Chapter 3

3.....RESEARCH DESIGN AND METHODOLOGY

3 Research design and methodology

3.1 Introduction

This research is aimed at the e-readiness of warehouse workers, and it was found that most of the e-readiness reports referred to countries' e-readiness, and did not yield significant information on the e-readiness of a community such as the warehouse workers. Research on e-readiness of a specific community is fairly new and prompted me to take an exploratory approach. Welman and Kruger describe exploratory research to "… determine whether or not a phenomenon exists, and to gain familiarity with such a phenomenon, not to compare it with other phenomena" (2001 p. 18).

The British Educational Communications and Technology Agency (Becta, 2005) has investigated the development of organisations (in this case schools) and determined levels of "ICT maturity" that may prepare that institution for modern demands. Becta (2005) argued that one level of maturity does not necessarily serve as a requirement for the next level, but that a next level is almost spontaneously developed from the fluency and confidence the users may have at the current level. Organisations support employees to reach a level of ICT maturity to meet new challenges on a next level. This research aimed to explore the level of readiness of the warehouse workers to learn and train with technology. The assumption is that when a maturity level of e-readiness is achieved the warehouse workers may spontaneously move or be challenged to progress to the next level.

I followed an interpretive approach to explore the e-readiness of South African warehouse workers with regard to IT. This case study has been supported with questionnaires, interviews, observations, and document referencing with regard to a specific group in South Africa – the warehouse workers of International Healthcare Distributors.

3.2 Interpretive approach to understand the aspirations and objectives

Recommendations from previous research were that the target group needs to be involved in planning of training and that it was important that the initiators of learning understand the situation, the group's position, aspirations, habits, attitudes, levels of competencies, objectives and integrate these with the business goals (Burton, 2002; Coco & Jolly, 2003; Herselman & Britton, 2002; Heydenrych, 2000; Llorens *et al.*, 2002; Mashile & Pretorius, 2003) (Refer § 2.5.2). Warehouse workers display a social action with the world when expressing their readiness for online learning. Social action may be oriented to past, present, or predicted future behaviour of others, and this regular interaction has the potential to create cultural norms and social organisation (Erickson, 1986; Weber, online).

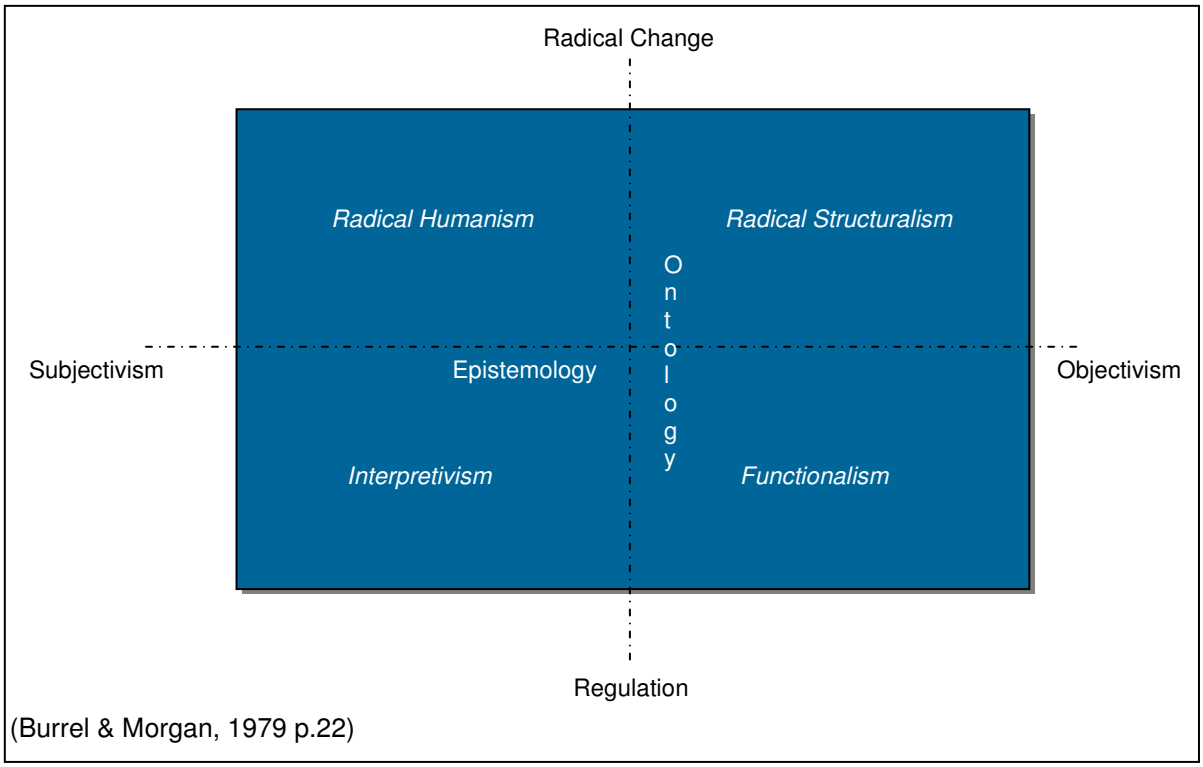
By adopting an interpretive approach, I concede that I believe that individuals construct meaning to their environment by experiencing the world from inside (Cohen *et al*., 2002). One of the ways to understand this meaning is by being "emotionally empathetic or artistic appreciative" (Weber, online). This description provided a useful direction for this research. Weber further explained that actions can be understood by direct observational understanding to reveal the subjective meaning of action. "What motives determine and lead the individual members and participants in this situation to behave in such a way that the situation came into being in the first place?" (Weber, online). Erickson sees that the task of interpretive research is to "discover the specific ways in which local and non-local forms of social organisation and culture relate to the activities of specific persons in making choices and conducting social action together " (Erickson, 1986 p.129).

The warehouse workers, as a social structure, are complex, multicultural and multi-faceted in their ways and habits. This study explores the relationship of a specific warehouse community within South Africa, and their readiness to learn and grow by means of Information Technology. Wright, Dereshiwsky, Emanuel and Martin listed seven habits of effective cyber instruction, and referred *inter alia* to one particular habit: "Seek first to understand, then be understood" (2004 p. 4199).

3.3 Qualitative research

Qualitative research attempts to understand and interpret the beliefs, actions, relationships and construed meanings people give to their environments (Cohen *et al*., 2002; Erickson, 1986; Merriam, 1998; Radnor, 2001). Merriam cites Sherman and Webb (1988) and Patton (1985) when she summarises that qualitative research implies the lived experience, as related through the experienced perceptions of the individual (Merriam, 1998; Radnor, 2001). The findings and status of the e-readiness of the warehouse workers were interpreted from my point of view, as an active participant in the functional business of IHD.

According to Burrell and Morgan (1979), social research paradigms can be classified in the four categories indicated in figure 3.2.



(Burrel & Morgan, 1979 p.22)

Figure 3.1 Four paradigms of social research

Interpretive research studies individuals from the inside and how they interact with their immediate surroundings, and how they negotiate and manage their respective environments (Cohen *et al.*, 2002; Merriam, 1998; Vockell, 2005). By assuming an interpretive approach, I was able to conduct the research from an empathic, personal and involved point of view. I wanted to explore and understand their anxiety, attitudes and perceptions regarding technology.

I wanted to understand the barriers the worker perceives as preventing them from working with technology, the anxiety they experience when opening a computer, and the joy and motivation resulting from a successful session with the computer. My interpretation of e-readiness was subjectively explored: "We interpret experiences through the filters of existing knowledge and beliefs, and this existing knowledge and beliefs that we hold are a product of ourselves as active subject construing meaning" (Radnor, 2001). Also known as the "interactionist" approach, it means that the individual is influenced by the environment, just as much as the environment influences the learner (Radnor, 2001). "The events and situations need to speak for themselves" (Cohen *et al.*, 2002 p. 182).

An interpretive approach implied that my epistemological approach was anti-positivist and indicated an exploration from the perspective of the participants. Radnor (2001) admits that it is not possible to "get into someone else's head", but through "empathy, communication, understanding and the sharing of experiences", one can learn a lot about a phenomenon. Table 3.1 lists Merriam's (1998) characteristics of qualitative research and how these attributes compare to my research.

Table 3.1 Characteristics of qualitative research compared with this exploratory study of e-readiness

Point of Comparison	Qualitative Research	e-Readiness Interpretation
Focus of research	Quality (nature, essence)	Investigation of the emotional, technological, educational, social and personal readiness to learn with IT
Philosophical roots	Phenomenology, symbolic interactionism	Interpretive approach, to understand and look into the positives, to identify constraints, understand barriers, find ideals and goals through interaction and involvement
Associated phrases	Fieldwork, ethnography, naturalistic, grounded, constructivist	Working in the field, involved, construct readiness profile
Goal of investigation	Understanding, description, discovery, meaning, hypothesis generating	Investigate, understand, discover, empathise, generate a profile of readiness
Design characteristics	Flexible, evolving, emergent	Flexible options, adaptable, intent on individual perceptions
Sample	Small, non-random, purposeful, theoretical	Warehouse workers of IHD – a pharmaceutical distribution company in Johannesburg
Data collection	Researcher as primary instrument, interviews, observations, documents	Researcher as primary instrument. Interviews, observations, focus groups, documents
Mode of analysis	Inductive (by researcher)	Inductive analysis, building and constructing an e-readiness profile as information is obtained
Findings	Comprehensive, holistic, expansive, richly descriptive	Descriptive and holistic reporting

(Merriam, 1998 p.9)

Qualitative research aims to understand the emotional, technical, educational and social aspects that may determine the e-readiness or lack thereof of warehouse workers. The warehouse workers as a unique community within South Africa lend themselves to be investigated as a case study. Interviews, documents and different types of observations have been used to collect data and evidence of e-readiness. Inductive and deductive modes of reasoning were used to analyse data and construct rich descriptions of the preparedness of e-learning of warehouse workers.

Figure 3.2 summarises the research design I had followed, namely an interpretive, qualitative case study to explore the e-readiness of the warehouse worker. Merriam (1998) described five types of qualitative research: generic, ethnography, phenomenology, grounded theory and case study.

