

CHAPTER 1

GENERAL ORIENTATION

1.1 INTRODUCTION

In recent years, new computer technology has become widespread throughout the world in many spheres of society, particularly in education. The use of the Internet and the World Wide Web (WWW) for learning and teaching is causing a major change at schools and colleges across South Africa. The research shows that the WWW and Internet technologies have become accepted and valuable tools for delivering course content in online learning, as well as a means to supplement traditional classroom instruction (Halloran, 1998: [online]). They are also a means for engaging students in interactive learning environments (Novak, 1999). Early attempts at using the WWW for educational applications is most often referred to as “web-based education” (WBE) (Stoltenkamp, 2003:13), “web-based instruction” (WBI) or “web-based learning” (WBL). This phenomenon is often referred to as “online education,” “online learning” or “e-learning.” In order not to confuse these terminologies, the term “online learning” will be purposely chosen to use in this study.



Online learning is interactive learning using the Internet to access learning materials, to interact with the instructor and learners and to obtain support and to grow from the learning experience (Ally, 2004:[online]). It is viewed as an innovative approach for delivering instruction to a remote audience through using the WWW as the medium (Khan, 1997). WWW Course Tools (WebCT), as one specific WWW-based course tool, is widely adopted for online learning, as well as being an interactive learning system that facilitates the creation of a WWW-based learning environment. WebCT claims to provide powerful and easy-to-use tool suits for instructors to build and manage virtual classrooms without sophisticated computer programming (Hindes, 1999:[online]). One of the many benefits of using WebCT includes the ability to offer an “always on” environment, providing more time for the student to interact with the lecturer and classmates as well as with the course material in an efficient, engaging and effective manner (University of Nevada, Reno, 2004: [online]).

Although the widespread use of WebCT is considered useful for improving students' learning, there is little authoritative documented evidence of how effective it is for learning. According to Reeves (1988), interactive learning systems are not always more effective than traditional methods of education and training. The reason for advancing this result is because there is no agreement about how to measure the effectiveness of interactive learning systems for learning. Without knowing how effective an interactive learning system is for learning, one will not know the value of its use. For this reason, the effectiveness of a training programme like WebCT should be evaluated. In this study, the interest of the researcher is in measuring how effectively Masters students learnt about Instructional Design using an interactive learning system in a course that is offered using a blended teaching/learning method. Selecting an effective evaluation model to find out the answer is thus a primary purpose for this study.

1.2 BACKGROUND TO THE RESEARCH PROBLEM

Computers properly used can improve learning effectiveness and efficiency (Alessi & Trollip, 2001:5). Many research studies have been conducted to prove that using computers to teach is better than using books, teachers or other more traditional methods (Kulik & Kulik, 1986; 1991). Overall, reviews of these studies claim a small effect in favour of computer-based instruction (CBI). Some researchers have argued that small differences are either a research artefact or caused by some reasons other than computer use (Clark, 1983). In addition, a considerable debate has surrounded whether computers or any medium can improve learning (Clark, 1994; Kozma, 1991, 1994; Tennyson, 1994).

According to Louw (2001:1), in the twentieth century, educators and behavioural scientists have compared the instructional effectiveness of different delivery media. Literature shows many comparisons that generally follow the approach of traditional and teacher-mediated learning against technology-based devices. More recent researches report that it is no longer necessary to convince people that computer technology has improved dramatically, and computers can be useful for learning. However, the quality of software for learning still lags far behind. Software that promotes truly active learning is still the exception.

Anderson and Elloumi (2004:[online]) refer to Clark and Kozma (2001) who state that there is an ongoing debate about whether it is the use of a particular delivery technology or the design of the instruction that improved learning. It has long been recognized that specialized delivery technologies can provide efficient and timely access to learning materials. However, Clark (1983) has claimed that technologies are merely vehicles that deliver instruction, but do not of themselves influence students achievement. As Clark noted, meta-analysis studies on media research have shown that students gain significant learning benefits when learning from audio-visual or computer media, as opposed to conventional instruction. The same studies however suggest that the reason for those benefits is not the medium of instruction, but the instructional strategies built into the learning materials. Similarly, Schramm (1977) suggests that learning is influenced more by the content and instructional strategy in the learning materials than by the type of technology used to deliver instruction.

