

CHAPTER 4

Research Methodology and Design

4.1 Introduction

All research is based on some underlying philosophical assumptions about what constitutes 'valid' research and which research method(s) is/are appropriate for the development of knowledge in a given study. In order to conduct and evaluate any research, it is therefore important to know what these assumptions are. This chapter discusses the philosophical assumptions and also the design strategies underpinning this research study. Common philosophical assumptions were reviewed and presented; the interpretive paradigm was identified for the framework of the study. In addition, the chapter discusses the research methodologies, and design used in the study including strategies, instruments, and data collection and analysis methods, while explaining the stages and processes involved in the study.

The research design for this study is a descriptive and interpretive case study that is analysed through qualitative methods. Questionnaires were used to evaluate participants' WebCT skills (before the course starts) and to determine their levels of satisfaction in the course (at the end of the case study). A descriptive statistical method was used to analyze the student satisfaction survey. Participant observation, face-to-face interviews, focus-group interviews, questionnaires, and member checking were used as data collection methods. Furthermore, the justification for each of the data collection methods used in the study was discussed. Finally, in order to ensure trustworthiness of the research, appropriate criteria for qualitative research were discussed, and several methods that include member checks, peer reviews, crystallisation and triangulation were suggested and later employed. The chapter closed with a diagrammatic representation of the major facets of the envisaged framework for the research design and development of the study, and a discussion on the project management approach envisaged for this study.

4.2 Research Paradigm

According to TerreBlanche and Durrheim (1999), the research process has three major dimensions: *ontology*¹, *epistemology*² and *methodology*³. According to them a research paradigm is an all-encompassing system of interrelated practice and thinking that define the nature of enquiry along these three dimensions.

The term paradigm originated from the Greek word *paradeigma* which means *pattern* and was first used by Thomas Kuhn (1962) to denote a conceptual framework shared by a community of scientists which provided them with a convenient model for examining problems and finding solutions. Kuhn defines a paradigm as: “an integrated cluster of substantive concepts, variables and problems attached with corresponding methodological approaches and tools...”. According to him, the term paradigm refers to a research culture with a set of beliefs, values, and assumptions that a community of researchers has in common regarding the nature and conduct of research (Kuhn, 1977). A paradigm hence implies a pattern, structure and framework or system of scientific and academic ideas, values and assumptions (Olsen, Lodwick, and Dunlop, 1992:16).

Ontological and epistemological aspects concern what is commonly referred to as a person's *worldview* which has significant influence on the perceived relative importance of the aspects of reality. Two possible worldviews are: objectivistic and constructivist. These different ways of seeing the world have repercussions in most academic areas; yet, none of these views is considered to be superior to the other. Both may be appropriate for some purposes and insufficient or overly complex for other purposes. Also a person may change his/her view depending on the situation. For example, this study makes use of elements from both views and considers them as complementary.

According to Lather (1986a: 259) research paradigms inherently reflect our beliefs about the world we live in and want to live in. Based on this belief, Guba and Lincoln (1994) distinguish between positivist, post-positivist and postmodernist enquiry, grouping postmodernism and post-structuralism within ‘critical theory’. The nature of

¹ The term *Ontology* refers to a branch of philosophy concerned with articulating the nature and structure of the world (Wand and Weber, 1993, p. 220). It specifies the form and nature of reality and what can be known about it.

² *Epistemology* refers to the nature of the relationship between the researcher (the knower) and it denotes (Hirschheim, Klein, and Lyytinen, 1995) “the nature of human knowledge and understanding that can possibly be acquired through different types of inquiry and alternative methods of investigation.” (p. 20)

³ *Methodology* refers to how the researcher goes about practically finding out whatever he or she believes can be known.

reality assumed by positivism is realism, whereby a reality is assumed to exist; in contrast, post-positivism assumes that this ‘reality’ is only ‘imperfectly and probabilistically apprehendable’ (Guba and Lincoln, 1994, p. 109). Post-positivism is viewed as a variant of the former positivism, but they are both objectivist.

Critical theory adopts a more transactional and subjectivist epistemology where ‘the investigator and the investigated object are assumed to be interactively linked, with the values of the investigator . . . inevitably influencing the inquiry’ (Guba and Lincoln, 1994, p. 110). Whereas the aim of positivist and post-positivist enquiry is explanation, prediction and control, the aim of critical theory is critique and emancipation (Willmott, 1997).

Gephart (1999) classified research paradigms into *three* philosophically distinct categories as positivism, interpretivism and critical postmodernism. This three-fold classification is considered ideal for this study because these three categories can be used to conveniently place the more specific psychological and sociological theories used in the field of ID.

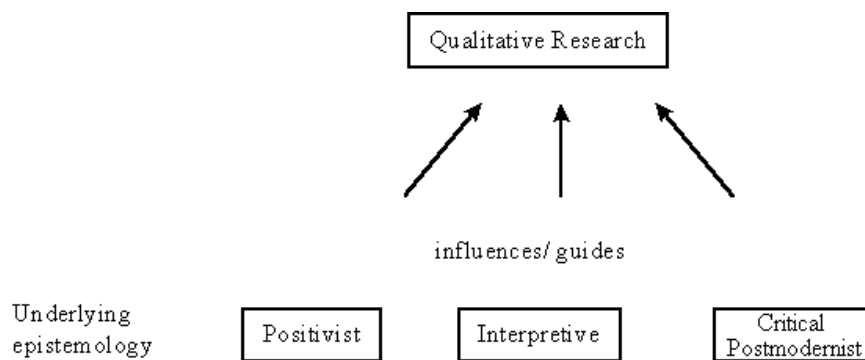


Figure 4.1: Underlying philosophical assumptions

Further, these three philosophical perspectives are the popular paradigms in contemporary social, organizational, and management research. The key features of these three perspectives that include the worldview, the nature of knowledge pursued, and the different means by which knowledge is produced and assessed within each paradigm or worldview are discussed below. However, there is no consensus, as to

whether these research paradigms are necessarily opposed or whether they can be seen as contributing a different role in the same study.

4.2.1 *Positivism*

The positivist paradigm of exploring social reality is based on the philosophical ideas of the French Philosopher August Comte. According to him, observation and reason are the best means of understanding human behaviour; true knowledge is based on experience of senses and can be obtained by observation and experiment. At the ontological level, positivists assume that the reality is objectively given and is measurable using properties which are independent of the researcher and his or her instruments; in other words, knowledge is objective and quantifiable. Positivistic thinkers adopt scientific methods and systematize the knowledge generation process with the help of quantification to enhance precision in the description of parameters and the relationship among them. Positivism is concerned with uncovering truth and presenting it by empirical means (Henning, Van Rensburg and Smit, 2004, p. 17).

According to Walsham (1995b) the positivist position maintains that scientific knowledge consists of facts while its ontology considers the reality as independent of social construction. If the research study consists of a stable and unchanging reality, then the researcher can adopt an 'objectivist' perspective: a realist ontology - a belief in an objective, real world - and detached epistemological stance based on a belief that people's perceptions and statements are either true or false, right or wrong, a belief based on a view of knowledge as hard, real and acquirable; they can employ methodology that relies on control and manipulation of reality.

Positivism regards human behaviour as passive, controlled and determined by external environment. Generally, the pedagogical basis for 'traditional' styles of teaching is underpinned by this realist and objectivist views of knowledge. This is reflected in the instructional approaches in this study because it employs instructivist strategies also along with constructivist approaches in a complementary manner. (Section 2.4)

Hwang's (1996, pp. 343-56) view of positivist thinking associates it with a broad variety of theories and practices, such as Comtean-type positivism, logical positivism (non-realism), behaviourism, empiricism, and cognitive science. Although positivistic

paradigm continued to influence educational research for a long time in the later half of the twentieth century, its dominance was challenged by critics from two alternative traditions – interpretive constructionism and critical postmodernism— due to its lack of subjectivity in interpreting social reality. According to its critics, objectivity needs to be replaced by subjectivity in the process of scientific inquiry. Constructionism and critical postmodernism offer alternative theoretical, methodological and practical approaches to research (Gephart, 1999).

In its pure form, the realist perspective represents, essentially, the classical positivist tradition. However, a *modified* objectivist perspective called *postpositivism* (Phillips, 1990) claims that, although the object of our inquiry exists outside and independent of the human mind, it cannot be perceived with total accuracy by our observations; in other words, complete objectivity is nearly impossible to achieve, but still pursues it as an ideal to regulate our search for knowledge. This represents the *critical realist* ontology, as articulated by Cook and Campbell (1979). Thus the positivist focus on experimental and quantitative methods have been superseded or complemented to some extent by an interest in using qualitative methods to gather broader information outside of readily measured variables (Gephart, 1999).