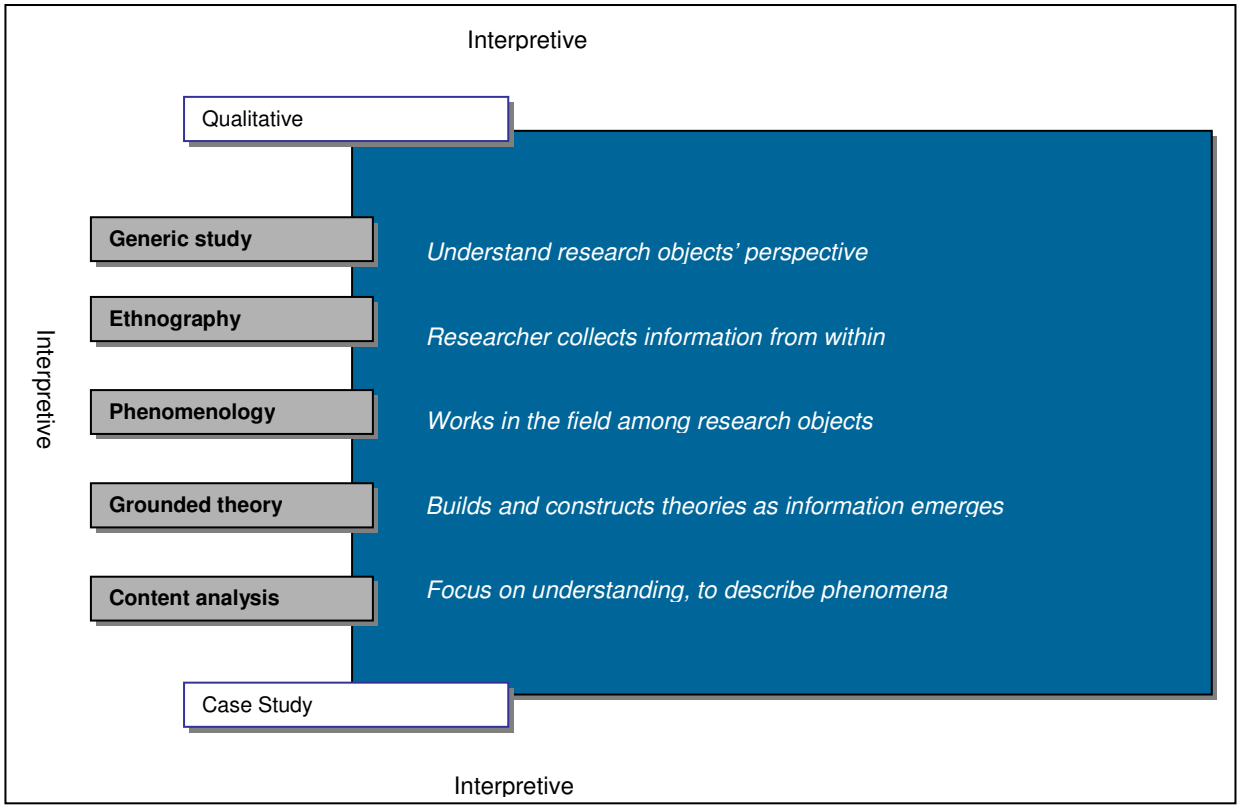


Figure 3.2 Methodology structure

Generic refers to a study of a phenomenon, not really focusing on the group of people involved. Ethnography focuses more on the anthropologist's study of a phenomenon within a specific group or culture. The objective is to obtain socio-cultural explanations from the research (Merriam, 1998). Although the working culture of the warehouse worker may have been interesting to investigate, I believed it would distract the focus and purpose of this research. There was a temptation to do phenomenological research into the e-readiness of the warehouse worker, as this study could easily have investigated the e-readiness phenomenon. Phenomenology is regarded to be the study of conscious experience of things, or the meaning things have in the life of humans (Smith, 2005). As Merriam stated, the focus *"would be on the essence or structure of an experience*" (1998 p. 15). The phenomenological approach was rejected because my study focused more on the specific group or individuals and how they experienced and perceived the phenomenon.

The *grounded theory approach* implies that the focus of the research is to develop a theory as information evolves from the research (Merriam, 1998). This study included a grounded theory approach by conducting a deductive-inductive data-analysis strategy, and aimed to reveal the aspects that may determine the e-readiness of the warehouse workers. This study was not intent only on theory developing; but also aimed to explore, understand, and experience e-readiness as demonstrated by a specific group, which was why the case study had been selected as my preferred means of research.

I also made use of content analysis to determine the presence of certain concepts and meanings. I have transcribed the interviews and observations to construct integrated data sets to analyse. The content analysis enabled me to explore for meaningful aspects or indicators of e-readiness. During this content analysis, I made use of a grounded theory approach and deductive-inductive modes of reasoning to identify and explore the data (Busch *et al.*, 1997). The main focus was to get an in-depth understanding of the warehouse workers' e-readiness - as determined by their unique aspirations, frustrations, emotions, responsibilities, attitudes and work relationships with their respective environments.

3.4 Case study as preferred research design

A case study was selected due to the unique unit of analysis to be explored, in this case the warehouse workers of a supply chain environment in South Africa. The aim was to explore and reveal a unique relation with regard to their preparedness for e-learning (Merriam, 1998). She identifies several types of case studies in education. Ethnographic case studies focus on cultures and behaviours of specified groups. Historical case studies concentrate on primary resource material and tend to report on "institutions, programs and practices as they have evolved over time" (Merriam, 1998 p. 35). The main attribute for historical case studies is that they report on the phenomenon over a specified period in time. A third type of case study is the physiological study that concentrates mainly on human behaviour. Sociological case studies are interested in human behaviour and their relationship to societies and socialisation (Merriam, 1998). Exploring e-readiness implied that an understanding of social constructs needs to be investigated.

Merriam (1998) describes three different ways to report on the phenomenon. These are descriptive, evaluative and interpretive. *Descriptive* case studies in education are detailed accounts of the phenomenon, but are seen by critics as "lacking in depth." *Interpretive* case studies are seen to be more analytical, in order to form conceptual information, with the purpose of challenging theoretical assumptions when the data has been collected. *Evaluative* case studies include description and analysis, but conclude with an in-depth evaluation (Merriam, 1998).

I have selected the interpretive case study to allow myself to report on e-readiness as experienced by the warehouse workers themselves. To interpret meant that the unit of analysis' receptiveness for a specific learning strategy could be understood from their own perspective. Interpretation included an exploration of the emotional and physical limitations, frustrations, aspirations and other related personal aspects that may affect their preparedness for e-learning. The interpretation included an understanding of the limitations and/or advantages of the infrastructure where they find themselves. The interpretive case study intended to explore all aspects that may play a role to promote or constrain the e-readiness of the warehouse workers within this specific organisation. The warehouse workers are a community that acts within the confines of the organisation, shares the same infrastructure, management guidance and planning, is subjected to the same training and learning infrastructure, but

responds to the environment in their own individual ways. This is an interpretive case study, to understand individual perceptions within the confines of a specific group of workers.

3.5 Warehouse workers as the unit of analysis

The warehouse workers at International Healthcare Distributors (IHD), a leading pharmaceutical distribution company in Southern Africa, have been selected for this research. I am employed at IHD as an IT training manager, and have been investigating e-learning as a possible training solution for the past couple of years. The organisation accepts the role and responsibility to empower its employees, hence the urgency to investigate e-learning as a possible training solution.

IHD consists of approximately five hundred employees, of which almost two-thirds are warehouse workers. IHD distributes pharmaceutical products to the entire Southern African Region from five distribution centres. These centres, commonly known as “DCs”, operate in the main metropolitan regions in South Africa, i.e. Johannesburg, Cape Town, Durban, Port Elizabeth and Bloemfontein. The following table is a summary of a survey conducted of some warehouse workers representing all the DCs in South Africa. The main purpose was to get an overview of their experience, ages, gender, race and qualifications. Table 3.2 refers to the biographical information of warehouse workers.

Table 3.2 Biographical data of IHD warehouse workers

Number of warehouse workers in the survey	
Bloemfontein	11
Cape Town	16
Durban	16
Linbro Park (Johannesburg)	95
Port Elizabeth	10
Experience of worker	
6 months or less	3
6 months to 1 year	11
1 to 2 years	28
2 to 5 years	39
5 years and longer	67
Age group	
18 to 24 years	22
25 to 30 years	29
31 to 35 years	38
36 to 45 years	36
46 years and older	23
Gender	
Male	113
Female	35
Race	
African	101
Asian	11
Coloured	26
White	10

Highest educational qualification	
No formal school education	0
Grade 5 – Primary School	0
Grade 6 – Primary School	0
Grade 7 – Primary School	0
Grade 8 – Secondary School	3
Grade 9 – Secondary School	0
Diploma, but not Grade 10	4
Grade 10 – Secondary School	44
Grade 11 – Secondary School	10
Diploma, but not Matric	17
Grade 12 (Matric) – Secondary School	62
Post-Matric diploma	0
University degree	0
No response	8

The unit of analysis of the study can thus be described as multi-racial, mostly black, fairly experienced employees, aged between 18 and 60 years old. Both genders are included, educational backgrounds differ, and most indicated that they have a secondary school qualification.

3.5.1 Selection Procedure

Cohen *et al* (2002) state that the style of the research determines the sample size, and add that qualitative research normally works with a smaller sample size. These workers share the attributes, biographic particulars, educational background and skills levels of most warehouse workers in South Africa, but for the reasons of this study, the target population need only be representative of warehouse workers working for IHD South Africa.

I selected warehouse workers from all five regions in SA to ensure that they represent all the warehouse workers working for IHD. Interviews were conducted with at least two to four workers from the remote DC's while most of the interviews and observations were conducted in Johannesburg, where most of the warehouse workers are employed. Table 3.3 refers to the number of participants per DC.

Table 3.3 Participants per distribution centre

	Questionnaires	No of Interviews	Managers
Bloemfontein	6	1	1
Cape Town	6	2	0
Durban	6	0	0
Johannesburg	68	8	5
Port Elizabeth	16	5	0

It is for this purpose that a non-probability sample, or "purposeful" sample is selected (Patton as cited in Merriam, 1998). A community is seen as a group of people with a common goal at that time, or as described by McInnerney and Roberts (2004): "a gathering of people within a single social structure".

Several types of non-probability samples are identified – convenience, quota, purposive, dimensional and snowball (Cohen *et al*., 2002). Convenience sampling refers to the availability of the nearest

group that forms part of the unit of investigation. Accessibility makes them the natural selection. Quota sampling implies that a representative section(s) or proportional weight of the research unit needs to be selected.

Purposive sampling refers to the selection of a sample with a specific intention. Where managerial and supervisory information is needed, the sample will obviously have to be from participants belonging to this category. Dimensional sampling is regarded by Cohen *et al* (2002 p. 104) as a "refinement of quota sampling". Participants are selected from several viewpoints in a bid to represent all viewpoints within the intended research. In snowball sampling, informants identify the next group of participants by word of mouth. The case study is another example of a non probability sample. The research is limited to one specific group only. A non-probability sample avoids generalisation and seeks only to represent the group or community from which it has been selected. The warehouse workers have been selected as such a community because they share the same environment, working conditions and social structure. In this case study, all findings and obtained information applies to them only.

I have used a convenience sampling strategy for my study. Due to the availability of the workers, I had to accept the conditions of the day, and the availability of staff. Table 3.5 illustrates that they are in fact representative of South Africa's major racial groups. All races are represented, from across the five main metropolitan regions in our country.

Access to the workers was not always easy due to work constraints and geographic distances of other DCs (except Johannesburg). I also had to conform to the prevailing culture in the warehouse by reporting to the manager and/or a supervisor first. I made a conscious decision to honour the seniority of the managers, supervisors while conducting any interviews and observations. I explained to each supervisor and manager what the purpose of my research was and left it to them to select an available respondent to interview or observe. This practice enhanced the validity and reliability of my research as it eliminated any preferences I might have had in selecting the participants. Each work area was very dependent on the workers, and management was not very keen to let the workers go during work hours. I also had the problem that the workers were all dependent on public transport, and not available after hours. I honoured the ethics of the organisation and all employees by applying for permission before conducting any interviews or observations (Appendix 3.1 – Application for Ethics Approval). I have also clearly explained the voluntary participation to all participants before including them in interviews or observations.

I had to consider the time for interviews and observations at all times, because the workload differed during the day. Warehouse workers were not readily available, and I had to consider their workload all the time. In most cases the interviews with managers were conducted after 14:00 in the day. Most supervisors and managers supported my research initiative, and were willing to participate.

3.6 Research methodology

Exploratory research is mainly concerned with why specific conditions prevail and why they are influenced by the surroundings. It is perceived to be a flexible research method that concentrates on the dynamics of "how things operate" (Ritchie & Lewis, 2003 p. 29). Cohen *et al* (2002) refer to Nisbet and Watt (1984) when they propose a staged approach to conduct case study research. An open and wide point of departure should be assumed at the start, without any prejudices. This should be followed by a narrower focus, as a result of the acquired information, until a draft interpretation is formed to investigate and understand further.

Qualitative data can be obtained by four methods: observations; interviews; documents; and research instruments such as interviews, questionnaires, surveys, and personality, attitude and cognitive tests (Erickson, 1989). To collect data by means of observation in the field, the researcher needs life skills and a good understanding of sociology (Erickson, 1986); i.e. the ability to identify relevant behaviour and any activity, dialogue or lack thereof that may be germane to the aspect being researched.