In comparison, Milne's (2001:[online]) article entitled "Effectiveness of Online Classes Distance Education Research," the author reports that few research projects demonstrate that online learning is the same as, or sometimes even better than, face-to-face learning. Researchers come to the conclusion, and extend a line of findings about online education, that there is "no significant difference" in delivery methods. The most cited source in this area is Tom Russell's 1999 meta-analysis of research from 1928-1998, which is called the "No-Significant-Difference Phenomenon." Furthermore, Niemiec and Walburg (1992) both provide literature reviews on evaluation of educational computing. Numerous studies have attempted to compare computer-based learning delivery with traditional delivery. Most studies have reported little "significant" difference in learning outcomes but overwhelming evidence of attitudinal differences.

More interestingly, as Storey, Phillips, Maczewski and Wang (2001) stated, institutions are adopting WWW-based learning tools without fully understanding their impact on the institution, administrators, instructors, and students. If institutions do not fully understand how interactive learning systems (such as WebCT) impact on students, it is impossible to enhance students' learning. Williams (2002:[online]) concludes that how to best evaluate the worth and merit of learning technologies in education is a continuing concern.

Therefore, the researcher believes that the challenge remains that finding appropriate ways to determine the effectiveness of interactive learning systems (like WebCT) is crucial. To determine the effectiveness of interactive learning systems, this study contends that the effectiveness of such systems will best be determined when the learning effectiveness has been determined. In addition, it is suggested that learning effectiveness cannot simply be determined by standardised tests and examinations. The reason is that the limitations of these instruments, as true evaluation instruments, have been widely reported in the literature. For instance, their validation procedures are complex; they can discriminate against students with reading difficulties and the actual skill demonstration cannot be evaluated via standardised test and examination (Sheinker, Barton & Lewis, 2002: [online]).

According to Bransford, Brown and Cocking (1999:39), learning is effective when the transfer of learning takes place. The 'Transfer of Learning' refers to the ability to use learnt knowledge and skills in new situations. If the transfer of learning is not achieved, the goal of the educational intervention has not been achieved. According to Kirkpatrick (1994:42), learning effectiveness is determined by measuring what knowledge is learned, what skills are developed or improved, and what attitudes are changed. Measuring learning is important because no change in behaviour can be expected unless one or more of these learning objectives have been accomplished. In order to determine the effectiveness of learning, Kirkpatrick (1994) suggests that a four-level evaluation model must be used. The four level measurements are learner reactions, learning, job behaviour, and observable results.

This study elects to determine the effectiveness of an interactive learning system (WebCT) by exploring the learning of a selected cohort of students in a Masters course in Computer-based Education. Due to the sheer volume of learning that takes place in this course, a single theme (Instructional Design) is selected. The framework against which the learning will be assessed is the Kirkpatrick evaluation model, as the researcher deems as the most appropriate and suitable in this context (see Chapter 3).

1.3 THE RESEARCH QUESTION

Based on the background sketched in paragraph 1.2, the research question that will guide this study is formulated as follows:

How effectively did Masters students in Computer-based Education learn about Instructional Design using an interactive learning system?

In order to answer the research question, the following sub-questions need to be posed:

- 1) How can the effectiveness of learning be determined?
- 2) How can it be determined if interactive learning software is effective for learning?
- 3) How effectively did learners in a Masters course on Computer-based Education at RAU learn?

1.4 THE RESEARCH AIM AND OBJECTIVES

The aim of this study and the objectives of the research are defined as follows.

1.4.1 The aim of the research

The aim of this study is to determine how effective an interactive learning system is for learning in a Masters course in Computer-based Education at RAU.

1.4.2 The objectives of the research

In order to achieve the research aim, the following objectives are formulated to guide the research:

- To carry out a literature review in order to determine how the effectiveness of learning can be established.
- Generate an evaluation instrument for determining the effectiveness of learning by using the Kirkpatrick evaluation model for learning evaluation.

- Evaluate, by means of case study research, how effectively students in this inquiry learned by using an interactive learning system.

1.5 THE RESEARCH DESIGN

A brief research design is described in this section. The full details are given in Chapter 2.

1.5.1 The participants in this study

The participants in this study are Masters students who take part in Computer-based Education course at the Rand Afrikaans University, Johannesburg, South Africa.

1.5.2 The research methodology

The “design type” (Henning, Van Rensburg & Smit 2004:38) of this study is a case study, utilising qualitative data and quantitative data. The researcher is a student in the course and is as such a participant-researcher. The sample is selected from a cohort of 18 students in the Masters course. A review of relevant literature is conducted in order to provide the theoretical background for this study.