4.2.2 Interpretivism

Interpretive researchers believe that the reality to consists of people’s subjective experiences of the external world; thus, they may adopt an inter-subjective epistemology and the ontological belief that reality is socially constructed. According to Willis (1995) interpretivists are anti-foundationalists, who believe there is no single correct route or particular method to knowledge. Walsham (1993) argues that in the interpretive tradition there are no ‘correct’ or ‘incorrect’ theories. Instead, they should be judged according to how ‘interesting’ they are to the researcher as well as those involved in the same areas. They attempt to derive their constructs from the field by an in-depth examination of the phenomenon of interest. Gephart (1999: [online]) argues that interpretivists assume that knowledge and meaning are acts of interpretation, hence there is no objective knowledge which is independent of thinking, reasoning humans. Myers (2009) argues that the premise of interpretive researchers is that access to reality (whether given or socially constructed) is only

through social constructions such as language, consciousness and shared meanings (online). Interpretive paradigm is underpinned by observation and interpretation, thus to observe is to collect information about events, while to interpret is to make meaning of that information by drawing inferences or by judging the match between the information and some abstract pattern (Aikenhead, 1997: [online]). It attempts to understand phenomena through the meanings that people assign to them (Deetz, 1996).

Reeves and Hedberg (2003, p. 32) note that the “interpretivist” paradigm stresses the need to put analysis in context. The interpretive paradigm is concerned with understanding the world as it is from subjective experiences of individuals. They use meaning (versus measurement) oriented methodologies, such as interviewing or participant observation, that rely on a subjective relationship between the researcher and subjects. Interpretive research does not predefine dependent and independent variables, but focuses on the full complexity of human sense making as the situation emerges (Kaplan and Maxwell, 1994). This is the interpretive approach, which aims to explain the subjective reasons and meanings that lie behind social action.

The interest of interpretivists is not the generation of a new theory, but to judge or evaluate, and refine interpretive theories. Walsham (1995b) presents three different uses of theory in interpretive case studies: theory guiding the design and collection of data; theory as an iterative process of data collection and analysis; and theory as an outcome of a case study. The use of theory as an iterative process between data collection and analysis has been applied in this research study.

According to Burrell and Morgan (1979), interpretivism is not a single paradigm; it is in fact a large family of diverse paradigms. The philosophical base of interpretive research is hermeneutics and phenomenology (Boland, 1985). Hermeneutics is a major branch of interpretive philosophy with Gadamer and Ricoeur arguably being its most well known exponents (Klein and Myers, 1999) and it emerged in the late nineteenth century (Kaboob, 2001). Hermeneutics can be treated as both an underlying philosophy and a specific mode of analysis (Bleicher, 1980). As a philosophical approach to human understanding, hermeneutics provides the philosophical grounding for interpretivism. As a mode of analysis, it suggests a way

of understanding the meaning or trying to make sense of textual data which may be unclear in one way or another.

The most fundamental principle of hermeneutics is that all human understanding is achieved by iterating between considering the interdependent meaning of parts and the whole that they form. Modern hermeneutics encompasses not only issues involving the written text, but everything in the interpretative process that include verbal and nonverbal forms of communication as well as prior aspects that affect communication, such as presuppositions, and pre-understandings (Wikipedia, n.d.).

The movement of understanding "is constantly from the whole to the part and back to the whole" (Gadamer, 1976b, p. 117). According to Gadamer, it is a circular relationship. It attempts to understand human beings in a social context. This principle is foundational to all interpretive work that is hermeneutic in nature.

Although the study is not primarily phenomenological, some of its aspects are underpinned by the principles of phenomenology which focuses on discovering and expressing essential characteristics of a certain phenomenon as they really are. Literally, phenomenology is the study of "phenomena": appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meanings things have in our experience (Stanford Encyclopedia, 2008). It is the study of structures of consciousness as experienced from the first-person point of view. In its most basic form, phenomenology attempts to create conditions for the objective study of topics usually regarded as subjective: consciousness and the content of conscious experiences such as judgments, perceptions and emotions (Wikipedia, 2009).

Creswell (1998) contends that a phenomenological study describes the meaning of the lived experiences for several individuals about a concept or the phenomenon (p. 51). In the human sphere, this normally translates into gathering "deep" information and perceptions through inductive qualitative research methods such as interviews and observation, representing this information and these perceptions from the perspective of the research participants (Lester, 1999: [online]). Observation and interviews are the key data collection methods within phenomenologies (Aspers, 2004: [online]). Phenomenological strategies are particularly effective at bringing to the fore the

experiences and perceptions of individuals from their own perspectives, and therefore challenging structural or normative assumptions (Lester, 1999: [online]).

This study is situated in the interpretivist paradigm. Table 4.1 displays the characteristics of interpretivism, as used in this study, categorised into the purpose of the research, the nature of reality (ontology), nature of knowledge and the relationship between the inquirer and the inquired-into (epistemology) and the methodology used (Cantrell, 2001).

Table 4.1: Characteristics of interpretivism

Feature	Description
Purpose of research	Understand and interpret students' and teachers' perspectives on the factors that could impact the successful use of elearning and face-to-face instructional approaches in a manner that they complement each other.
Ontology	<ul style="list-style-type: none"> ➤ There are multiple realities. ➤ Reality can be explored, and constructed through human interactions, and meaningful actions. ➤ Discover how people make sense of their social worlds in the natural setting by means of daily routines, conversations and writings while interacting with others around them. These writings could be text and visual pictures. ➤ Many social realities exist due to varying human experience, including people's knowledge, views, interpretations and experiences.
Epistemology	<ul style="list-style-type: none"> ➤ Events are understood through the mental processes of interpretation that is influenced by interaction with social contexts. ➤ Those active in the research process socially construct knowledge by experiencing the real life or natural settings. ➤ Inquirer and the inquired-into are interlocked in an interactive process of talking and listening, reading and writing. ➤ More personal, interactive mode of data collection.
Methodology	<ul style="list-style-type: none"> ➤ Processes of data collected by text messages, interviews, and reflective sessions; ➤ Research is a product of the values of the researcher.

The key words pertaining to this methodology are participation, collaboration and engagement (Henning, van Rensburg, and Smit, 2004). In the interpretive approach the researcher does not stand above or outside, but is a participant observer (Carr and Kemmis, 1986, p. 88) who engages in the activities and discerns the meanings of actions as they are expressed within specific social contexts.

4.2.3 *Critical Postmodernism*

The critical postmodernism is a combination of two somewhat different worldviews—critical theory and postmodern scholarship (Gephart, 1999). Critical Theory is a tradition developed by the Frankfurt School in Germany, based on the German tradition of philosophical and political thought of Marx, Kant, Hegel and Max Weber. Postmodernism is a form of scholarship which emerged in part through the work of French intellectuals such as Lyotard, Derrida and Foucault (Gephart, 1999).

Though they are derived from different views, they are broad rubrics for intellectual movements rather than specific theories, yet they are essential parts of social semiotic analysis. Critical Postmodernism is less radical in its approach and is a growing field of study that is moving beyond the supposedly radical postmodernism. This paradigm is a force of liberation that engages an on-going conflict with the powers of oppression and seeks to bring about educational reform (Reeves and Hedberg, 2003, p. 33).

Critical researchers assume that social reality is historically constituted and that it is produced and reproduced by people (Myers, 2009). Although people can consciously act to change their social and economic circumstances, critical researchers recognize that their ability to do so is constrained by various forms of social, cultural and political domination. Therefore, critical scholarship seeks to transcend taken-for-granted beliefs, values and social structures by making these structures and the problems they produce visible, by encouraging self conscious criticism, and by developing emancipatory consciousness in scholars and social members in general (Kincheloe and McLaren, 1994, pp. 138-157). The aim is to openly critique the status quo, focuss on the conflicts and constraints in contemporary society, and seek to bring about cultural, political and social change that would eliminate the causes of alienation and domination. Thus, the paradigm of critical theory encourages evaluators and instructional designers to question and also to evaluate the cultural, political, and gender assumptions underlying the effectiveness of the instructional product or programme (Reeves and Hedberg, 2003). The critical theory seeks to deconstruct the "hidden curriculum" or "text" and search for the "truth" and "understanding within the social context" (Reeves and Hedberg, 2003, p.33).

According to Gephart (1999) the goal of critical postmodernism is social transformation to displace the existing structures of power and domination by opening opportunities for social participation among persons previously excluded and dominated (online). The task in critical postmodern analysis has been to deconstruct discourse to reveal hidden structures of domination, particularly dichotomies (e.g., male/female) and then reconstruct or offer alternative, less exploitive social arrangements (Boje, 2001).

A critical postmodern manifesto resists the reduction of all postmodern theories into the camp of naïve interpretivism or relativistic social construction (Boje, 2001). Critical postmodern research has often focused on discourse at the micro level, in contrast to a somewhat more macro level focus in critical theory research. It often uses conventional positivist and interpretivist methods; thus, rather than methodological differences it is a commitment to dialectical analysis and to critical/postmodern theory which most clearly differentiates critical postmodern research from positivism and interpretivism (Gephart, 1999).

4.2.4 Theories adopted in this research study

Researchers base their work on certain philosophical perspectives; it may be based on a single or more paradigm(s), depending on the kind of work they are doing. Following the above discussions, the philosophical assumptions underlying this study come mainly from interpretivism (of hermeneutic in nature). However, the study has also footprints of the other two perspectives— postpositivism (a modified objectivist stance), and critical postmodernism (as it supports different world views— instructivist and constructivist philosophies, and often uses conventional positivist and interpretivist methods).