I have opted for an interpretive study, and planned to explore e-readiness through the eyes and words of the warehouse workers. Radnor (2001) advised that to "get into someone else's head", one needs "empathy, good communication, [and the] understanding and the sharing of experiences". Or, as described by Welman (2001 p. 7) "experience the phenomena *in their* [and in my] *bones*…". I have used a "hybrid data" (Mouton, 2001 p. 149) collection strategy. This included documentation, questionnaires, interviews and different types of observation to collect my data on the e-readiness of warehouse workers.

3.6.1 Data collection strategy

Denzin (2002) defined six steps in a research process:

- framing the research question
- opening and analysing previous conceptions of the problem
- orienting the phenomenon in the natural world and looking at it from different perspectives
- identifying and breaking the phenomenon into its smaller elements to reveal essential features and attributes
- synthesising and reconstructing the phenomenon
- relocating the phenomenon in its real context.

I have used the knowledge and expertise of subject matter experts (SME) to frame the research question and to obtain existing and previous conceptions of the research problem.

I have used the following steps to identify the elements of e-readiness of warehouse workers. The previous and existing concepts of the research problem will be as defined by a group of experts. (Appendices 3.2 and 3.3). Appendix 3.2 lists the groups that have been identified for data collection and describes the reason for their selection. Appendix 3.3 lists the subject-matter experts to be interviewed with regard to e-readiness. Their respective CVs have been added. The data-collection

instruments are observations, questionnaires and interviews. The basic data-collection strategy was conducted in four phases:

- Preparation phase: Biographical Information prior to interviews, observations (Refer § 3.5)
- Phase 1: Subject Matter Experts to determine a consensus of e-readiness characteristics and dimensions
- Phase 2: Interviews and observations of warehouse workers to explore for elements of e-readiness identified in phase 1
- Phase 3: Interviews with business managers to determine environment readiness and support.

Figure 3.3 is a diagram to illustrate the phased approach of my intended research and explains how the interviews, observations and documents were used once the construct e-readiness had been defined and outlined by subject-matter experts.

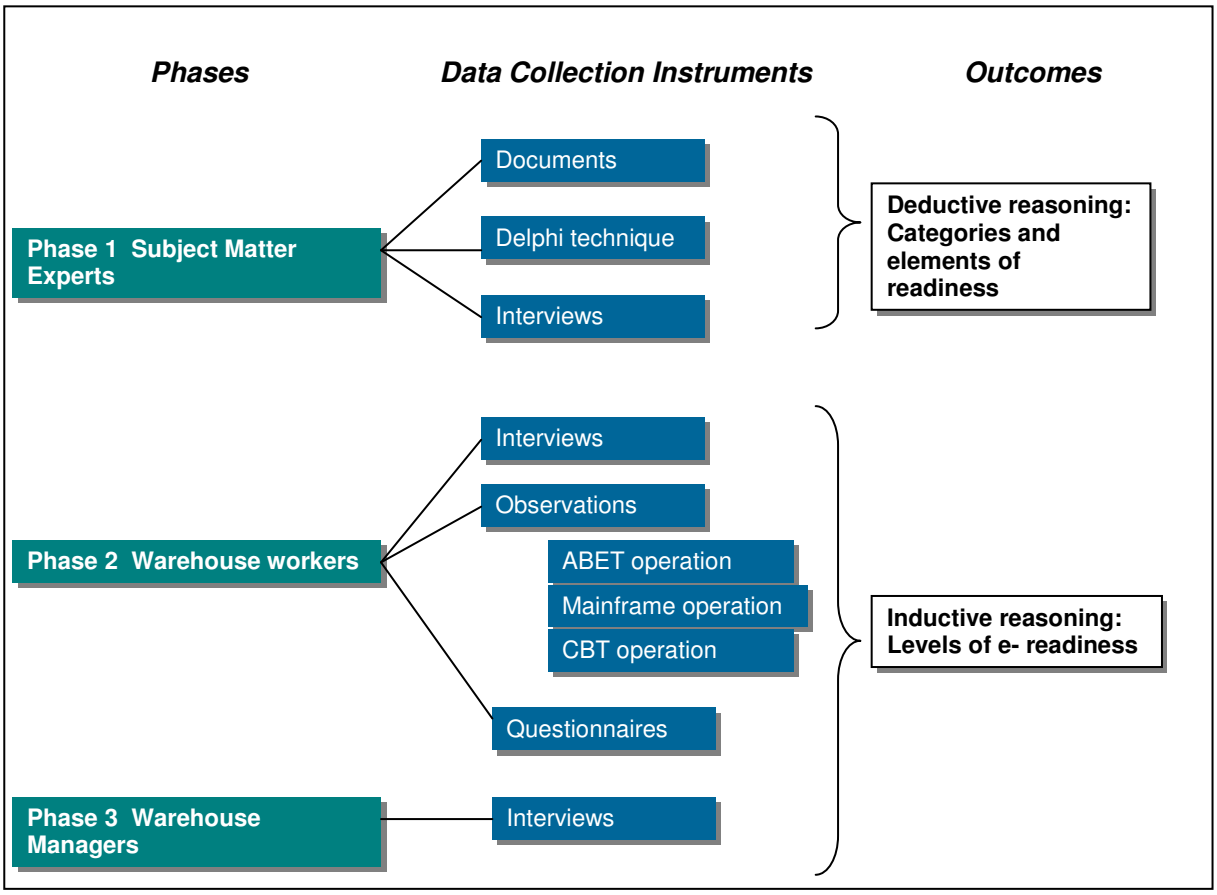


Figure 3.3 Phased approach to collect data

I have mainly used interviews and observations to collect data, supported by questionnaires and documents on e-readiness. Interviews were used to obtain an in-depth understanding of warehouse workers' perceptions of e-readiness, and observations to note their reactions when completing work and learning tasks on the computer. Existing literature has been researched to get to the latest findings and strategies on determining e-readiness.

I have used two questionnaires during this study. The first questionnaire (Appendix 3.4 – Warehouse worker information) formed the background study of the warehouse workers to obtain information with regard to their biographical information. The questionnaires also collected data with regard to learning

preferences and computer use within the organisation. The questionnaires were handed to as many participants as possible throughout the research process. The last versions of the questionnaire differed somewhat from the first, it was adapted to obtain more information regarding use of the habits and skill with computers (Appendix 3.5). The questionnaires were twofold: to obtain the biographic information of the unit of analysis, and to support findings that emerged during the interviews and observations. A second questionnaire was presented to ten Port Elizabeth warehouse workers only, namely to question their basic knowledge regarding e-learning (Appendix 3.6). It was already near the end of my data-analysis phase, it was during a stage when I wondered about the participants' knowledge of e-learning.

I have also used different types of observations. Some of the observations were recorded in video format files (Appendix 3.7). The results of these different observations had been explored and compared in order to ensure the validity and reliability of the research. From these observations I found evidence that explicitly indicated the presence or lack of e-readiness and in other cases I interpreted implications of e-readiness. Deductive and inductive reasoning were used to debate the e-readiness of the workers. Deductive reasoning is seen to be arguing from the broad to the specific (Mathematics Network - Question Corner, 1998; Mouton, 2002; Welman & Kruger, 2001). I have applied deductive reasoning to identify categories of e-readiness from the existing literature as described in § 2.10 and during the SME interviews. The purpose here was to identify aspects of e-readiness as identified by the experts and in the literature. Inductive reasoning is used to argue from the specific to the general (Mathematics Network - Question Corner, 1998; Mouton, 2002; Welman & Kruger, 2001). During phases two and three I applied inductive argumentation to construct the preparedness of the warehouse workers from data received from the warehouse worker interviews and observations. Eventually these findings may be generalised to apply to other warehouse communities in developing countries.

The next section explains the data collection procedures in three phases. Phase one aims at getting a consensus of what is meant by readiness, and to identify categories to structure the remainder of the research. Phase two explains the procedures during the interviews and observations with the warehouse workers, and phase three refers to the interviews with the warehouse managers.

3.7 Phase 1 Identifying the categories of e- readiness

Target-group analysis

The main research problem implied that a training strategy is considered, and that the viability of this strategy is dependent on several variables, among these are the needs, nature and characteristics of the intended students (Alessi & Trollip, 2001; Davis, 2004 p. 112; Mager, 1991).

> An understanding of the technological background of the intended students is crucial, including their expectations, their financial and other resources, their access to the web or other online networks, their bandwidth limitations, and any other pertinent information about their preparedness and ability to participate equally and fully in the learning experience (Davis, 2004 p. 99).

I found guidance from the available literature to determine what I needed to look for in the unit of analysis. Existing literature (i.e. Alessi & Trollip, 2001; Anderson & Elloumi, 2004; Davis, 2004; Mager, 1991; Reeves, 1999) indicated the importance of an in-depth target-group analysis before designing e-learning for the specific learner group. Alessi & Trollip (2001 p. 439) advocate a comprehensive description of the target group to identify their "characteristics, competencies, limitations, and familiarity with the subject area". Mager (1991 p. 52) emphasized the need for a thorough target-group analysis, because "Not only will careful thought about your students help determine the starting point of a course, but it will help to shape the course itself". He continued that this will assist instructional designers in the use of appropriate and relevant vocabulary, examples, media and which procedures to adopt. "If you spend even a tenth as much time thinking about and describing your students as you do thinking about your subject, you will develop a powerful tool for insuring the effectiveness of your instruction" (Mager, 1991 p. 52).

Reeves (1999) proposed three main categories to be considered when instructional designers plan training on the web. They are "Cultural habits of mind, aptitude and individual differences and origins of motivation" (Reeves, 1999). These three concepts include many aspects that need to be considered when instructional designers plan e-learning. When these characteristics are known, it may assist instructional designers to analyse a specified target group. Some of these characteristics are: age, educational level, cultural background, physical and learning abilities or disabilities, learner interests, experience, personal goals and attitudes, learning preferences, learning styles, motivation, communication skills, computer literacy, previous experience, language preferences, receptiveness for other learning methods, etc (Alessi & Trollip, 2001; Anderson & Elloumi, 2004; Khan, 2005; Reeves, 1999). With this in mind I knew what aspects I had to address in my interviews with the subject-matter experts.

3.7.1 Previous e-readiness research and reports

I consulted literature on e-readiness, e.g Ifinedo's "Measuring Africa's e-readiness in the global networked economy" (2005), World Economic Forum's e-readiness report (2003), Paxton's "Seven systems determine an organisations's readiness for e-learning" (Business Wire, 2001), Piskurich's "Quicklist for readiness for online learning" (2003), the University of Georgia's student online readiness tool (SORT) (Board of Regents University of Georgia, 2003) to get an understanding of what I should be looking for when I needed to explore the readiness of warehouse workers (§ 2.10). I have identified six main categories or dimensions (theory codes) that have been listed by these authors and reports. I have identified them as the six main theory codes of e-readiness:

- experience with technology
- access to infrastructure
- attitudes, learning habits and individual differences

- organisation/business contributions and constraints
- origins of motivation
- cultural constraints and contributions (§ 2.10: Synthesis or e-readiness elements).

I now had two fundamental points of departure. The existing literature guided me to explore specified categories of readiness, while experts in the field of e-learning (Alessi & Trollip, 2001; Anderson & Elloumi, 2004; Khan, 2005; Mager, 1991; Merrill, 2002b; Reeves, 1999) emphasised that the characteristics of a target group needed to be understood before a specific learning strategy is imposed upon them. I realized that a learner's characteristics will either contribute or hamper his receptiveness, for example, access to technology. What I was not sure about, is what was generally accepted characteristics of e-readiness? I consulted with eight South African e-learning experts to learn from them what aspects they regard as important to demonstrate the capacity for e-learning. I wanted them to agree to the concepts of e-readiness, so that a basic pattern would indicate whether a learner is e-ready or not.