The data are collected through using observations (fieldwork), individual interviews and questionnaires, and the analysis of documentation. Through analysing the collected data, the experience of students about the effectiveness of using an interactive learning system for learning is interpreted. In addition, their pre- and post- knowledge in the selected theme will be assessed by means of questionnaires and interviews. A complete description of the research methodology is found in Chapter 2.

1.5.3 Literature review

Before carrying out the empirical research, it is necessary to focus on the research questions required do a literature study. The literature review will provide information on the background for this study and form the basis for a theoretical framework and rubrics for this study.

1.5.4 Data collection techniques

Data collecting is aimed at determining how Masters students experienced using an interactive learning system for learning and how effective learning among them occurred.

This research uses the conventional main data gathering/collection methods, namely: questionnaires, observations, interviews and the document analysis. The data is collected against the framework established by Kirkpatrick (1994). This requires data collection in relation to the four levels of the model:



Level 1: Reaction	Questionnaires/Observations/Interviews
Level 2: Learning	Interviews/Document analysis
Level 3: Behaviour	Questionnaires/Interviews
Level 4: Results	Interviews (Adapted for workplace results)

1.6 THE RESEARCH PROGRAMME

Chapter two explains the research design and the research methodology for this study in detail. A description of the data-gathering instruments is given.

Chapter three is a review of the most relevant literature with regard to inquiry paradigms and evaluation models for evaluating online learning. It provides the theoretical framework and informs rubrics for this study.

Chapter four presents programme descriptions. An overview of the Masters course and the training programme WebCT used for this course are given.

In Chapter five, the data analysis is undertaken and the finding results of evaluation with regard to the research topic are reported.

Chapter six contains an overview of the study, conclusions, action taken, considerations and recommendations. Deficiencies of the research and recommendation for further research are also considered.

1.7 SUMMARY

This chapter presents a contextual framework and a rationale for the research. The research question “How effectively did Masters students in Computer-based Education learn about Instructional Design using an interactive learning system?” is clearly stated. The aim and the objectives of the research are defined. A brief research design for the research is given. An evaluation case study based on qualitative data and quantitative data will be researched. Chapter two will describe the research design in detail.



CHAPTER 2

RESEARCH DESIGN

2.1 INTRODUCTION

In chapter one, the general orientation of the research study was presented. This chapter discusses the research design and the methodology used for this particular study. The selection of participants, the methods of data collection and the data analysis are described. The purpose of the literature review, the trustworthiness and ethical considerations of the research are also briefly discussed.

2.2 THE RESEARCH DESIGN

The research design refers to the detailed plan of how a research study will be conducted. It provides the framework according to which data are to be collected to investigate the research question (De Vos, 1998:123). The function of the research design is to provide a plan for the assembling, organizing and integrating of data which results in a product which is the research findings (Van Der Westhuizen, 1999:123). In the research design, the researcher should select the research approach, the nature of the research questions and the resources available to him/her (Schurink, 1998:253). For example, the researcher may begin with examining the relevant literature and filling in his/her knowledge of the subject and learning what others say about it as an important aspect of enabling him/her to select a research design (De Vos, 1998:46). In addition, the design should utilize the techniques that best fit the problem and [which] give the most reliable and valid data (Hopkins, 1996:237). In this study, in order to answer the research question, "How effectively did Masters students in Computer-based Education learn about Instructional Design using an interactive learning system?" the researcher considers to conduct an empirical research. The heart of empirical research lies on a well-planned and structured research design. The well-planned and structured research design in this study include an explanation of the paradigm (the qualitative research approach), the method (the research methodology), data collection instruments, data analysis techniques, the literature review, measurements to establish the trustworthiness and ethical considerations of the research.

2.3 THE QUALITATIVE RESEARCH APPROACH

According to Guba and Lincoln (1988), qualitative research uses a naturalistic approach that seeks to understand phenomena in context-specific settings. It focuses on the experiences, interpretations, impressions or motivations of an individual or individuals which seek to describe how people view things and why. The purpose of qualitative research is to describe, interpret, verify and evaluate (Hittleman 1997:42) and it relates to beliefs, attitudes and changing behaviours (CIREM, 2004:[online]). In qualitative research, information can be gathered through visual materials, participant observation, in-depth interviews and document analysis. The researcher uses a qualitative approach as a way of approaching the empirical world (Schurink, 1998:243) for a deeper understanding of a complex phenomenon.