Interpretive approaches give the research greater scope to address issues of influence and impact, and to ask questions such as ‘why’ and ‘how’ particular technological trajectories are created (Deetz, 1996). Walsham (1993) asserts that the purpose of the interpretive approach in information science is to produce an understanding of the context and the process whereby information science influences and is influenced by the context. This assertion justifies the researcher’s choice of hermeneutic as the

philosophical rationale for this study. Thus, the Researcher adopted an inter-subjective or interactional stance towards the reality he was investigating.

Constructivism is closely related to interpretivism. Interpretivism often addresses essential features of shared meaning and understanding whereas constructivism extends this concern with knowledge as produced and interpreted. In the context of this study, individuals construct their own knowledge within the social-cultural context influenced by their prior knowledge and understanding, and therefore, the Researcher positions himself as a Researcher within the parameters of a constructivist epistemological discourse.

As the emphasis is on the socially constructed nature of reality, the learning environment has to be created in such a manner that there is intimate relationship between the researcher and what is being studied, and learners could describe / express their unique individual experiences in the learning process. Such a research environment provides the researcher to observe, investigate, and understand the learning process, and further, gather and document the subtleties of learners' experiences through strategies such as participant observation, various written texts, face-to-face individual as well as focus-group interviews in a social and cultural context in which the learning occurs.

4.3 Research Methodology

The research method is a strategy of enquiry, which moves from the underlying assumptions to research design, and data collection (Myers, 2009). Although there are other distinctions in the research modes, the most common classification of research methods is into qualitative and quantitative. At one level, qualitative and quantitative refer to distinctions about the nature of knowledge: how one understands the world and the ultimate purpose of the research. On another level of discourse, the terms refer to research methods, that is, the way in which data are collected and analysed, and the type of generalizations and representations derived from the data.

Quantitative research methods were originally developed in the natural sciences to study natural phenomena. Qualitative research methods were developed in the social sciences to enable researchers to study social and cultural phenomena. Both

quantitative and qualitative research studies are conducted in education. Neither of these methods is intrinsically better than the other; the suitability of which needs to be decided by the context, purpose and nature of the research study in question; in fact, sometimes one can be alternatives to the other depending on the kind of study. Some researchers prefer to use mixed methods approach by taking advantage of the differences between quantitative and qualitative methods, and combine these two methods for use in a single research project depending on the kind of study and its methodological foundation (Bryman and Burgess, 1999, p. 45).

Qualitative research is naturalistic; it attempts to study the everyday life of different groups of people and communities in their natural setting; it is particularly useful to study educational settings and processes. "...qualitative research involves an interpretive, naturalistic approach to its subject matter; it attempts to make sense of, or to interpret, phenomena in terms of the meaning people bring to them (Denzin and Lincoln, 2003). According to Domegan and Fleming (2007), "Qualitative research aims to explore and to discover issues about the problem on hand, because very little is known about the problem. There is usually uncertainty about dimensions and characteristics of problem. It uses 'soft' data and gets 'rich' data". (p. 24). According to Myers (2009), qualitative research is designed to help researchers understand people, and the social and cultural contexts within which they live. Such studies allow the complexities and differences of worlds-under-study to be explored and represented (Philip, 1998, p. 267).

In qualitative research, different knowledge claims, enquiry strategies, and data collection methods and analysis are employed (Creswell, 2003). Qualitative data sources include observation and participant observation (fieldwork), interviews and questionnaires, documents and texts, and the researcher's impressions and reactions (Myers, 2009). Data is derived from direct observation of behaviours, from interviews, from written opinions, or from public documents (Sprinthall, Schmutte, and Surois, 1991, p. 101). Written descriptions of people, events, opinions, attitudes and environments, or combinations of these can also be sources of data.

An obvious basic distinction between qualitative and quantitative research is the form of data collection, analysis and presentation. While quantitative research presents statistical results represented by numerical or statistical data, qualitative research

presents data as descriptive narration with words and attempts to understand phenomena in “natural settings”. This means that qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them.” (Denzin and Lincoln, 2000, p. 3).

Quantitative research makes use of questionnaires, surveys and experiments to gather data that is revised and tabulated in numbers, which allows the data to be characterised by the use of statistical analysis (Hittleman and Simon, 1997, p. 31). Quantitative researchers measure variables on a sample of subjects and express the relationship between variables using effect statistics such as correlations, relative frequencies, or differences between means; their focus is to a large extent on the testing of theory.

Stake (1995) describes three major differences in qualitative and quantitative emphasis, noting a distinction between: explanation and understanding as the purpose of the inquiry; the personal and impersonal role of the researcher; and knowledge discovered and knowledge constructed (p. 37). Another major difference between the two is that qualitative research is inductive and quantitative research is deductive. In qualitative research, a hypothesis is not needed to begin research; It employs inductive data analysis to provide a better understanding of the interaction of “mutually shaping influences” and to explicate the interacting realities and experiences of researcher and participant (Lincoln and Guba, 1985). It allows for a design to evolve rather than having an complete design in the beginning of the study because it is difficult if not impossible to predict the outcome of interactions due to the diverse perspectives and values systems of the researcher and participants, and their influence on the interpretation of reality and the outcome of the study. However, all quantitative research requires a hypothesis before research can begin.

Table 4.2 below shows a summary of major differences between quantitative and qualitative approaches to research.

Table 4.2: Differences between quantitative and qualitative approaches

Orientation	Quantitative	Qualitative
Assumption about the world	A single reality, i.e., can be measured by an instrument.	Multiple realities
Research purpose	Establish relationships between measured variables	Understanding a social situation from participants' perspectives
Research methods and processes	- procedures are established before study begins; - a hypothesis is formulated before research can begin; - deductive in nature.	- flexible, changing strategies; - design emerges as data are collected; - a hypothesis is not needed to begin research; - inductive in nature.
Researcher's role	The researcher is ideally an objective observer who neither participates in nor influences what is being studied.	The researcher participates and becomes immersed in the research/social setting.
Generalisability	Universal context-free generalizations	Detailed context-based generalizations

In qualitative studies the researcher is considered the primary instrument of data collection and analysis. The researcher engages the situation, makes sense of the multiple interpretations, as multiple realities exist in any given context as both the researcher and the participants construct their own realities. She/he strives to collect data in a non-interfering manner, thus attempting to study real-world situations as they unfold naturally without predetermined constraints or conditions that control the study or its outcomes. According to Merriam (1998),

she/he engages the situation most often without an observation schedule, and plays a dynamic role in constructing an understanding of the research environment through self interpretation of what happens... thus, qualitative research produces a result which is "an interpretation by the researcher of others' views filtered through his or her own" (p. 23).

Stainback and Stainback (1988) list three basic purposes of quantitative research as: to describe, to compare and to attribute causality (p. 317). Maxwell (1998) enumerates five research purposes for which qualitative studies are particularly useful:

- Understanding the meaning that participants in a study give to the events, situations and actions that they are involved with; and of the accounts they give of their lives and experiences;

- Understanding the particular context within which the participants act, and the influence this context has on their actions;
- Identifying unanticipated phenomena and influences, and generating new, grounded theories about them;
- Understanding the process by which events and actions take place; and
- Developing causal explanations. (p. 66)

Merriam (1998) states that qualitative case studies in education are often framed with concepts, models and theories (pp.11, 19). An inductive method is then used to support or challenge theoretical assumptions. Although the research process in qualitative research is inductive, Merriam (ibid: 49) notes that most qualitative research inherently moulds or changes existing theory in that:

- Data are analysed and interpreted in light of the concepts of a particular theoretical orientation;
- Findings are usually discussed in relation to existing knowledge (some of which is theory) with the aim of demonstrating how the present study has contributed to expanding the knowledge base.

However, Lincoln and Guba (1985) caution that qualitative research, which is an approach that acknowledges the researcher's subjectivity, requires that the "biases, motivations, interests or perspectives of the inquirer" are identified and made explicit throughout the study (p. 290). Given below are some other disadvantages⁴ of qualitative research. These points are useful to the researcher such that he / she can try to minimise their effects during the course of the study.

- Researcher bias can bias the design of a study.
- Researcher bias can enter into data collection.
- Sources or subjects may not all be equally credible.
- Some subjects may be previously influenced and affect the outcome of the study.
- Background information may be missing.

⁴ <http://writing.colostate.edu/guides/research/observe/com2d2.cfm>

- Study group may not be representative of the larger population.
- Analysis of observations can be biased.
- Any group that is studied is altered to some degree by the very presence of the researcher. Therefore, any data collected is somewhat skewed. (Heisenburg Uncertainty Principle)
- It takes time to build trust with participants that facilitates full and honest self-representation. Short term observational studies are at a particular disadvantage where trust building is concerned.

In defence of qualitative research, Merriam (1985) states that most writers suggest judgement should focus on whether the research is “credible and confirmable” rather than imposing statistical, quantitative ideas of generalisability on qualitative research.