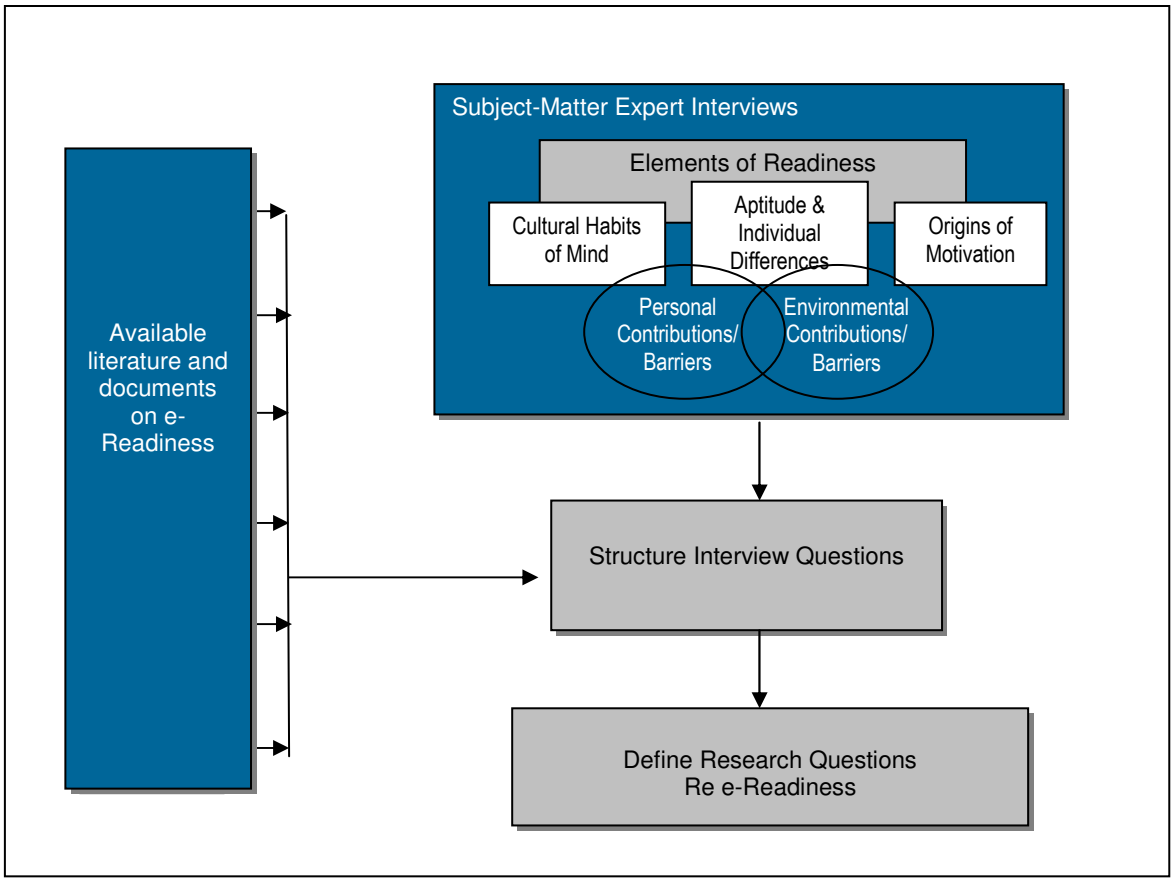


Figure 3.4 Identifying the categories of e-readiness

Figure 3.4 illustrates the methodology for phase 1. It illustrates the two fundamental points of departure that has been used during this research. Available documents and literature were consulted to get guidelines for my study. Subject-matter expert inputs provided further information on the aspects of e-readiness that I should explore.

3.7.2 Subject-matter experts

I identified South African subject-matter experts who have tertiary qualifications and experience in teaching and learning with computers and designing e-learning in the South African context. Three have completed their PhDs in computer assisted education (CAE) and four have Masters in CAE. All of them are involved in corporate training (Appendix 3.3 - List of subject-matter experts). Their theoretical and academic knowledge about the subject (e-learning), and their experience regarding design and development of training for learners in corporate organisations in South Africa, prompted me to draw from their expertise. The group of experts has been selected due to their expertise and experience of implementing computer-based training at various levels of the corporate sector. They also:

- knew what e-learning was and had experience of this learning strategy
- were knowledgeable and experienced instructional designers who often needed to do needs analyses to determine the viability of a planned training intervention.

I used their guidance and experience to assist me in identifying the most important aspects of e-readiness.

My first interview did not yield the rich information I anticipated. I was naïvely hoping that the interview would reveal an image with an e-ready employee from the developing communities in South Africa. My questions were more structured and as far as I could detect, a little forced. I became aware of the fact that I had preconceived ideas, and wanted to enforce issues. The interview was mostly an account of the participants' encounters with learners. If I had hoped to get a detailed description of what an e-ready student resembled, I failed. But later, when doing the transcripts, I found that I had been on the right track. Interesting comments regarding learner cultures, e.g. to speak to supervisors and managers before going to their subordinates, were revealed. Learner attributes emerged that may not be found or discussed in any of the existing e-readiness assessment tools, but as far as the warehouse workers were concerned, it was of utmost importance.

This first interview set the tone for most of my later interviews. I decided to cover the six theory codes (categories) in the interviews, by just basically referring to them, as prompts to the experts. I thought that I would get more information by respecting their expertise and allowed them to speak freely. I did not want to come across as an interrogator, and decided to sit back to enjoy the ride. I got my rewards.

3.7.3 The Delphi technique

I conducted interviews with the SMEs between April and September 2005, and by means of the Delphi technique, I eventually identified a list of elements of e-readiness seen in a South African context. The Delphi technique has been developed to achieve consensus among a selected group of experts (Stuter, 2002). Cline (2000) described the Delphi technique as a method to obtain consensus on subjective matters where many different opinions may exist. Dunham (1998) portrayed the Delphi technique as a useful tool to facilitate judgements and decision making. He added that e-mail

communication can be effectively used to obtain information. It suited my plans, because the SMEs were not easy to reach, and once I had the initial interviews with them, we communicated telephonically or via e-mail.

I conducted open, loosely structured interviews with the identified group (Appendix 3.8 – Structure of SME interviews). I wanted to learn how the experts experienced the implementation of online learning in their respective environments. I structured the interviews around the theory codes (§ 3.7.1) of e-readiness, and prompted aspects like age, educational level, cultural background, physical and learning abilities or disabilities, learner interests, experience, personal goals and attitudes, learning preferences, learning styles, motivation, communication skills, computer literacy, previous experience, language preferences, receptiveness for other learning methods, etc. Although the basic questions included literacy, culture, learning habits and attitudes, the discussion was to encourage the expert to describe his/her experiences re the implementation of online learning. The SMEs were most obliging to discuss their experiences in establishing learning cultures in their respective working environments. Being qualified educators in the field, I found that they tended to be prescriptive in their narrations, and often prescribed the ideal or preferred situations that "should be happening or in place".

The purpose of these interviews was to obtain a South African perspective of e-readiness, from each of the participants' point of view. I recorded the conversations and transcribed them on Atlas.ti™, a Computer Assisted Qualitative Data Analysis Software (CAQDAS) and by means of an inductive-deductive data-analysis approach identified a list of conceptual codes of e-readiness to be considered when e-learning is planned (Appendix 3.9 – Hermeneutic Unit 1: Elements of e-Readiness).

I categorised the identified readiness list according to Reeves' (1999) three input areas: cultural habits, individual differences and origins of motivation to create a structure to work from. While I worked through these elements, it emerged that there were elements of readiness that are controllable by the individual, while others are determined by the environment. The latter referred to all the factors where the workers were dependent on the business culture as contributors or constraints of their e-readiness. For example, where the business needs to provide the infrastructure, it will be regarded as an environment attribute, while the habit to learn, is regarded as a personal attribute.

The list of e-readiness elements have been categorised according to Reeves' model for developing learning for the www. During the interviews, it was argued that some attributes are the responsibility of and should be provided by the environment. This environment can be the workplace, or it can be at home, or the individual him/herself that needs to accept responsibility for learning to happen. For instance the "urgency and priority to learn" is an intrinsic motivator from a learners' point of view, but when the environment takes the responsibility, it refers to the presence of a solid and sound learning culture in the business. Many examples exist in these listed codes. Table 3.4 illustrates the three input codes as defined by Reeves (1999) with e-readiness codes that emerged from the SME interviews.

Table 3.4 Elements of e-readiness emerged from SME interviews

Cultural Habits of Mind	Learner culture: Literacy, intrinsic motivation & drive to develop self, family support, home infrastructure, access to technology, family basic needs, learning habits, educational levels, confidence to take initiative, taking responsibility, urgency and priority to learn, language, communication, social support, life style and habits, sharing of responsibilities; Workplace culture: Learning oriented, supportive, adapt to cultural differences, language barriers, provision of opportunity & challenges, encourage creativity and participation, time and budget provision for training, managerial styles, career planning and PDP's, differentiated training strategies (blended), ground rules for learning, shared responsibility.
Attitude and Individual Differences	Learner attributes: Literacy, intrinsic motivation, skills and competence, ability to adapt, anxiety, confidence, apply acquired information, team work, communicate to achieve objectives, learning styles, understand instruction & language, sense of achievement, urgency to develop self, response to ground rules, aspirations and intrinsic urgency to develop; External attributes: Managerial styles, training strategy, format of learning material, career options, Infrastructure and access to technology, learning content and presentation, training and learning management.
Origins of Motivation	Learner: Access & literacy, intrinsic motivation, career focus, relevancy, clarity of objectives, culture, personal development plan (focus), feedback and support, orientation, extrinsic rewards and recognition, locus of control, ground rules for learning, work outputs benefit business, managers share responsibility; Environment: Access & infrastructure, workplace opportunity & challenges, career options, encourage creativity and participation, feedback and support, different training strategies & guidance, facilitator communication, support and feedback, differentiated learning content and presentation, legislative issues – "Growth Charter".

Examples under cultural habits of mind include: family support under learner culture, while aspects like "provision of opportunity and challenges" are the responsibility of the organisation. Attitude and individual differences include aspects like anxiety and confidence from a personal point of view, and managerial guidance is an example of an aspect related to business culture. Motivational aspects like access are supported both by individuals and the organisation.

3.7.4 Rate the importance of identified elements of e-readiness

I then drew up a rating list by identifying the elements that had the highest frequency as coded in Atlas.ti™). I then listed the elements according to Reeves' culture, individual differences and origins of motivation respectively. Personal and environment influences have also been identified. Experts were asked to rate the importance of each of these concepts as they personally experience it. I regarded all the elements to be important, but I needed to identify the most critical of them. The SMEs were asked to rate from "Neutral" – 1, to "Most important" – 5 (Appendix 3.10: Rating of e-readiness aspects). These lists were e-mailed to the experts with the request to rate each readiness factor. All

of the lists were sent with the request to circulate these among their colleagues. All eight of the SMEs sent their evaluations, and I have received two additional ratings from other colleagues for a total of ten responses.

The feedback from the SMEs were combined, analysed and culminated in a list of ninety-nine conceptual codes (my version of identified aspects) of e-readiness. I used the rated aspects of readiness to prepare and structure the interviews with and observations of the warehouse managers, supervisors and workers. I used it as a guide to explore and understand the material I encountered in my interactions with the participants.

To summarize phase one: earlier reports on e-readiness and literature on target group analysis, guided my interviews with SMEs and to eventually determine categories of capabilities to have in an e-ready community. I was now able to focus on exploring specific attributes during my interviews and observations of warehouse workers in phases two and three.