However, qualitative research is not like quantitative research, which interprets data by means of numbers, statistics and quantitative values (Silverman, 2000); rather it focuses on an in-depth understanding of the meaning of phenomena. Qualitative research is usually conducted in a real-life situation (Tesch, 1990:43). Using this approach allows researchers to examine the complex phenomena without relying upon the structured data collection necessitated by quantitative designs. In qualitative research, researchers attempt to describe and interpret some human phenomenon, often in the words of selected individuals. They try to be clear about their biases, presuppositions and interpretations so that others can decide what they think about it all (Heath, 1997). Interpretation of data is done by means of set criteria in order to determine the quality of the findings. According to Royse, Thyer, Padgett and Logan (2001:83), all qualitative studies share the following three common ingredients: 1) focus on naturalistic settings *in situ*; 2) rely upon the researcher as the instrument of data collection, and 3) report emphasizing narrative over numbers.

Qualitative research is a popular research approach and can be used in many fields of study. There are many reasons for doing qualitative research in this study. Firstly, in order to understand the meaning of the phenomena, such as “How effective an interactive learning system is for learning?” this study needs to be conducted in a real-life situation, at a Masters course at RAU. Secondly, the researcher is more interested in what the learners said rather than in the numbers of

learners making a particular statement. In order to gather a rich data set, this study can not merely rely upon the quantitative design to use the survey questionnaires; rather it relies upon the researcher as the “human instrument” of data collection. Thirdly, in the research finding, the researcher wants to describe and interpret the complex phenomena by using the words of selected individuals, careful analysis of documentation and participant observations. The research findings will be interpreted using inductive data analysis. The final report requires narrative over numbers. For all these reasons, the researcher needs to follow the qualitative research design in this study.

2.4 THE RESEARCH METHODOLOGY

The research methodology refers to the method of collecting data in qualitative research. It focuses on the sources and the methods to be used in generating qualitative data (Mason, 1997:35). The research method used in this study is a case study, which is a form of qualitative descriptive research. The case study, however, is distinguished from other types of qualitative research, focuses on more intensive descriptions and analyses of a single unit or bounded system (Smith: 1978), such as an individual, a programme, event, group, intervention or community.

According to Bless and Higson-Smith (1995:44), the case study is used as a way of organising social data and looking at individuals, a small group of participants, or a group as a whole. The reason for using a case study in this research is that the researcher does not want to focus on the discovery of a universal, generalised truth, nor typically look for cause-effect relationships; instead, emphasis is placed on exploration and description of how students effectively learnt about Instructional Design using WebCT in the Masters course. In order to gain an in-depth understanding of this phenomenon, the researcher needs to look intensely at an individual learner or a small group of Master learners to be studied as a whole in that specific situation.

Henning, Van Rensburg and Smit (2004:42) state that a case study requires multiple methods in order to truly capture the case in some depth. In this study, to obtain an in-depth account of learner experience of using WebCT for learning, the case study needs to combine a mixture method of data collection to triangulate findings because a combination of methods can provide a more complete insight. In addition, the use

of multiple-data-collection methods can contribute to the trustworthiness of the data. This practice is commonly called “triangulation” (Glesne & Peshkin, 1992:24). The term “triangulation” in research refers to the combination of two or more theories, data sources, methods, or investigators in one study of a single phenomenon to converge on a single construct (Hilton, 2004: [online]). Triangulation not only examines the same phenomenon from multiple perspectives, but also enriches the researcher’s understanding by allowing for new or deeper dimensions to change (Maanen, 1983:138). In this study, using mixed-method data collection instruments by surveying and interviewing learners, observing their behaviour, analysing their assignment, and evaluating their performance records, the question about “how students effectively learnt about Instructional Design using WebCT” can be studied and interpreted. Thereafter, the conclusion of the research finding, thus, can be drawn.

2.5 SELECTION OF PARTICIPANTS

The participants in this study are first year Master's degree students who are enrolled for the Computer-based Education course in 2004 at the Rand Afrikaans University, Gauteng, South Africa. In order to capture the rich data, all 18 students who are studying at this course are selected for data collection. Some of them will be interviewed as “key informants” (Creswell, 1994).

2.6 DATA COLLECTION INSTRUMENTS

Data is usually collected through various methods, such as open-ended interviews, review of documents and through participant observations. The researcher’s choice of data collection mode is driven by the goals of the evaluation and the availability of resources. Whenever possible, more than one source of data is pursued. More importantly, the researcher needs to be clear about the types of data that are needed and what evaluation questions can be addressed.