To sum up this section, qualitative research is a systematic inquiry into the nature or qualities of complex social group behaviours by employing interpretive and naturalistic approaches. Qualitative study lends itself to thick narrative description of the group behaviours in the group's natural environment. It attempts to be non-manipulative and takes into account the unperturbed views of the participants as the purpose is generally to aim for objectivity. Qualitative research are most appropriate when the researcher wants to become more familiar with the phenomenon of interest, to achieve a deep understanding of how people think about a topic and to describe in great detail the perspectives of the research participants.

4.3.1 Rationale for a Qualitative Study

Many scholars (e.g., Domegan, and Fleming, 2007; Henning, Van Rensburg, and Smit, 2004; Denzin and Lincoln, 2003; Richardson, 1995) argue that human learning is best researched by using qualitative data. In selecting a research methodology, Guba (1981, p. 76) suggests that “it is proper to select that paradigm whose assumptions are best met by phenomenon being investigated”. This study is about human learning and the effective use of emerging technology in facilitating it. It is also generally recognised that qualitative researchers are concerned with processes rather than simply the outcomes or products. When the understanding of an event is a

function of personal interaction and perception of those in that event, and the description of the processes that characterise the event, qualitative approaches are more appropriate than quantitative designs to provide the insight necessary to understand the participants' role in the event, and their perceptions of the experience. Qualitative approaches are becoming more widely used as analysis methods improve and people search for better ways of gathering data about a problem (Price, 2002: [online]). Botha, van der Westhuizen, and de Swardt (2005) argue that empiricist designs that depend on pre-testing and post-testing using quantitative data may not be the most appropriate way of researching online learning.

The purpose of the study is to investigate without manipulation the process of elearning with appropriate blending of face-to-face elements in an undergraduate course as it unfolds in real world UB situations that is to study events in their natural setting with a view to interpreting phenomena in terms of the meaning individuals attach to them. The focus was on participants' multiple perceptions, meanings of events and processes in tutoring and the researcher understands of these. Due to the typical processes used, qualitative approaches can better account for the complexity of group behaviours and reveal interrelationships among multifaceted dimensions of group interactions.

The essential processes in this study included observing, investigating and documenting in detail, the unique educational experiences of individuals in the complexity of a real classroom. The processes that influenced these experiences and the analysis of the resulting descriptive data were all undertaken by the researcher as a participant in the study. This approach allowed for 'thick narrative descriptions' of the phenomena under study and gave the researcher opportunity to take into account the views of the participants and the subtleties of complex group interactions and multiple interpretations in the group's natural environment. The Researcher found a qualitative description of their experiences and an inductive analysis of data as most appropriate for the purpose of this research because all these procedures enhanced the possibility for some kind of objectivity which would have been lost if quantitative or experimental strategies were applied. Further, constructed knowledge is not *truth* that remains stable and generalisable across all possible contexts, rather, it exists within specific contexts and perspectives - knowledge that may profess to be truth for one context may not be truth for other contexts. Therefore, experimental designs in social

science research using quantitative data may not be the most appropriate way of researching online learning. However, it has to be noted that the resulting outcomes do not support extensive generalisations; rather, they present contextual findings that help develop knowledge and understanding in the UB context.

Learning is a complex process. For the learning environment to be effective, it requires the complex interaction of many variables. Assessment of learning is better done when the learning *is* taking place (rather than after it *has taken place*) by observing how the learners are participating and progressing in the learning process. As a result, description of the processes or events is more valuable than the research outcomes or products. Further, it is difficult, if not impossible, to predict with accuracy the behaviour of complex organisms. The use of quantitative research could make obscure some of those insights and experiences of participants that the researchers needed to understand in order to address the complexities of learning processes and the contextual factors required for the learning environment.

4.4 Research Design

Research design can be thought of as the *logic or master plan* of a research that throws light on how the study is to be conducted. It shows how all of the major parts of the research study– the samples or groups, measures, treatments or programs, etc– work together in an attempt to address the research questions. Research design is similar to an architectural outline. The research design can be seen as actualisation of logic in a set of procedures that optimises the validity of data for a given research problem. According to Mouton (1996, p. 175) the research design serves to "plan, structure and execute" the research to maximise the "validity of the findings". It gives directions from the underlying philosophical assumptions to research design, and data collection. Yin (2003) adds further that "colloquially a research design is an action plan for getting from *here* to *there*, where 'here' may be defined as the initial set of questions to be answered and 'there' is some set of (conclusions) answers" (p. 19).

From a meta-analysis of research topics and methodologies in South Africa, van der Westhuizen (2002) found that the most typical application of qualitative research in instructional technology seems to be that of case studies. This Researcher investigated 24 dissertations at Masters and Doctoral levels at the UB library and found 19 of them

case studies from Botswana.

4.4.1 The Case study strategy

A case study is one of several ways of doing research whether it is social science related or even socially related because its aim is to understand human beings in a social context by interpreting their actions as a single group, community or a single event: a case. Gillham (2000a, p.1) defines a *case study* as an investigation to answer specific research questions which seek a range of *different evidences* from the case settings. Yin (2003) defines a case study as an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly defined. The case study approach is especially useful in situations where contextual conditions of the event being studied are critical and where the researcher has no control over the events as they unfold. Ritchie and Lewis (2003) see the primary defining features of a case study as being “multiplicity of perspectives which are rooted in a specific context”.

The case may also be a program, an event, or an activity bounded in time and place. According to McMillan and Schumacher (2001), a case study examines a —bounded system or a case over time in detail, employing multiple sources of data found in the setting. All the collected evidences are collated to arrive at the best possible responses to the research question(s). As a result the researcher may gain a sharpened understanding of why the instance happened as it did, and what might become important to look at more extensively in future research. Mertens (1998, p.145) emphasises the single case study’s appeal in the fields of education and psychology, especially its effectiveness when used to test a “specific instructional strategy”.

Given the interpretive position adopted in this research and the nature of the research question, the case study methodology was considered the most appropriate approach to employ because it provides a systematic way to collect data, analyze information, and report the results, thus understand a particular problem or situation in great depth. More specifically, it:

- (i) provides a variety of participant perspectives;
- (ii) uses multiple data collection techniques; and

(iii) examines integration of elearning and face-to-face instructional approaches within a technology rich environment.

Further, unlike many other forms of research, the case study does not utilise any particular methods of data collection or data analysis (Merriam, 1998, p. 28); therefore, a combination of data collection methods were selected in this study in anticipation of providing a more complete picture; thus it allowed for the adoption of both qualitative and quantitative data collection methods which presents a more coherent picture of a unique situation. The case study approach makes use of multiple methods of data collection such as interviews, document reviews, archival records, and direct and participant observations and subsequently 'thick descriptions' of the phenomena under study (Yin, 2003). Such 'thick descriptions' give the researcher access to the subtleties of changing and multiple interpretations (Walsham, 1995b). A descriptive statistical method was used to analyze the quantitative data from the student satisfaction survey.

While data collection can often be less structured in an exploratory study, this is not to say that there is no structure – instead, it is a matter of its extent. Generally, one area that requires less structure is that of focus groups. This can often be attributed to: (i) the difficulty in imposing structure on a group discussion; and (ii) the fact that “data emerges through interaction within the group” –a key feature of focus groups (Ritchie and Lewis, 2003). Theorists differentiate between unstructured and in-depth interviews within the realm of qualitative research. Nevertheless, while unstructured or in-depth interviews often “involve a broad agenda” (Ritchie and Lewis, 2003), they can be focussed through questioning and management techniques.

Merriam (1998) identifies four essential characteristics of a case study: *particularistic, descriptive, heuristic, and inductive*. Particularistic refers to one event, process or situation that is the focus of a study. Descriptive refers to the rich and extensive set of details relating to the phenomena. Each of these two is heuristic because they advance understanding of the phenomena, while inductive refers to the form of reasoning used to determine generalisations or concepts that emerge from the data.

Case studies do not claim to be representative, but the emphasis is on what can be learned from a single case (Tellis, 1997). Case studies have value in advancing

fundamental knowledge in the relevant knowledge domains. The underlying philosophy of single case study is “not to prove but to improve” (Stufflebeam, Madaus, and Kellaghan, 2000, p. 283). Indeed, this study seeks to improve the integration of technology within the learning environment at UB through the development of a model, which might then be applicable other institutions operating under similar situations.

It has to be noted that research methodology and paradigm are independent though they can be used by researchers to complement their researches; thus, it has to be noted that “qualitative” methodology is not a synonym for the “interpretivist” philosophical stance adopted in this study. Qualitative research may or may not be interpretive, depending upon the underlying philosophical assumptions of the researcher. Qualitative research can be positivist, interpretive, or critical. It follows from this that the choice of a specific qualitative research method (such as a case study or action research) is independent of the underlying philosophical position adopted.