3.8 Phase 2 Interviews and observations with warehouse workers

Phase one provided me with a list of e-readiness categories to explore during the interviews and observations. Phase two included three different data collection strategies:

- Questionnaires: biographic and other relevant data
- Interviews with warehouse workers
- Observations of warehouse workers:
    - ABET observations
    - Operational (main frame) observations
    - Tutorial observations.

To analyse the data collected from the warehouse workers and their managers, I created a second hermeneutic unit (HU) with Atlas.ti™, “e-Readiness of warehouse workers”. This HU constituted the interviews with experts, warehouse workers, managers and observations of the warehouse workers. I initially created a total of 336 codes but managed to combine and eliminate some to end up with a total of 208 codes. These codes were then synthesized to a list of twenty-six concepts or theory codes of e-readiness. To limit problems with reliability and validity I used thesauruses and have taken the context into consideration where my judgment was called upon (Busch *et al*., 1997). Figure 3.5 illustrates the data collection strategies with the warehouse workers. It also refers to the literature and SME inputs from which the interviews have been structured.

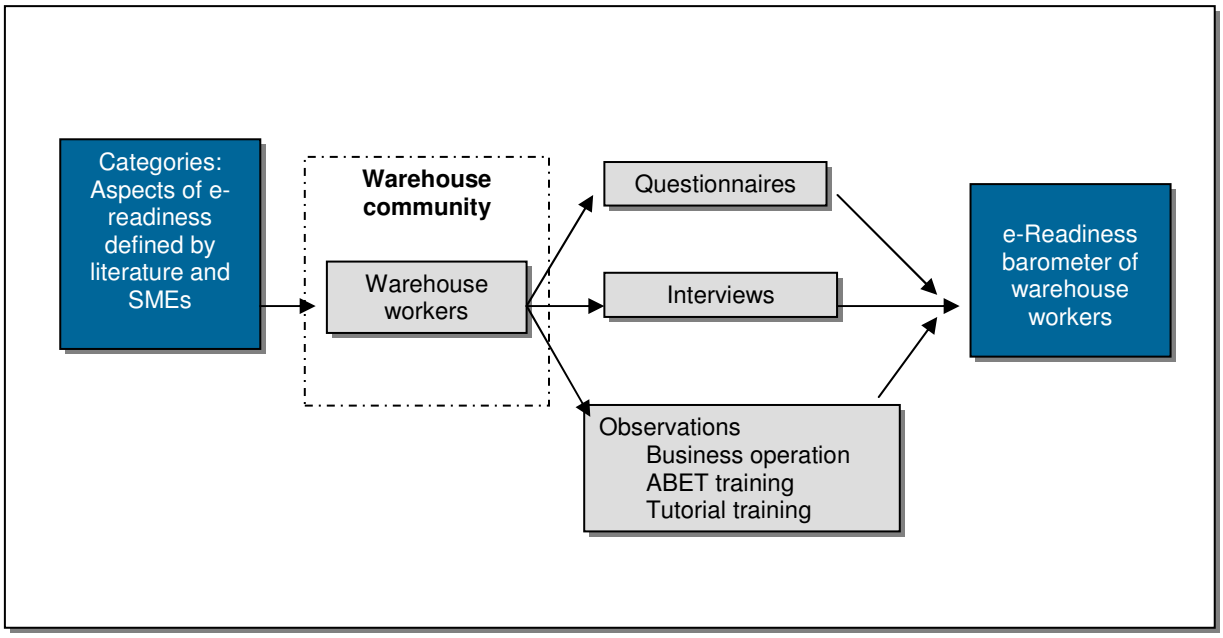


Figure 3.5 Collecting data from the warehouse workers

3.8.1 Utilising a questionnaires to obtain background information

Qualitative research depends mostly on interviews and observation to obtain rich and loaded data. Questionnaires are more related to quantitative research (Cohen *et al.*, 2002; McMillan & Schumacher, 2001; Merriam, 1998). I used a questionnaire in my research to learn more about my unit of analysis, merely to substantiate whether there were grounds for this research to be conducted. I did not generate any numeric data neither did I use the questionnaires to collect data to be analysed, compared or measured.

I conducted a questionnaire (Appendix 3.4) to learn the background of the target group and to explore the use of computers by the warehouse workers. I ran this same questionnaire three times with minor adjustments. The first questionnaire was done during August and September 2004 when I visited the DC's for work-related activities. The second time I ran the questionnaire was during the interview phase. After the first six interviews with warehouse workers, I decided to make the participants complete the questionnaire before conducting the interview. I used the information on the questionnaires to verify some of the data I received during the interviews. I included as many participants as possible to get the basic background of a warehouse worker. An updated list of questionnaires was given to a few participants after I had obtained more information regarding the attitude and relationship of warehouse workers to technology.

The purpose of the questionnaire was to obtain information on the following main aspects:

- Distribution centre and experience in years
- Biographical data
- Access to computers and networks
- Skill, experience and how (and if) computers are used.

The following categories were added with the second and third questionnaires:

- Use of other technology, e.g. cell phone
- Career plan information (Appendix 3.5).

Biographic information of the warehouse workers

The questionnaire was given to one hundred warehouse workers from all the distribution centres (DC) in SA. Sixty eight of the questionnaires were returned. The warehouse workers were well represented across the South African warehouse workers with six questionnaires returned from each of the regional DCs, while more than forty five responses had been received from Linbro Park, the headquarters in Johannesburg. Ages ranged from between eighteen to older than forty-six, with the largest sector being older than thirty-six years old. More than two thirds of the participants were male and the racial distribution was a fair reflection of the different races in South Africa. The educational levels of the workers are an important indicator for this research in that it may reflect their potential and yield some information on the current e-readiness level they may find themselves on (Appendix 3.4).

The educational levels as it emerged from the questionnaires are illustrated in Table 3.5.

Table 3.5 Educational levels of warehouse workers that completed the questionnaire

Education level	
No formal school education	1
Grade 5 or less	1
Grade 6 – Primary school	3
Grade 7 – Primary school	2
Grade 8 – Secondary school	5
Grade 9 – Secondary school	5
Diploma, but not Std 8	1
Grade 10 – Secondary school	9
Grade11 – Secondary school	12
Diploma, but not Matric.	0
Grade 12 – Matric	25
Post-Matric Diploma	2
University Degree	2

The basic reason for this questionnaire was to explore if the workers were exposed to technology, and to learn whether they used the computers. I had to know if they were aware of the potential of the computers. I already explained in chapter one that the SCM industry is dependent on technology, and I was sure that they had to be aware of computers, but what I needed to determine was whether computers caused anxiety and negative attitudes. What the questionnaire pointed out to me was that almost all of them indicated that they used the computer in their basic line of work. This gave me a valid foundation to from which to explore e-readiness. Two of the questions referred to internet use, and their reactions to these questions guided me to recognise their basic knowledge of the internet and relating technology. It made the interviews more meaningful, and provided me with relevant, meaningful knowledge to use during the interviews.

3.8.2 Interviews

Interviews are one of the major and most common forms of data collection for qualitative research (Erickson, 1986; Merriam, 1998; Radnor, 2001). The main purpose is to explore interesting and relevant aspects related to the research topic or to understand how individuals make sense of their worlds. Interviews are recommended to ensure that the relevant phenomenon is addressed and to explore those things we can not directly observe such as feelings, thoughts and intentions (Erickson, 1986; McMillan & Schumacher, 2001; Merriam, 1998).

The three basic structures for interviews are summarized in Table 3.6.

Table 3.6 Interview structure types

Highly Structured/Standardised	Semi-structured	Unstructured/Informal
Wording of questions is predetermined	Mix of more – and less - structured questions	Open-ended questions
Order of questions is predetermined		Flexible, exploratory
Oral form of survey		More like a conversation

(Merriam, 1998 p.73)

The preferred choice of interview for this research was semi-structured, to probe and understand on the cultural readiness, habits and attitudes, and origins of motivation during the interviews. I had structured the interviews loosely around Reeves' three identified input categories. This "loose structure" is also referred to as an "interview guide" (McMillan & Schumacher, 2001; Merriam, 1998). Open conversation was promoted during my interviews, especially to establish rapport between interviewer and interviewee (Erickson, 1986). The interview structure is available in Appendix 3.11 – Structure of interviews with warehouse workers.

The interviews with the warehouse workers were used to explore their views and experiences with regard to learning with computers, and the possibility to use computers to take responsibility for their own learning. I did not follow a pre-planned strategy, but allowed the atmosphere, signs of respondent anxiety and responses to guide the conversations. I obtained a general idea of the participants' knowledge of the subject, and tried to focus on their demonstrated readiness as it emerged during the interview.

I recorded all the interviews and transcribed them to ensure comprehensiveness and to provide reliability. Although sources advocate that field notes be taken during the interviews, I minimized this, due to the sensitivity of the unit of analysis and to avoid a perception that they are being checked. I tried to promote an open, warm, conversational atmosphere to imply empathy and understanding. I did this to "convey acceptance to encourage elaboration of subtle and valid data" (McMillan & Schumacher, 2001 p. 449). I realized that they may have felt threatened and focused on creating an atmosphere of trust.

The first few interviews were awkward in that the participants felt that they had been singled out for a specific reason. Fortunately, I was involved in the implementation of a new business initiative known

as “voice picking” in the warehouse. I postponed all the interviews until this project had been completed. The project required me to work closely with the warehouse workers, and I won their trust and friendship during this time. It took almost a month before I started interviewing again, this time with a much improved rapport between interviewer and participants.

All the interviews have been stored as my second hermeneutic unit (HU) on Atlas.ti™ (Appendix 3.12 Hermeneutic Unit 2 e-Readiness of warehouse workers).

Disadvantages

I admit that the transcriptions were very time consuming and that interviews usually are one-sided accounts from the participants. Merriam (1998) warns that information may be exaggerated or distorted, therefore I followed recommendations by conducting several interviews and to substantiate specific opinions with observations or documentation. Other disadvantages of interviews are that interviewers may be biased and ask “leading” questions (McMillan & Schumacher, 2001). The participants did not know much about the concept e-learning, and I found that in some cases I had asked some leading questions to explain. The responses that elicited yes/no were ignored during the analysis. I tried to focus on the research problem to avoid invalid information. I was more interested in their skill and competency of e-learning. Table 3.7 illustrates where interviews were conducted.

Table 3.7 Interviews conducted

Distribution centre	No of participants	Managers/supervisor
Johannesburg	7	5
Cape Town	2	No interviews
Bloemfontein	1	1
Durban	No interviews	No interviews

Time, finances and distance prevented more interviews – especially in the regional DCs. I conducted interviews and observations where possible, but unfortunately interviews in Durban and Port Elizabeth were not possible due to economic reasons. But by this time I had found that the interviews were almost all following the same pattern, and I decided that it would suffice with the interviews and observations I had thus far.

3.8.3 Observations

Observational data presents the observer with first-hand knowledge of the unit of analysis in action. Skilled observers are able to pick up nuances, body language, non-verbal communication, and the results of the encounter being observed (Erickson, 1986; Merriam, 1998).

The literature describes four basic roles of an observer: the complete observer, observer as participant, participant as observer and complete participant (Cohen *et al.*, 2002; Merriam, 1998; Radnor, 2001). I have adopted the role as observer participant, due to my responsibility within our working environment. The observed group was aware that I was observing them during the execution

of their routine tasks. As facilitator with the responsibility to train and prepare the staff for business procedures, I am known to most of the staff, and they were more at ease, and I believe, more "natural" in their reactions during the observations, especially after the completion of the voice-pick project. I had the benefit that I knew most of the warehouse procedures, and had access to most of the warehouse workers. The procedures were familiar to me and consequently enabled me to focus on their demonstrated skills, and their reactions to technology.

