0
Office of Students Affairs	222	0
Computer Centre	96	0
Faculty of Built Environment	54	96
Faculty of Civil Engineering	79	136
Faculty of Electrical Engineering	66	138
Faculty of Mechanical Engineering	113	149
Faculty of Chemical and Natural Resources Engineering	103	104
Faculty of Science	90	191
Faculty of Geoinformation Science and Engineering	50	81
Faculty of Computer Science and Information Systems	36	145
Faculty of Management & Human Resource Development	29	156
Faculty of Education	50	91
Centre of Islamic Studies and Social Development	16	40
Centre for Diploma Programme	77	176
Pahang Campus (secondment)	13	9
Total	2,205	1,521

Source: Office of the Registrar, December 2000

Figure B: A Typical Organisational Structure of a Faculty in UTM



Source: Researcher's personal observation

Table B: Yearly IT Courses Conducted By UTM

COURSE TITLE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MS-Word			5-6			9-10			8-9			
MS-Excel			12-13				7-8			8-9		
MS-Power Point			17-18			17-18			17-18			
MS-Access			19-20			24-25		18-19				
Page Maker					26-27		28-29		24-25			
Local Area Network (LAN)				9-10		10-11			9-10			
Computer Maintenance				16-17			9-10		16-17			
INTERNET	By demand only											
SAS						25-26				20-21		
Visual Basic				14-15			1-2			1-2		
HTML	By demand only											
Autoware	By demand only											
Corel Draw				21-22			21-22		23-24			
Photo Shop				23-24			30-31		29-30			
SPSS					5-6			4-5		6-7		
Monitor repair				21-22			14-15			13-14		
Windows NT				15-16		16-17				7-8		
Front Page					26-27			27-28		22-23		
Printer repair					6-7			5-6		6-7		
PC Troubleshooting					12-13			6-7		15-16		
Linux Operation System					20-21		15-16			14-15		
Photo Paint					21-22		23-24			21-22		
Macromedia Flash					7-8				15-16			
Photo Shop (Advance)					12-13			25-26				
Programming C++				28-29				13-14				
Java				14-15				20-21				
MS-Windows 95	By demand only											
MS-Windows 98	By demand only											
MS-Windows 2000			10-11			11-12			10-11			
Basic PC Maintenance												
MS-Project					19-20		16-17					
Dream Weaver						23-24			22-23			
Staroffice	By demand only											
Active Server Page				23-24		18-19		12-13				
Nescape Composer	By demand only											