Case study research has been subject to criticism on the grounds of non-representativeness and a lack of statistical generalisability. Moreover, the richness and complexity of the data collected means that the data is often open to different interpretations, and potential ‘researcher bias’ (Cornford and Smithson, 1996). Despite the lack of a detailed step-by-step data analysis of case study data (Miles and Huberman, 1994), and the problem of not being able to provide generalisability in a statistical sense, Denzin and Lincoln (2000) argue that case studies can be generalised, arguing that “looking at multiple actors in multiple settings enhances generalisability” (p. 193). Similarly, Yin (2003) argues that case studies are used for analytical generalisations, where the researcher’s aim is to generalise a particular set of results to some broader theoretical propositions. These for and against views indicate that no research methodology is perfect, and therefore, researchers have to use data obtained with multiple methodologies.

Given the interpretive stance adopted in this research and the nature of the research question, the Researcher believes that the case study approach is the most appropriate research strategy for this study because of its advantages in revealing in detail the unique perceptions and concerns of individual participants in a real-world situation

which would have been lost in quantitative or experimental strategies. The case study design is particularly well suited to situations where it is very difficult to separate a phenomenon's variables from its context (Yin, 2003).

4.4.2 Research Design: the case study in question

The research design for this study is a descriptive and interpretive case study that is analysed largely through qualitative methods with a small quantitative component. Qualitative researchers tend to analyse their data inductively. In a descriptive and interpretive case study, the researcher analyses, interprets and theorises about the phenomenon against the backdrop of a theoretical framework. Merriam (1998) states that qualitative case studies in education are often framed with concepts, models and theories. An inductive method is then used to support or challenge theoretical assumptions. Since “meaning” is of essential concern to the qualitative approach (Bogdan and Biklen, 2003), the participant's perspectives on their own conceptions of practice will be the focus. Hence, the framework developed in this thesis supports evaluating participant perspectives. Findings were discussed in relation to existing knowledge with the aim of demonstrating how the present study has contributed to expanding the knowledge base.

Figure 4.2 illustrates the schematic representation of the framework for research design of the study and the flow of process of the design, development and implementation of a Web-based blended learning environment.

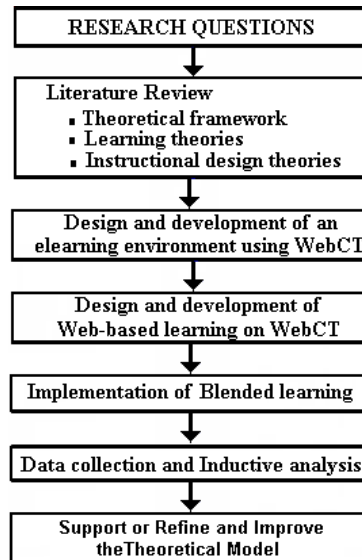


Figure 4.2: Research approach and design

4.5 *Participants in the study*

The subjects in this research are undergraduate students who are enrolled for a course in Biology. More details about subjects are provided in Section 6.3.1. The tutor of this course also plays a significant part in the study. This is a purposeful sampling.

Purposeful sampling is a non-random method of sampling where the researcher selects “information-rich” cases for study in depth (Patton, 2002). Purposeful sampling takes place when the researcher selects a sample from which the most can be learned (Merriam, 1998). It is the most common sampling strategy in qualitative research and seeks cases rich in information which can be studied in great deal about issues of central importance to the purpose of the research. The benefit [of purposeful sampling] is that, as Patton (2002) puts it, “Any common patterns that emerge from great variation are of particular interest and value in capturing the core experience and central, shared dimensions of a setting or phenomenon”.

4.6 *Data Sources*

Evaluation is the process of systematically collecting data that represents the opinion and experience of its participants or other stakeholders. The primary data sources included the students enrolled in this course, the tutor of this course and four lecturer

colleagues. The main data collection techniques used in this research study were the literature reviews, interviews, questionnaires, participant observation, group discussion, and observation.

4.6.1 Interviews

Interviews are methods of gathering information through oral quiz using a set of pre-planned core questions. According to (Shneiderman and Plaisant, 2005), interviews can be very productive since the interviewer can pursue specific issues of concern that may lead to focussed and constructive suggestions. The main advantages of interview method of data collection are (Genise, 2002; Shneiderman and Plaisant, 2005) that:

- a) direct contact with the users often leads to specific, constructive suggestions;
- b) they are good at obtaining detailed information;
- c) few participants are needed to gather rich and detailed data.

Depending on the need and design, interviews can be unstructured, structured, and semi-structured with individuals, or may be focus-group interviews.

(i) *Unstructured Interviews*

The unstructured type of interviews allows the interviewer to pose some open-ended questions and the interviewee to express his/her own opinion freely. This requires both the interviewer and the interviewee to be at ease because it is like a discussion or brainstorming on the given topic. The direction of the interview is determined by both the interviewee and interviewer, not predetermined. According to Preece, Rogers, and Sharp (2002) it makes it difficult to standardise the interview across different interviewees, since each interview takes on its own format. However, it is possible to generate rich data, information and ideas in such conversations because the level of questioning can be varied to suit the context and that the interviewer can quiz the interviewee more deeply on specific issues as they arise; but it can be very time-consuming and difficult to analyse the data.

(ii) *Structured interviews*

In structured interviews, the interviewer uses a set of predetermined questions which are short and clearly worded; in most cases, these questions are closed and therefore, require precise answers in the form of a set of options read out or presented on paper. This type of interviewing is easy to conduct, and can be easily standardised as the same questions are asked to all participants. According to Preece, Rogers, and Sharp (2002), structured interviews are most appropriate when the goals of the study are clearly understood and specific questions can be identified.

(iii) *Semi-structured interviews*

This method of interview has features of both structured and unstructured interviews and therefore use both closed and open questions. As a result, it has the advantage of both methods of interview. In order to be consistent with all participants, the interviewer has a set of pre-planned core questions for guidance such that the same areas are covered with each interviewee. As the interview progresses, the interviewee is given opportunity to elaborate or provide more relevant information if he/she opts to do so.

This study interviews every participant in using a semi-structured interview approach to appraise the pedagogical design of the Model.

(iv) *Focus-group interviews*

Focus group interview is less structured compared to the three categories of interview discussed above. This is because of the difficulty in bringing structure in a group; however, rich data can emerge through interaction within the group, for example, sensitive issues that could have been missed in individual interviews, may be revealed. In a group, people develop and express ideas they would not have thought about on their own (Preece et al, *ibid*).

This type of interview is conducted after a series of individual interviews, to further explore the general nature of the comments from different individuals (Shneiderman and Plaisant, 2005). A representative sample was drawn from the subjects who were interviewed by the Researcher by asking simple questions and further, moderating the

responses from the group. Maughan (2003) recommends the membership of an ideal focus group to range from six to twelve subjects.

This study conducts a focus-group interview in order to triangulate data from other sources.

4.6.2 Questionnaires

Questionnaire has the advantage of taking it to a wider audience compared to interviews, but has a disadvantage of not being possible to customise it to individuals as it is possible with other methods of data collection. This study uses four questionnaires as listed below:

- (i) Self evaluation survey of ICT and WebCT skills (Appendix C) was taken by participants in the pilot as well as the actual study before the course started with a view to providing them with training in these two areas; this questionnaire also attempted to determine their attitude towards elearning as well as perceptions and concerns on the new approaches to learning in technology-based environments (Appendix D);
- (ii) Course evaluation survey which is used for semi-structured interviews to appraise the pedagogical design of the model (Appendix B);
- (iii) Online course satisfaction survey (Appendix C);
- (iv) Expert evaluation instrument (Appendix D).

Online course satisfaction survey was subjected to a test-retest analysis which gave a fairly high measurement reliability of 0.822.

4.6.3 Observational evaluation

The Researcher as a participant observer carried out observational methods of data collection and evaluations by observing how the learners were engaging in learning activities.

Observational methods have the advantage of directly evaluating learners' involvement and engagement in the learning environment and with the learning

activities. As the highly honoured American philosopher Yogi Berra put it, "You can observe a lot just by watching." By watching students in different instructional practices (class discussions, group work, active learning exercises, online chat or discussion forums), the Researcher could explore how students learned - how they interpreted and made sense of the subject, where they stumbled, what they did when they did not understand the material, and so on. It has a disadvantage in that students may change their behaviour when they know that they are being observed. However, it was noted that after a few visits to their learning environment by the Researcher, students started to consider him as a supporter in their learning activities and began to feel at ease with him.

4.7 Data Collection and Analysis

Interpretive researchers attempt to derive their data through direct interaction with the phenomenon being studied. An important aspect of data analysis in qualitative case study is the search for meaning through direct interpretation of what is observed by themselves as well as what is experienced and reported by the subjects.

Bogdan and Biklen (2003) define qualitative data analysis as "working with the data, organising them, breaking them into manageable units, coding them, synthesising them, and searching for patterns". The aim of analysis of qualitative data is to discover patterns, concepts, themes and meanings. In case study research, Yin (2003) discusses the need for searching the data for "patterns" which may explain or identify causal links in the data base. In the process, the researcher concentrates on the whole data first, then attempts to take it apart and re-constructs it again more meaningfully. Categorisation helps the researcher to make comparisons and contrasts between patterns, to reflect on certain patterns and complex threads of the data deeply and make sense of them.