Cohen *et al*. added that observations are often combined with other forms of data collection, and "together, elicit the participants' definitions of the situation and their organizing constructs in accounting for situations and behaviour" (2002 p. 311). This is described as "immersed" in the particular context which will give the researcher the ability to generate "thick descriptions" to understand and interpret the target group's construction of their reality.

To enhance the validity of my observations, I opted to observe the warehouse workers while they were executing four different activities. "The greater the number of observations, the greater the reliability of the data might be" (Cohen *et al*., 2002 p. 314). I have observed how the warehouse workers conducted ABET training on computers, secondly I observed them during their normal operational functions when using and working with mainframe systems, thirdly I selected two individuals' to explore and discuss their behaviour, emotions and expectations during a CBT lesson. The last observation was of a single worker in Bloemfontein completing a specific business operation. I also asked this respondent to show me his e-mail skills.

Table 3.8 Number and types of observations conducted

Distribution centre	No of participants observed	Activity
Linbro Park (Johannesburg)	5	Mainframe activities
Linbro Park	4	ABET operation
Linbro Park	2	Tutorial operation
Bloemfontein	1	Mainframe and e-mail procedures

I observed the warehouse workers during four different activities.

ABET observations

A selected group of warehouse workers were involved with Adult Basic Education (ABET) programme initiated by the Human Resources department. This ABET programme is presented by means of computer tutorials and learners are left on their own to complete it at specific times during the week, usually in the mornings. This gave me an opportunity to observe some of the warehouse workers while they were busy with e-learning. I conducted three observations on different mornings to observe their basic reactions and body language while they were busy with learning. I did not interact with them at all during these sessions (Appendix 3.12).

The HR training department of IHD has invested in the Adult Basic Education and Training 5.0 (ABET) program from Media-works to train the staff with limited education. The application had been loaded

onto a network server and allowed the enrolled employees to sign on, and to do basic language and numerical exercises. The selected group gets a specified time per day - usually between seven and nine am - three times a week, to go to the IS training room and attend the ABET classes. A group of ten students are currently enrolled for ABET training. The ABET training consists of a series of CBT lessons. Students complete these lessons entirely on their own, and no instructor is present during these sessions. The learner logs on with his name on a preloaded list. Once logged on, a list of courses opens. It seemed that each user's courses have been preloaded against his/her name. The ABET courses gave me an opportunity to observe the unit of analysis' behaviour when they had to do training in their "own" time and without the presence of a facilitator.

Mainframe system observations

My second round of observations was in the warehouse, to observe some of the warehouse workers conducting their everyday responsibilities on the mainframe system. I deliberately decided to include at least one observation of each main business operation area of the warehouse. I observed six of the warehouse workers while performing their tasks on the mainframe system. The activities I observed were: two pickers picking stock, one male performing receiving duties, a female employee during the manifesting (packing) of stock, and another doing stock replenishments. Their duties required them to use the mainframe system to manage and guide the procedures. I had also observed a single female using the latest voice-picking technology to pick stock by means of audio technology (Appendix 3.13 – observation of voice-pick procedure).

I used a Panasonic digital recorder to capture one minute video clips of the participants while completing their routines. The activities were later described in detail including my reflections and observations. I wrote my observations down and added it to the hermeneutic unit "e-readiness of warehouse workers" (Appendix 3.12).

Tutorial observations

Enterprise Business Management Systems (EBMS) is an interactive program accessible from the IHD Intranet and illustrates the business processes with flowcharts, and is available to all employees of the company. EBMS did not require developed computer skills, and most information can be accessed by clicking the mouse. It is highly interactive and enables the user to learn more about his business areas, as well as related processes up- and downstream. No typing skills are needed, the most important computer skills seem to be the ability to identify interactive areas, click to drill down and to interpret the screens and information accurately. I developed a tutorial "Working and learning with EBMS" on Macromedia Captivate®.

The tutorial was relevant to all employees at IHD. I didn't know if the warehouse management communicated this to their staff and whether the application was known to the workers. The information on EBMS was specifically of value for staff-related questions regarding leave, benefits, etc. It was for this reason that a question regarding staff leave has also been included in the tutorial. The

rationale was that if staff knew how to find information on EBMS, they would bother others less with unnecessary queries while having access to such information if they only knew how.

I anticipated that the warehouse workers may find it difficult at first to identify the business areas accurately, when confronted with the flowcharts. They work in very practical areas with logical and physical flow, while EBMS presented the business area in a very theoretical way. I expected them to be confused at first. I simulated the normal actions to open EBMS and the drilling down activities to find information on selected business areas. I expected the warehouse workers to initially struggle to find their way with the tutorial, unless given a thorough briefing. I knew that experienced web browsers and e-warehouse workers may not find any problems with this.

For the requirements of my research, I knew I had to adapt to the level of my target group, the warehouse worker. I did not know how informed they were regarding EBMS, or if they had access to the intranet to open this facility. I decided to develop and author this tutorial only when I had finished most of the interviews. This proved to be a wise decision, for I learnt that very few of the workers had ever worked or browsed on the intranet. The tutorial is titled: *Working and Learning with EBMS* (Appendix 3:14).

Tutorial design and navigation

The screen layout consists of three main areas. The content area which is the main focus area (displayed information), the navigation instructions area and the text area box that explains or informs the user of the content he sees. The navigation instructions, with “next” and “back” buttons are situated in a triangle at the right hand bottom of the screen. The navigation instructions are intended to stand out from the rest of the information, to provide new users with the quick assurance that they are in control. I reasoned that the sooner the users learn that they are in control and have the option to determine their destiny, the easier they will concentrate on the content to be learned. The text boxes in shades of light yellow, contrast with the main background information. It can easily be distinguished from the rest of the information displayed on the screen. The purpose is to explain and provide information regarding the displayed screen. Figure 3.6 illustrates the three main information areas of the tutorial.

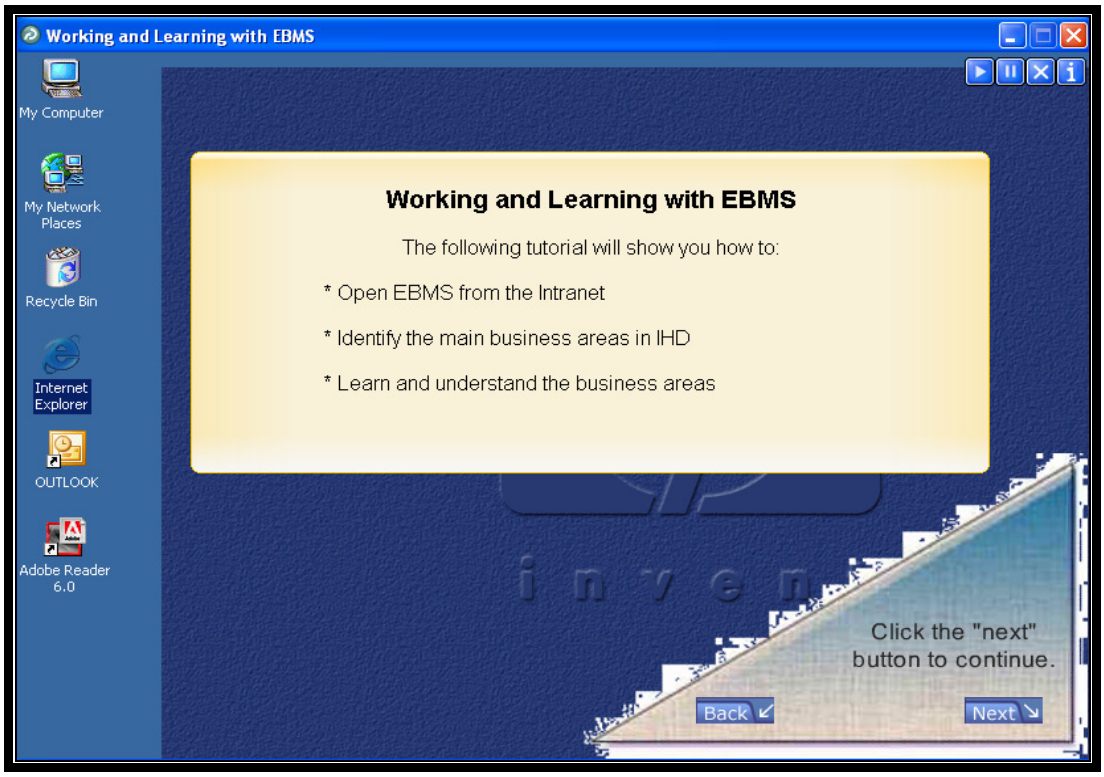


Figure 3.6 Screen lay-out of the EBMS tutorial with information and navigation areas

I have selected two warehouse workers to complete the tutorial while I observed their actions and interviewed them. Both were selected by their supervisor. Although the two participants were male and female, the aim of the research was to focus on their skill and perception of e-learning, therefore no conclusions were made to their differences or similarities with regard to their gender. The observations were made in my office, away from the warehouse activities. I recorded their actions with my digital video camera, and interviewed them while executing the tutorial. For both participants, several one minute videos were recorded and transcribed (Appendices 5.16 to 5.44).

Disadvantages of observations

The observer can be biased and observe only what he wants to. Gans in Merriam (1998 p. 103) mentions “a tendency to over identify with the people to be studied”. Another disadvantage may be that the observer’s presence might change the behaviour of the participants (Merriam, 1998). I have found that I have been subjected to both these disadvantages, hence my decision to observe different activities, people and in different places. I also tried to identify and eliminate this over identification and conforming behaviour as far as possible by focusing on the displayed skill levels of the participants.

3.9 Phase 3 Interviews with warehouse managers and supervisors

Lastly I conducted interviews with managers and supervisors of the warehouse workers. Table 3.3 indicates that six managers and supervisors were interviewed: one supervisor and two warehouse

managers, a manager of one of the regional DCs, the HR training manager and the network manager of the information systems department. I included the HR training manager to explore his understanding of training and his perception of the warehouse workers' e-readiness. The interview with the information services network manager aimed to probe the technical readiness of and access to technology by the employees in the warehouse.

Again the interviews were semi-structured, to allow the participants some kind of freedom and to eliminate a feeling of "being interrogated". Especially since they were responsible for the career plans of the staff reporting to them, and may experience a feeling that they are under scrutiny. I needed them to speak freely regarding their views and perceptions of learning with technology.

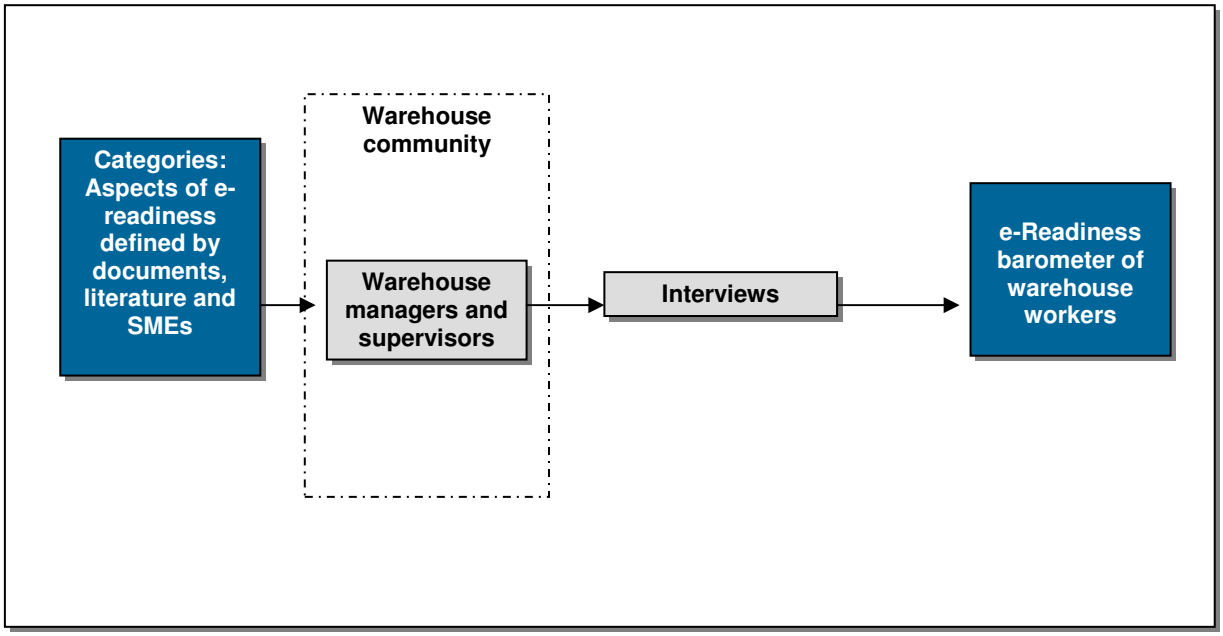


Figure 3.7 Data Collection Phase 3 Warehouse managers and supervisors

Figure 3.7 illustrates the activities of phase three. It was aimed to add to the data collected during phase two and to present another angle of the perceived e-readiness of warehouse workers. I wanted to probe and explore the guidance and direction the warehouse workers received with regard to their e-readiness.