The process of data analysis begins with the categorisation and organisation of data in search of patterns, critical themes and meanings that emerge from the data. A process sometimes referred to as "open coding" (Strauss and Corbin, 1990) is commonly employed whereby the researcher identifies and tentatively names the conceptual categories into which the phenomena observed would be grouped. The goal is to create descriptive, multi-dimensional categories that provide a preliminary framework

for analysis. These emerging categories are of paramount importance as qualitative researchers tend to use inductive analysis.

In a case study like this one, the data collection and analysis can also go hand in hand in an iterative manner in that the results of the analysis will help guide the subsequent collection of data. Data collection and analysis inform or drive each other, with the result that the analysis becomes a higher level synthesis of the information. The iterative cycle is repeated and course design and development checked and revised as the process continues.

In this study, the interviews, both individual and focus group, were recorded and transcribed. A couple of open-ended questions were posed to which learners were required to respond in writing. In these processes useful information that may be closely linked to their experiences can emerge. The individual responses were analysed, compared and categorised with the results of transcription of the focus group interview, and subsequently triangulated and interpreted to draw conclusions.

4.8 Research Evaluation: Trustworthiness of the Study

The traditional criteria for ensuring the credibility of research data— objectivity, reliability and validity— are used in scientific and experimental studies because they are often based on standardized instruments and can be assessed in a relatively straightforward manner. In contrast, qualitative studies are usually not based upon standardized instruments and they often utilize smaller, non-random samples. Therefore, these evaluation criteria cannot be strictly applied to the qualitative paradigm, particularly when the researcher is more interested in questioning and understanding the meaning and interpretation of phenomena. But the question is whether these evaluation criteria have any value in qualitative studies. Merriam (1998) cautions researchers that a debate is raging because the constructs of reliability and validity are quantitative and positivist, and not necessarily that applicable to qualitative research (p. 199).

Assessing the accuracy of qualitative findings is not easy. However, there are several possible strategies and criteria that can be used to enhance the trustworthiness of qualitative research findings. *Trustworthiness* is the corresponding term used in

qualitative research as a measure of the quality of research. It is the extent to which the data and data analysis are believable and trustworthy. Guba and Lincoln (1981), Krefting (1991) and Creswell (1998) suggest that “the trustworthiness of qualitative research can be established by using four strategies: credibility, transferability, dependability and conformability, and are constructed parallel to the analogous quantitative criteria of internal and external validity, reliability and neutrality. Each strategy in turn uses criteria like reflexivity, triangulation and dense descriptions. The Researcher takes cognisance of this argument and prefers to use the term trustworthiness as it is used by several others to cover all these.

4.8.1 Credibility

Credibility in qualitative research is defined as the extent to which the data and data analysis are believable and trustworthy. Credibility is analogous to internal validity, that is, how research findings match reality. However, according to the philosophy underlying qualitative research, reality is relative to meaning that people construct within social contexts.

Qualitative research is valid to the researcher and not necessarily to others due to the possibility of multiple realities. It is upon the reader to judge the extent of its credibility based on his/her on understanding of the study. Most rationalists would propose that there is not a single reality to be discovered, but that each individual constructs a personal reality (Smith and Ragan, 2005). Thus, from an interpretive perspective, understanding is co-created and there is no objective truth or reality to which the results of a study can be compared. Therefore, the inclusion of member checking into the findings, that is, gaining feedback on the data, interpretations and conclusions from the participants themselves, is one method of increasing credibility. Although it has its own disadvantages, Lincoln and Guba (1985) consider member checking into the findings as “the most critical technique for establishing credibility” (p. 314).

4.8.2 *Transferability*

Research findings are transferable or generalisable only if they fit into new contexts outside the actual study context. Transferability is analogous to external validity, that is, the extent to which findings can be generalized. *Generalizability* refers to the extent to which one can extend the account of a particular situation or population to other persons, times or setting than those directly studied (Maxwell, 2002).

Transferability is considered a major challenge in qualitative research due to the subjectivity from the researcher as the key instrument, and is a threat to valid inferences in its traditional thinking about research data. However, a qualitative researcher can enhance transferability by detailing the research methods, contexts, and assumptions underlying the study. Seale (1999) advocates that transferability is achieved by providing a detailed, rich description of the settings studied to provide the reader with sufficient information to be able to judge the applicability of the findings to other settings that they know (p. 45).

Since this study adopts a single case study approach, the process of generalisation that aptly matches it is “inferential generalisation” which is best explained as generalising from the context of the research study itself to other settings or contexts (Ritchie and Lewis, 2003). Therefore, it is a requirement that the researcher documents and justifies the methodological approach, and describes, in detail, the critical processes and procedures that have helped him to construct, shape and connect meanings associated with those phenomena. Further, throughout the process of this study, the Researcher was sensitive to possible biases by being conscious of the possibilities for multiple interpretations of reality.

In qualitative research, generalizability is sometimes simply ignored in favour of enriching the local understanding of a situation. However, the Researcher has provided a rich, thick description⁵ of the study such that data and description speak for themselves to enable readers to appraise the significance of the meanings attached to the findings and make their own judgment regarding the transferability of the research outcomes. The thesis provides a detailed description of organisational context of UB in Chapter 1 in order to assist readers interested in making use of the

⁵ *Thick description refers to a detailed description of a phenomenon that includes the researcher's interpretation in addition to the observed context and processes. It may also include providing a thorough accounting of the methods and procedures followed during and after data collection.*

study outcome in other situations. Therefore, the generalizability issue has to be resolved by the reader of the research report based on how close the Researcher's and the reader's contexts are. It is a matter of judgement of the context and phenomena found which allows others to assess the transferability of the findings to another setting (Ritchie and Lewis, 2003, p. 268).

4.8.3 Dependability

Dependability is analogous to reliability, that is, the consistency of observing the same finding under similar circumstances. According to Merriam (1998), it refers to the extent to which research findings can be replicated (p. 205) with similar subjects in a similar context. It emphasises the importance of the researcher accounting for or describing the changing contexts and circumstances that are fundamental to consistency of the research outcome.

Reliability is problematic and is practically impossible as human behaviour is not static, is highly contextual and changes continuously depending on various influencing factors. It is further compounded by the possibility of multiple interpretations of reality by the study subjects; a similar study with different subjects or in a different institution with different organisational culture and context or by a different researcher may not necessarily yield the same results. The quality of inferences also depends on the personal construction of meanings based on individual experience of the researcher and how skilled the researcher is at gathering the data and interpreting them. As a result of all these, reliability in the traditional sense is not practical in a qualitative case study. Merriam (1998) suggests that reliability in this type of research should be determined by whether the results are consistent with the data collected. The following techniques are provided to achieve this:

- explain the assumptions and theory behind the study;
- use multiple methods of data collection and analysis (triangulation);
- explain in detail how data was collected to allow for an audit trail if necessary.

Merriam (ibid) provides the following six strategies to enhance internal validity in qualitative research:

- Triangulation – using multiple sources of data or techniques to confirm emerging findings;
- Member checks – taking data and tentative interpretations back to the people from whom they were derived and asking them if the results are plausible;
- Long-term observation;
- Peer examination;
- Participatory or collaborative modes of research;
- Clarifying the researcher's biases, assumptions, worldview and theoretical orientation at the outset of the study.

According to Seale (1999), dependability can be achieved through auditing which consists of the researcher's documentation of data, methods and decision made during a thesis as well as its end products. Auditing for dependability requires that the data and descriptions of the research should be elaborate and rich. It may also be enhanced by altering the research design as new findings emerge during data collection.

4.8.4 Confirmability of the findings

Confirmability is the degree to which the research findings can be confirmed or corroborated by others. It is analogous to objectivity, that is, the extent to which a researcher is aware of or accounts for individual subjectivity or bias. Seale (1999) argues that auditing could also be used to establish confirmability in which the researcher makes the provision of a methodological self-critical account of how the research was done (p. 45). In order to make auditing possible by other researchers, it is a good idea that the researcher archives all collected data in a well-organised, retrievable form so that it can be made available to them if the findings are challenged.

4.8.5 Triangulation

In social research, the term *triangulation* is used in a less literal sense—it involves the use of multiple methods and measures of an empirical phenomenon in order to

‘overcome problems of bias and validity’ (Blaikie, 2000; Scandura and Williams, 2000).

Triangulation arose from an ethical need to confirm the validity of the processes and, in case studies, it can be achieved by using multiple sources of data (Yin, 2003). It is an approach that utilizes multiple data sources, multiple informants, and multiple methods (e.g., participant observation, focus groups, member checking, and so on), in order to gather multiple perspectives on the same issue so as to gain a more complete understanding of the phenomena. Triangulation is used to compare data to decide if it corroborates (Creswell, 2003; Patton, 2002), and thus, to validate research findings. It is one of the most important ways to improve the trustworthiness of qualitative research findings.