3.9.1 Making use of Atlas.ti™ to prepare the data analysis

When all the interviews with the warehouse workers and managers were completed, I transcribed them and saved them on the CAQDAS Atlas.ti™ as HU "e-readiness of warehouse workers" (Appendix 3.12). The interviews and observations culminated in one integrated dataset and consisted of three primary documents. Primary document one (P1) refers to the input received from the SMEs, P2 is the warehouse worker transcriptions and P3 is the manager interview transcriptions. This HU became my main source of data to be analysed for the e-readiness of the warehouse workers.

Atlas.ti™ references indicate where these comments can be found in the hermeneutic units. I used the Atlas numbering code to identify quotes from the primary documents. A quote can be identified as 3:33 (195:200), which means it is quoted from primary document three, quotation number thirty three and ranges from lines 195 to 200 in the specified primary document. The comments made by participants during interviews and observations are quoted verbatim in italics. Afrikaans quotations are translated, with the original quotes added as footnotes.

I eventually made use of two HUs on Atlas.ti™. The first HU *Elements of e-Readiness* (Appendix 3.9) was generated from the SME interviews and used to determine the main categories of e-readiness as described in chapter 4. The second HU *e-Readiness of Warehouse Workers* (Appendix 3.12), was used to analyse the questionnaires, interviews and observations of the SMEs, warehouse workers and their managers as will be described in chapter 5.

3.9.2 Defining theory codes and conceptual codes of e-readiness

I have identified six categories or dimensions of e-readiness from the literature. For the requirements of my study I refer to these as *theory codes*, to make a clear distinction of the literature-related dimensions of e-readiness. These six theory codes were instrumental in formulating my research questions during the data analysis.

The aspects of e-readiness that emerged from my data analysis were referred to as *conceptual codes of e-readiness* of the warehouse workers. I used Reeves' three inputs to structure the SME information and eventually identified ninety-nine conceptual codes of e-readiness. These conceptual codes were rated by the SMEs and together with the six theory codes obtained from the literature culminated in the six sub-questions to guide and structure the data analysis as described in chapter five. The analysis of the six questions eventually resulted in twenty conceptual codes of e-readiness, and was then related to the theory codes to generate the seven main findings of this study. Where I used deductive reasoning during the literature review to generate the categories of readiness, I used inductive reasoning to generate an e-readiness barometer of warehouse workers. Patterns and trends emerged during the data analysis and enabled me to define an opinion of the e-readiness of the warehouse workers. I used the information thus gained to determine the e-readiness of the warehouse workers.

The data I used did not represent any statistical inferences, nor did I want to reach any conclusions with regard to the number of occurrences of a specific code. I merely related my interpretation of the data and explored the importance of specified aspects of e-readiness, and how the warehouse workers and their managers responded to specified theory codes.

3.10 Validity

In qualitative research, validity refers to the depth of the investigation, the angles of approach, the data gathered, analyses and further investigation, the extent of crystallisation, the position of the researcher during the research, and the objectivity of the report.

Cohen *et al.* (2002) used principles from Lincoln and Guba (1985), Bogdan and Biklen (1992), Giddens (1979), Lave and Kvale (1995), and Geertz (1974) to provide a summary of naturalist research. The unit of analysis is investigated in its natural settings in a clearly defined context. The researcher finds him/herself totally absorbed and part of the social situation of the target group. They agree that the researcher, who is in turn to be interpreted by him/herself at a later stage, is interpreting the observed situation from a holist point of view. An inductive data analysis follows and reporting must always be provided from the participants' point of view (Cohen *et al.*, 2002).

Maxwell (in Cohen *et al.*, 2002) explains validity in qualitative research by means of five types of validity. *Descriptive validity* that ensures facts are true and not distorted, *interpretive validity* to ensure that the investigator has the ability to understand the situation accurately, and *theoretical validity* ensures the investigator has the ability to reflect the true meaning of events. *Generalisability* refers to the possibility to make the researched situation applicable to other environments, and lastly, *evaluative validity* that takes a single unit of research and subjects it to critical evaluation.

Validity is further obtained by classifying the *internal* and *external validity* of the research. Cohen *et al.* draw from LeComte and Preissle (1993) to identify several kinds of internal validity. Among these are the authenticity cogency of the data and soundness of the research design. Also included are aspects like credibility, auditability, dependability and confirmability of the data (Cohen *et al.*, 2002). This can be achieved by being balanced in the representation of results, by being authentic in the approach and succeeding in making the unknown known. New knowledge should emerge from this data and should give rise to new actions to be undertaken (Cohen *et al.*, 2002). Merriam (1998) classifies six strategies to ensure internal validity. These are *crystallisation*, that means that data obtained from several investigators, sources, methods should be used to compare findings with one another. Secondly, *member checks*, where the data and findings is verified by other participants. *Long-term observation* to gather data over an extended period to increase validity, *peer examination* refers to getting the opinions of colleagues and co-workers. Lastly, *researcher bias* should be cleared by clarifying the researchers' assumptions, views and theoretical orientation before starting the research (Merriam, 1998 p. 205). Crystallisation was used to validate data for this research.

This research is crystallised by investigating several workers from five different DCs in South Africa. Peer participants will assist to confirm or reject findings. Crystallisation is obtained by conducting interviews with participants from all the five DCs in South Africa, by conducting different observations during the execution of three different activities, and to compare findings with one another (Appendix

3.15). External validity refers to the applicability of the results and research findings to a wider environment, or generalising them for other situations. The depth and essence of the research makes it “comparable and transferable” to other situations (Cohen *et al.*, 2002 p. 109).

In my research, the construct "e-readiness" is carefully defined, so that a clear and exact understanding is formed before any interviews or observations were undertaken. This is one of the reasons I decided to conduct interviews with the subject matter experts first, to get a clear understanding of what an “e-ready” learner must be. The position the researcher takes, the ability to ignore personal biases, and above all, the ability to understand the participants’ views, attitudes, habits and actions within the context of the researched situation, relates directly to validity of the research.

3.11 Reliability

Reliability in qualitative research is not as clear as in quantitative research (Cohen *et al.*, 2002; Merriam, 1998) “In qualitative research reliability includes fidelity to real life, context- and situation-specifity, authenticity, comprehensiveness, detail, honesty, depth of response and meaningfulness to the participants” (Cohen *et al.*, 2002 p. 120). Replication in qualitative research is not possible as a repeat of the same research will not yield the same results because “human nature is never static” (Merriam, 1998 p. 205).

Reliability in interviews is achieved by minimising the bias of the interviewer as far as possible. The reliability of observations is also threatened if the observer is ignorant of all factors, such as cultural habits. Another aspect that may affect reliability in observations is the fact that “different behaviours may occur”, or the observer may become too involved to see the behaviour clearly (Cohen *et al.*, 2002 p. 129). Merriam (1998 p. 206) describes reliability for qualitative studies as “results [which] are consistent with the data collected”, and recommends the following techniques:

- researchers should be clear and unambiguous regarding their positions and theories for the research
- explain the sample selection and the social context of the data collection
- crystallize the results using multiple methods of data collection and analysis
- present an audit trail by describing clear and specific explanations of how data is collected
- categories derived, and how decisions were made (p. 207).

The concept readiness implies a condition which is not easily measurable in terms of numbers, and it implies a subjectivity that makes the risk very high. I am aware of these risks and aim to minimize the risk by the data collection strategy illustrated in Figure 3.8. It summarizes the data collection strategy where it started from the literature, drew information from the SMEs to guide the interviews with warehouse workers. Questionnaires and different types of observations were used to collect data. The unit of analysis included warehouse workers, managers and supervisors. These different approaches and collected perceptions of the warehouse workers were used to enhance the validity and reliability of this research.

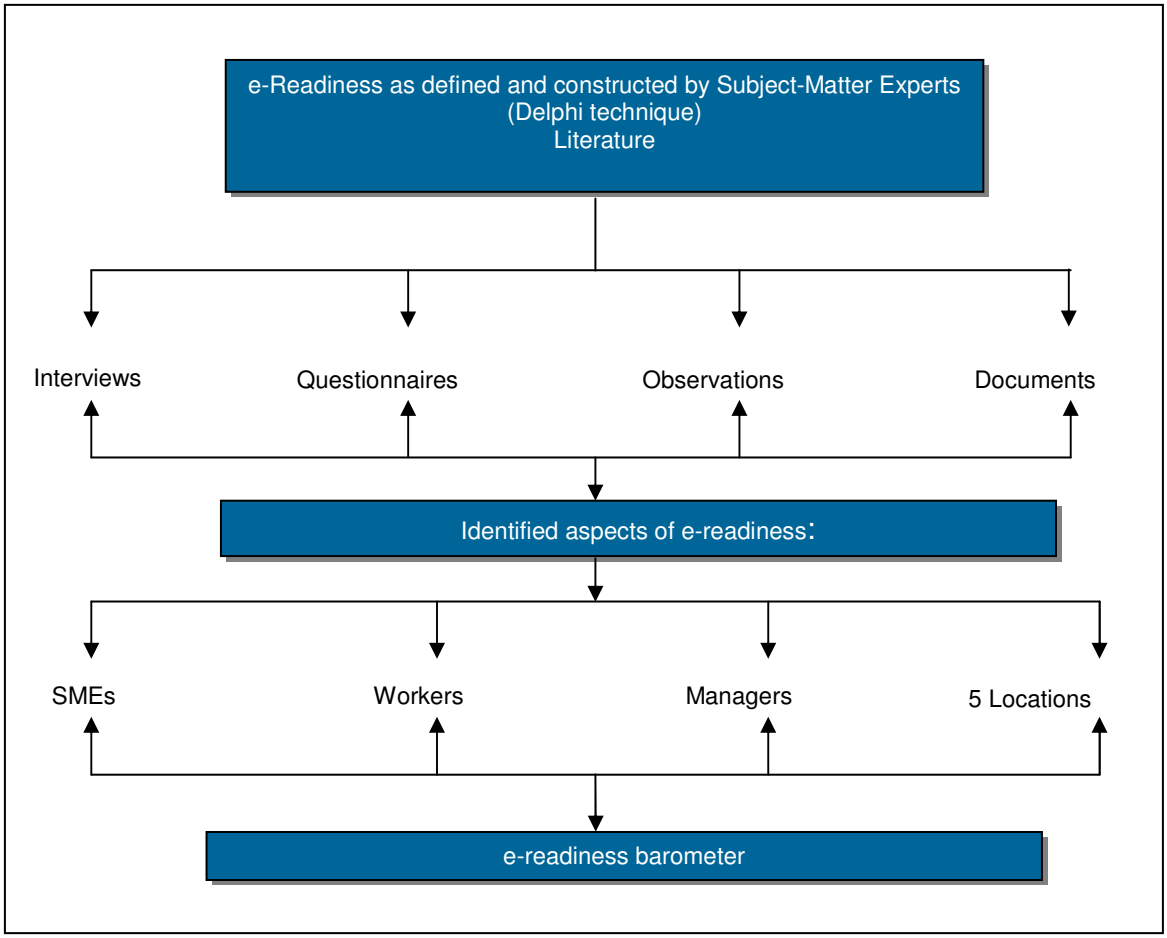


Figure 3.8 Reliability and validity ensured by several collection strategies

3.12 Data-analysis

Content analysis is believed to be a suitable data-analysis technique for qualitative case studies: "in one sense, all qualitative data analysis is content analysis in that it is the *content* of interviews, field notes, and documents that is analyzed" (Merriam, 1998 p. 160). Merriam states "Although categories and 'variables' initially guide the study, others are allowed and expected to emerge throughout the study" (1998 p. 160). Specific words, concepts, implications of meanings have been identified in the form of codes, and then categorized to describe concepts of e-readiness (Busch *et al.*, 1997). Busch listed the possibilities for content analysis:

- identify the intentions, focus or communication trends of an individual, group or institution
- describe attitudinal and behavioural responses to communications
- describe psychological or emotional state of persons or groups.