Triangulation being a way of mutual validation of results, it can uncover biases when there is only one researcher investigating a phenomenon. Triangulation may incorporate multiple data sources, investigators, and theoretical perspectives in order to increase confidence in research findings (Painter and Rigsby, 2005: [online]). The use of results from one set of data to corroborate those from another type of data is also known as *triangulation* (Brannen, 2004, p. 314).

Since any method can have weaknesses and strengths, triangulation is also a method to increase reliability by reducing systematic (method) error, through a strategy in which the researcher employs multiple methods or sources. If the alternative methods do not share the same source of systematic error, examination of data from the alternative methods gives insight into how individual scores may be adjusted to come closer to reflecting true scores, thereby maximising the richness and validity of the data, and thus, increasing reliability.

Triangulation is also often cited as one of the main ways of ‘validating’ qualitative research evidence. Yet much debate exists as to whether triangulation offers qualitative researchers a satisfactory method of verifying their findings. Many viewpoints have been expressed, resulting in the argument that the worth of triangulation is the provision of broader insights. For example, Richie and Lewis (2003) state that “the ‘security’ that triangulation provides is through giving a fuller picture of phenomena, not necessarily a more certain one” (p. 44).

Due to its multi-perspective sources and nature, Richardson (1995, p. 5) and Denzin

and Lincoln (2000) describe triangulation as **crystallization** which is more than the concept of triangulation. In the **crystallization** process (Richardson, 1995) the researcher told the same story through data gathered from different data sources. This was also followed by a process that considers the data from various angles – by highlighting different aspects, depending on different phases of the analysis. Borkan (1999) explains an extended form of crystallisation which is known as ‘Immersion/ crystallisation’ for the qualitative data analysis process. It involves:

- *Immersion* - a process whereby researchers *immerse* themselves in the data that they have collected by reading or examining some portion of the data in detail, and
- *Crystallization* - a process of temporarily suspending the process of examining or reading the data (immersion) in order to reflect on the analysis experience and attempt to identify and articulate patterns or themes noticed during the immersion process.

These dual processes continue until all the data have been examined and patterns and claims emerge from the data that are meaningful and can be well articulated and substantiated.

Triangulation is the major approach used to evaluate the outcome of this study. Focus group interviews and individual interviews were conducted with students based on the evaluation instruments provided in Chapter 5 (Appendices B and C). Other methods used were: participant observation (with field notes), member checking, peer reviews, and clarification of biases. The outcomes of the focus group interviews were triangulated with the user-satisfaction survey completed by the students as well as the reports of experts who though are colleagues. The views of the focus group participants were triangulated with the survey results and the observation report from colleague experts. Thus the triangulation exercises were done at various levels to focus on a final outcome based on various perspectives.

4.8.6 Expert evaluation

Four lecturers who coincidentally, are colleagues to the Researcher were selected to engage in some observational activities by occasionally visiting the face-to-face

sessions and also auditing the online learning space for an evaluation of the pedagogical benefits of blended learning and the interface design based on the LAPTEL Model. They were free to visit the face-to-face sessions and access the online part of the course anytime. They were briefed on the goal of the study and given copies of the all evaluation tools used in the study early enough. Section 4.7 presents the ethical considerations in this study.

4.9 Ethical Considerations

This being a qualitative study, the researcher has to interact deeply with the participants and the tutor, thus entering their personal domains of values, weaknesses, individual learning disabilities and the like to collect data. Silverman (2000, p. 201) reminds researchers that they should always remember that while they are doing their research, they are in actual fact entering the private spaces of their participants. Understandably, this raises several ethical issues that should be addressed during, and after the research had been conducted. Creswell (2003) states that the researcher has an obligation to respect the rights, needs, values and desires of the informants. Miles and Huberman (1994) list several issues that researchers should consider when analyzing data. They caution researchers to be aware of these and other issues before, during, and after the research had been conducted. Some of the issues involve the following:

- Informed consent (Do participants have full knowledge of what is involved?)
- Harm and risk (Can the study hurt participants?)
- Honesty and trust (Is the researcher being truthful in presenting data?)
- Privacy, confidentiality, and anonymity (Will the study intrude too much into group behaviours?)
- Intervention and advocacy (What should researchers do if participants display harmful or illegal behaviour?)

One of the normally unexpected concerns relating to ethical issues is the cultural sensitivity. Silverman (2000) argues that the relationship between the researcher and the subject during an interview needs to be considered in terms of the values of the researcher and cultural aspects.

Therefore, appropriate steps should be taken to adhere to strict ethical guidelines in order to uphold participants' privacy, confidentiality, dignity, rights, and anonymity. In view of the forgoing discussions, the following section describes how ethical issues in the conduct of the research have been addressed:

i) Informed consent

The Researcher informed the participants – the students and their tutor - of the purpose, nature, data collection methods, and extent of the research prior to commencement. Further, the Researcher explained to them their typical roles; this was very critical as the approach was all together different form the traditional face-to-face approaches. In line with this, the Researcher obtained their informed consent in writing in the format given in Appendix H.

ii) Harm and risk

In this research study the Researcher guaranteed that no participants were put in a situation where they might be harmed as a result of their participation, physical or psychological as stated by Trochim (2000a: [online]).

iii) Honesty and trust

Adhering strictly to all the ethical guidelines serves as standards about the honesty and trustworthiness of the data collected and the accompanying data analysis.

iv) Privacy, confidentiality, and anonymity

As the study included a test-retest reliability check, total anonymity was not possible. However, the Researcher ensured that the confidentiality and anonymity of the participants would be maintained through the removal of any identifying characteristics before widespread dissemination of information. The Researcher made it clear that the participants' names would not be used for any other purposes, nor will information be shared that reveals their identity in any way.

v) Voluntary participation

Despite all the above mentioned precautions, it was made clear to the participants that the research was only for academic purpose and their participation in it was absolutely voluntary. No one was forced to participate.

Based on the literature review, and the identified research methodologies, the next section describes the different stages of the study.

4.10 The Stages of the Research Study

The aim of the study is to design a Web-based blended learning environment; in the process both objectivist and constructivist approaches were utilised in a manner that would complement each other. The research was carried out in several stages as described below. Figure 4.3 represents the process of the design and development of the research in this study. It depicts the major facets of study. Such a framework helps a researcher to link concepts from literature to establish evidence to support the need for the research question, and to specify the significant disciplinary ideas and forms of reasoning that constitute the prospective outcomes or endpoints for the learners' learning (Cobb, Confrey, Disessa, Lehrer, and Schauble, 2003, p. 11).

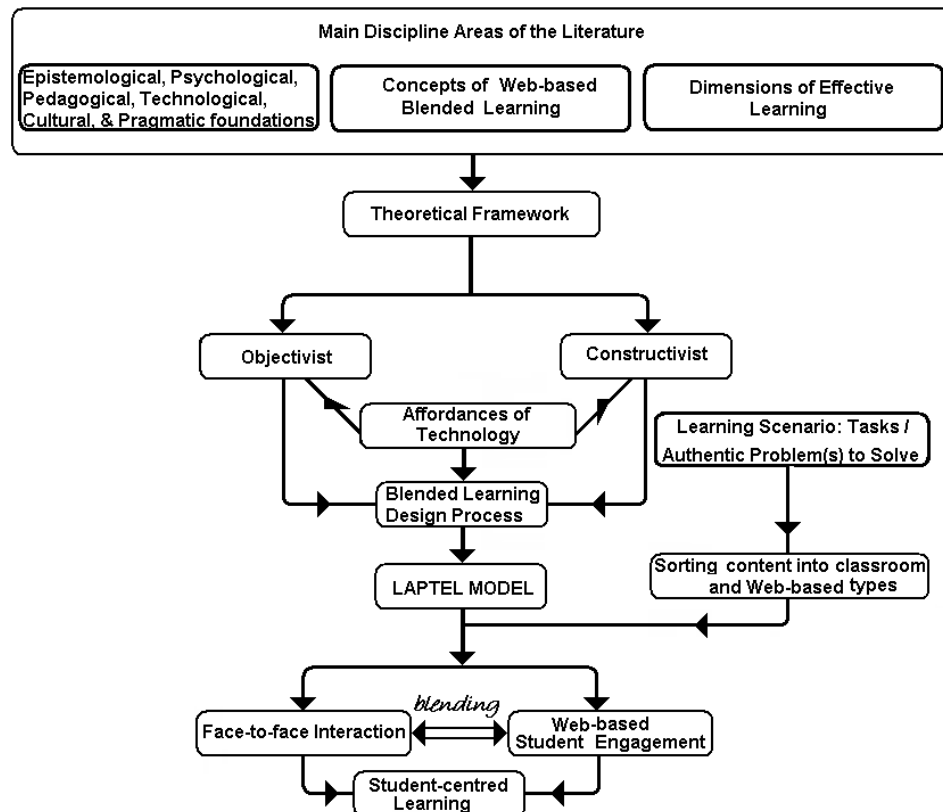


Figure 4.3: The conceptual framework for the research design and development of the study

Based on this framework, the information gathered from Chapters 2, 3 and 4, and the design principles presented in Section 5.6.1, a pedagogical design framework that will help translate the philosophy into actual practice was developed in Chapter 5.