Content analysis allows me to explore and possibly reveal the warehouse workers' "... focus, attitudes, habits, motivations and definitely their psychological or emotional states" (Busch *et al.*, 1997).

The documents, questionnaires on the biographical data, interviews with the subject-matter experts, interviews and observations of the warehouse staff yielded a large number of data. By storing them as a "case record" it organised the large number of case data into "a comprehensive primary resource package" (Merriam, 1998 p. 194). My adopted interpretive approach enabled me to understand and report the views and culture of the target group (Ritchie & Lewis, 2003).

For me to make general statements about relationships among categories of data, I had to look for patterns. These patterns are the relationships that may exist between categories (Busch *et al.*, 1997; McMillan & Schumacher, 2001). I have used this "integrated dataset" to code all identifiable concepts on Atlas.ti™. I then used these to create categories of codes. Categories are seen "as ways to group, display and discuss data thematically such that comparisons between conceptual content can be made or further discussions be pursued" (Ritchie & Lewis, 2003 p. 205). Chapters 4 and 5 describe how the data had been analysed, coded, categorised to explore patterns. These patterns are directly related to my research questions.

Phase 1 of my data collection strategy comprised the identification of readiness categories by means of secondary and primary data. I had the initial challenge that e-readiness is a general concept and people may have different perceptions of such readiness. I had to generate a general consensus of what is meant by "e-readiness". I generated diagrams of the ratings received by the SMEs to ensure that the most important elements were addressed during this research. Phases two and three of my data-collection procedure have resulted in an integrated and single dataset on Atlas.ti™. This hermeneutic unit is labeled "e-Readiness of warehouse workers" (Appendix 3.12). All the interviews, observations and questionnaire data have been coded to assist me in categorizing the data in the conceptual codes of e-readiness as established during phase 1. Codes were generated for each item of text, to embody the central message of the selected text or word. They were not coded beforehand, to ensure the "emergence" of data from the target group's point of view. These rich descriptions resulted in 348 identified codes. These codes were then sorted, reduced and organized to eliminate duplication. I eventually ended with 208 codes. Atlas.ti™ was then used to identify relationships and to identify categories that may be grouped into the main categories of e-readiness elements. Or, as described by Ritchie and Lewis: "the construction and assignment of labels, the bringing together of similar material, the summarizing of original text all require an interpretation of what has been said or observed" (Ritchie & Lewis, 2003 p. 237).

I then referred to relational analysis to identify relations between the identified patterns (Busch *et al.*, 1997). Cognitive mapping was used to draw maps and to explore the emerging relationships between categories and patterns. "Maps of mental models are representations of interrelated concepts that reflect conscious or subconscious perceptions of reality, language is the key to understanding these models, and these models can be represented as networks" (Busch *et al.*, 1997). Reliability had to be ensured to make the coding valid. According to Busch (1997) reliability can be ensured by deciding on a set of rules when coding. To make sure that I used a set and a stable structure to code text, I

deliberately read only the words or concentrated on shorter paragraphs to establish the meaning. Although I knew the context of the communication, I tried to create a first rule by merely identifying the content of that specific word or paragraph. Atlas.ti™ assisted me to get a list of codes that implied single words first. The second time round I highlighted paragraphs, and coded them. Only when I had finished most of my coding, did I address the deeper meaning of the communication to code the concepts.

To achieve validity for this research, conclusions have only been drawn as they relate to the codes and identified categories. Questions were represented in the identified patterns. All findings are discussed and explained from the patterns and their related categories and codes as they emerged.

3.13 Ethical issues

"Qualitative researchers are guests in the private spaces of the world. Their manners should be good and their code of ethics strict" according to Stake (1994) (in Merriam, 1998 p. 214). Interviewing can make participants feel exposed and might threaten their privacy, or even give them a sense of false importance that their opinions are valued in certain circumstances. All interviewees have to be informed of the purpose of the research and their consent should be given before any interview is conducted (Cohen *et al.*, 2002). I have received informed consent from the supervisors and management by means of a signed document that permitted me to conduct research in the warehouse with selected workers (Appendix 1.1 - Permissions to conduct research with warehouse workers at IHD).

I have also explained at the beginning of each interview that the interview was voluntary and that the participants may withdraw whenever they wanted. I tried to avoid suspicion and wariness at all costs, therefore did I not make them sign any physical document before starting the interviews. I believed that such a signing may have influenced their trust in me, and that they would be wary of what they said, especially regarding the guidance and support they received. I gave them the option to withdraw immediately, or at any stage of the interviews or observations. I have also promised them anonymity. I was also constantly aware of the fact that the interviewer's main purpose was to understand, and not to pass judgment or evaluate information at any stage (Merriam, 1998). In all cases, the participants agreed, and participated freely.

Observations pose ethical questions in that the observer needs to be inconspicuous, yet has to have permission to observe. A dilemma may arise in that the observer may be compelled to intervene. The observer should be very aware that his/her main purpose is to understand the actions within the conditions he has set out to investigate from the start (Merriam, 1998). I have pledged to respect and protect the dignity and identity of all participants throughout this research, according to the Ethical Statement and Procedures preventing Plagiarism of the University of Pretoria (University of Pretoria: Faculty of Education, 2005). I have also pledged to support:

- the principle of *voluntary participation* in research, implying that the participants might withdraw from the research at any time
- the principle of *informed consent*, meaning that research participants must at all times be fully informed about the research process and purposes, and must give consent for their participation in the research
- the principle of *safety in participation*; that the human participants must not be placed at risk or harm of any kind
- the principle of *privacy*, meaning that the *confidentiality* and *anonymity* of human participants must be protected at all times, and
- the principle of *trust*, which implies that human participants will not be subjected to any acts of deception or betrayal in the research process or its published outcomes (University of Pretoria: Faculty of Education, 2005. Purpose of ethical statement.).

Appendix 3.1 refers to the ethical statement.

3.14 Limitations

The interpretive strategy always has a risk of subjectivity, and researchers may easily be caught up in a situation where the focus can be lost. The researcher needs to be well aware of his/her own experience and stance regarding race, class, gender, age, and the way these factors may influence his/her interpretation of a situation (Erickson, 1986). To be unobtrusive during observations is not easy, but this should be the goal.

During observations, the participant may regard the observer as an outsider and as a result may not act naturally. It is the responsibility of the observer to consciously remind him/herself of this, and try and counter this by being present as often as possible thus making his presence as unobtrusive as possible. Erickson lists four types of problems typical of poor qualitative research:

- Inadequate amounts of evidence. Collected data may not shed any light on the initial research problem, and an insufficient quantity of information is directed at the initial problem;
- Inadequate varieties of kinds of evidence. Lack of adequate research methods and sources results in unsubstantiated evidence.
- Inadequate attention to disconfirming data. Uncovering and analysing “disconfirming” data is just as important as substantiating information.
- Lack of attention to discrepant cases. Care should be taken that unexpected results are not discarded just to concentrate on evidence to support an argument (Erickson, 1986 p.140).

Qualitative research is formed by well-structured questions, and data are collected by being extremely focused on the unit of investigation being observed or interviewed.

I am aware of the fact that I am a white male researcher, and directly involved with the warehouse workers. I was also extensively aware of researcher orientation (Mouton, 2002) during my data collection strategies, especially in the light of South Africa’s racial history. I agree that I am therefore very open to be biased, in that I may “see only what I want to”, and report the findings in a subjective manner. My race may also be a limitation in that my culture differs from most of the target group. I was constantly aware of this racial orientation during the interviews and observations, and went through special considerations and exercises to create an open relaxed atmosphere during the interviews and observations. Being subjective is one of the attributes of qualitative, interpretive research, and I do not claim not to be subjective, but I tried to eliminate researcher bias by using several data collection methods, and by selecting a very open and simple data-analysis strategy. I

made a point of it to record comments and remarks accurately, so that I would have the opportunity to understand the messages these contained, rather than my immediate response or understanding during the interviews. I also aimed to see the situation from the participants point of view at all times.

I believe this research is also very subject to the "omniscience syndrome" (Mouton, 2002 p. 153) meaning the belief of participants to answer questions about which they have limited knowledge. When asked whether they would be able to undergo computer training, all answered in the affirmative, while I knew that most did not really know what it entailed. I had to make a special effort to identify these responses and to concentrate more on skills and competencies of computer usage.

Participant attitudes were also under scrutiny. Attitudes to technology was one of the main variables that I needed to explore, and I was focused on their attitudes from the outset. I tried to discern between "attitudes of being selected for the interview" (false perception of being singled out) and the general attitude towards technology. It was for this purpose that I decided to observe the workers when they use technology. I believed that this would give me an opportunity to explore their attitudes and skills to use technology. I had the privilege to be involved in an earlier project prior to my observations where I had to be present in the warehouse almost every day. This opportunity provided me an element of unobtrusiveness that is needed for observations.

I am aware that I will never be able to explore and understand the warehouse workers from each individual's point of view, as they represent all races and almost all cultural groups in South Africa. I tried to explain to them that this research was aimed at a target group analysis, and to conduct a bottom-up approach to prepare e-learning content that may be relevant and applicable for them at their levels. I also invited them to give me their account of what works for them and what not. During these interviews I tried to be sensitive to the culture, habits, and traditions as found within the South African context. I realized that it would be impossible to conduct research from every cultural point of view, but I concentrated mostly on the business culture, and acknowledging that the warehouse workers hail from all the ethic groups in South Africa.

3.15 Summary

My interpretation of e-readiness is based on a qualitative case study, with the intent on understanding the emotional, technical, educational and social aspects that may determine the e-readiness or lack thereof of warehouse workers. Individual perceptions were used as a guide and as indicators of the levels of preparedness to learn by means of computer technology. The warehouse workers as a specific community in South Africa were investigated as a case study. Interviews, documents and observations have been used to collect data and evidence of e-readiness. Inductive and deductive arguments were used to organise, analyse data and construct rich descriptions of the preparedness for e-learning of warehouse workers.

My research aimed to find information, and reveal structures, meaning-perspectives, causal links and local events intrinsic of the target group. When planning e-learning for warehouse workers we need to identify fears, uncertainty, confidence, skills, and determine levels of e-readiness before recommending or constructing possible learning solutions. However, I do believe that follow-up research on e-readiness can be focused on development of e-learning strategies for warehouse workers, especially in the South African environment.