Before the main study, a pilot study was conducted with another group of students for a period of three weeks in order to pre-test or 'try-out', to identify any problems associated with the proposed research design and its entire implementation and then, to modify the programme accordingly. However, the data from the pilot study was not mixed with the data from the actual study.

Once the pilot study has been completed and the course has been refined adequately, the Researcher together with the same tutor ran the course with another cohort and that represents the real study. During the implementation, the Researcher was a participant observer working through the programme with the students and the tutor, but not unnecessarily intimidating in the running of the programme unless they asked for any support. Students were given a copy of the content in their own flash memory stick or on a CD for offline use. Participants were informed in the beginning that they would be given a copy of all the activities they undertook during the study period; this may be kept by them as their personal ePortfolio for the study period.

Data collection and analysis were carried out as described earlier in order to establish whether the outcome of the study was achieved. Whether or not the study achieved its objectives was determined by analysing data collected through various methods that included observation, interviews, and questionnaire surveys on the usability of the programme. As part of observation, interactions in online chat sessions, discussion forums and email exchanges were reviewed.

The course was delivered through a mix of lectures, in-class discussions, project-based individual and collaborative learning activities, online discussions, chats, and just-in-time personalised feedback with assessments properly aligned with course activities and learning outcomes.

4.11 Blended Curriculum Design as Project Management

Caplan (2004) argues that:

Online course development is a complex endeavour, and it is not reasonable to believe that a high calibre online course of instruction can be created by just one or two people. Quality courseware production requires a highly organized, concerted effort from many players (p. 186).

In this study, the emphasis is on the design for learning and the required collaboration between instructional designers, instructors, media developers, technologists, and potential learners. According to Ismail (2002) many elearning projects do not realise their full potential, because they fail to adequately meet basic instruction goals and objectives, therefore an elearning environment model should include a project management component to assist the institution with collecting, organising, managing, maintaining, reusing, and targeting instructional content.

According to Steyn (1998), a project is a temporary endeavour undertaken to create a unique product or service (p. 2). Project management has a defined set of resources, a timeline, and a clear deliverable. Bates (2000) argues that:

the use of project management in an instructional technology environment leads to improved quality and cost effectiveness.... the project management approach to developing and delivering technology-based teaching and learning ensures that resources are used efficiently and that individual team members contribute appropriate skills and knowledge to the project (p. 66-68).

In an instructional design and development environment, a project management team usually has different roles and work together in synergy. According to Bates (2000), the roles are typically those of project or course manager, project leader (academic), instructional designer, subject expert, instructional technologist/ author/ multimedia developer and sometimes a graphic designer, editor and programmer (p. 67). They carry out a participatory approach to quickly analyse and design instructionally sound learning environments. The success of a project depends very much on the ability of the team to work together. Liu, Jones, and Hemstreet (1998) argue, "As multimedia development demands the cooperation of many highly skilled and talented individuals, division of responsibilities, smooth communication, and strong

commitment to the objectives of the project are essential to make a project successful".

If the team is made up of small sizes, it is common for team members to play multiple roles, in which case some roles may overlap. A project approach must also consciously attempt to focus on cost effectiveness within the design process. This study employed a collaborative team-based approach to online course development bringing together people each with unique skills, into a course design and development team.

4.11.1 Course Design and development team roles

Although specific roles in collaborative approaches for online course design and development may vary, they can be grouped into four general categories: (i) project management, (ii) subject matter expert, (iii) instructional design, and (iv) Others: Media development/support/production, and Editor. It is very important for all team members to be clear on what their role(s) and have an understanding of the responsibilities and expectations for other team members (White, 2000).

(i) Project Manager

An instructional designer often serves as the project manager (Caplan, 2004) and can have administrative duties (outside the realm of instructional design) of organizing the course development process. If the project manager is not an instructional designer, the role of coordination is often shared between the instructional designer and the project manager, to ensure consistency across the team, and to help identify challenges that emerge as the design process progresses.

The project manager addresses the project conceptualization stage which comprises a critical look at the educational needs, the objectives, the interface design and a proposal for the delivery of content. A kick-off meeting will endorse a project proposal or charter, to identify the goals and objectives for the project, clarify team member's roles, and outline the project's timeline. The meeting finalises the design principles that lead into an educational model after which an iterative process of design and development is followed. S/he will also facilitate a liaison with external specialists. The project manager is also responsible for outlining the schedule for the

project and for ensuring that all team members are able to fulfil their tasks on time, and responds to challenges as they occur across the project timeline. Status reports are then issued regularly by the project leader and sent to all stakeholders. According to Liu et al (ibid), s/he coordinates the efforts of the team, encourages positive interpersonal communications, and ensures that team members stay on track and complete their part by specified deadlines.

(ii) Subject-matter expert (SME)

SME is often a faculty member who takes the role of the content developer to design and develop content in a manner that is suitable for the LMS, easy to access and interesting for the students. Although instructional designers will assist with issues of online pedagogy, Caplan (2004, p.188) argues that faculty must also be responsible for the following:

- identifying or creating textbooks, readings, and resources;
- ensuring a pedagogical “match” among the course objectives, content, exercises, examinations, and assignments;
- identifying materials that require copyright clearance, and providing the instructional designer with the necessary information; and
- providing other team members with a legible copy of any written material.

(iii) Instructional designer

The instructional designer works closely with faculty to facilitate the design of activities and materials that are appropriate for the online environment. Instructional designers have several practical roles (Caplan, 2004) that include:

- making the SME aware of appropriate pedagogical strategies and options;
- helping to determine, create, and adapt instructional resources;
- providing advice on how best to present information;
- writing statements of learning outcomes;
- sequencing learning outcomes and activities;
- evaluating instruction;
- arranging technical production and services;

- usually acting as project manager;
- acting as editor; and
- acting as Web developer.

When the Instructional designer is also the project manager, instructional design tasks are embedded into a project management tool to allow tasks to be assigned and tracked. Hixon (2008) argues that the instructional designer stays on top of where the course is, what is going on, and making sure that everybody is on the same page. They usually produce a storyboard and flowchart of the complete structure of the envisaged final elearning environment. This approach leads to generic and flexible models that enable developers who are not trained in instructional design principles to adopt and follow a good instructional design methodology in developing learning environments for any teaching subject. When supplemented by templates, this approach allows content developers to adequately plan and execute the development of their elearning project.

(iv) *Others*

The *Multimedia and Web Developers* add interactive materials and multimedia elements. They describe different ways in which different components of the course – the learning objectives, an outline of the content, assignments, evaluation information, resources, links, a list of requirements, and FAQs— can be displayed to make them inviting to the students.

Caplan (2004) identifies their other roles as:

- helping the SME or instructor to use the tools to create the course Web pages, and to maintain the course when complete;
- helping the instructor or tutor to use the tools needed to make the course interactive, such as email and chat utilities;
- working with the graphic designer to conceptualize the screens, backgrounds, buttons, window frames, and text elements in the program;
- creating interactivity, and determining the “look and feel” of the interface; and
- creating design storyboards.

Usually a graphic designer works with the Web developer as the content is being developed. S/he also ensures that SME will have continuing support in designing appropriate high quality graphical elements when courses are being updated or revised.

A programmer may not be necessary when using a readily available LMS such as WebCT.

If an *Editor* or technical writer is involved in the team s/he usually works closely with the content developer and the instructional designer, and is responsible for ensuring that the content is well written and meets quality standards. The editor reviews the course content for spelling, grammar, tone, and general usability.

Library/information resource specialists play an important role in making the necessary resources available to both faculty and students. They are consulted at various stages of the course development, but they are not usually considered part of the course development team.

In order to develop effective instructional design, and for the practices to have a significant impact on course activities and course quality, Shulman (1986, 1987) argues that instructional designers need to understand not only pedagogical strategies and learning theory, but also have some understanding about the subject matter being taught and the culture of the discipline. Research on instructional design has not explored the possible impact that the disciplines might have on instructional design, yet this Researcher endorse this view as it is a sensible belief.

Shulman introduced a framework for introducing the concept of pedagogical content knowledge (PCK) for instructional designers. In Shulman's view, PCK is a form of practical knowledge that is used by teacher practitioners to guide their actions in highly contextualized classroom settings. This form of practical knowledge involves (a) an understanding of how to structure and present the subject matter to be learned, (b) an understanding of the common conceptions, misconceptions, and difficulties that learners encounter when learning particular subject matter, and (c) knowledge of the instructional strategies that are effective at addressing students' learning needs in particular classroom circumstances. In other words, pedagogical content knowledge should become integrated within the roles and functions of instructional designers.

4.12 Summary

This chapter has outlined the research paradigm, research methodologies, strategies and design used in the study, including procedures, participants, data collection tools, data collection and analysis methods, and data credibility issues. The research design for this study was a descriptive and interpretive case study that was analysed largely through qualitative methods mainly using descriptive statistics. Further it also briefly described the several stages involved in the design and development processes of the research in this study. The next chapter provides the design principles, evaluation instruments, and then the pedagogical framework for the study that helped to translate the philosophy into actual practice.