The choice of selection of data collection instruments in this study is based on the Kirkpatrick four level evaluation model. The researcher believes that the Kirkpatrick evaluation model provides a conceptual framework to assist in determining what data should be collected for evaluation purposes. By using this model as a framework, an evaluation instrument to determine the effectiveness of learning will

be generated. How effectively students in this inquiry learnt by using the blended interactive learning system will also be evaluated. To conduct such an evaluation, the mixed data collection methods will be used for gathering the rich data. A detailed discussion of the mixed data collection methods, such as observations, questionnaires, interviews, and the document analysis, follows.

2.6.1 Observations

Observations are one of the most important data collection techniques used by qualitative researchers. Reasons for utilizing observational techniques include the following: Observations can give additional and more accurate information on behaviour of people than interviews or questionnaires. Observational techniques build on direct experience; they make it possible to record behaviour and events as they occurred, to build on both propositional and tacit knowledge. McCall and Simmons (1969) claim that observational techniques are well adapted to “maximize discovery and description.” They can enhance the observer’s ability to understand complex situations. The use of observational techniques may be the only way to understand the complexity of the situation or behaviour (Guba & Lincoln, 1988:193). The purpose of using observations as a data collection method in this study is to determine how learners experienced the use of an interactive learning system for learning. Their reactions of using that learning system for learning will be observed.

There are two types of observation, namely: direct observation and participant observation. According to Lautenbach (2000:46), direct observation is impossible in a virtual classroom whilst the learners are engaged in a learning activity. Van der Westhuizen (1999:135), however, argues that it is possible to observe activity in the WWW-based environment. He refers to this type of observation as a virtual observation. The researcher believes that learners submit their work electronically through using WebCT makes learning in an online learning environment observable and the actual contributions of the learners can be observed.

Participant observations are one of the primary data collection techniques used by qualitative researchers (LeCompte & Preissle, 1993:195). The observer takes part in the situation he/she observes. As a class member and an observer, the researcher does the same work and experiences the same environment and circumstances as the rest of the group. It is able to observe and experience how

learners benefit using WebCT for learning. Both direct observations and participant observations are used in this study.

2.6.2 Questionnaires

A survey questionnaire is an effective instrument for gathering data from many participants. The survey questions can be open-ended or closed (with pre-categorised answers). The questions are often presented and are to be answered by the respondents in written form. Many researchers claim that pencil-and-paper surveys are convenient to use for both trainees and the evaluator because they are usually more practical. If a questionnaire is designed properly, it can provide data for the researchers. For instance, collecting data about learners' reaction to instruction, which is Level 1 in the Kirkpatrick (1994) evaluation model, is widely accepted and usually feasible in most contexts.

According to Kirkpatrick (1994), questionnaire forms are most often used for reactions and can protect the anonymity of respondents. Participant reactions are useful provided that they do not serve as the only level of evaluation data. There is clear evidence that when reaction data is used to measure learning or other achievement goals, the information can often indicate the exact opposite of what actually happened (Clark, 2001). When compiling a questionnaire, the researcher can find either "factual information" or "opinion." Therefore, planning the questionnaire is crucial. When the researcher designs the questionnaire it must be based on the research question to decide what questions to ask, how to sequence them and how to word them.

As Kirkpatrick (1994) said, the best way to assess reaction and attitude (Level 1) of students is to utilize the survey questionnaire. In this study, in order to evaluate reactions of students in the Masters course, a well-designed survey questionnaire is used and consists of two parts of questions. The first part questions are designed by using the standard five-point scales, such as: Strongly agree=5, Agree=4, Neither agree or disagree=3, Disagree=2, and Strongly disagree=1, and aim to gather students opinions on the training programme WebCT, the course, the learning environment, and their behavior change in which the training takes place. The second part questions are open-ended questions, which provide an opportunity to encourage students to write down their comments and suggestions about the

training programme and the course. The input of students can be used to improve the quality of learning in future. Their reaction and attitude about the course and the programme in this research will help the researcher to interpret whether WebCT is used successfully for learning in this Masters course and to what extent.

2.6.3 Interviews

Interviews are a powerful tool for collecting data that involve oral questioning of respondents, either individually or as a group. Answers to the questions posed during an interview can be recorded on video or audiotape, or written down, or by a combination of both. One advantage of using interviews is that they provide participants in an evaluation more opportunities to speak in their own voice and express themselves freely, instead of merely responding to the categories of questions that others have defined for them (Royse *et al*, 2001:94). Another advantage of using interviews is to allow for more in-depth on-the-spot questioning if needed. Guba and Lincoln (1988:164) state: “to compare questionnaires, interviews are more personal, and they are a better exploratory tool in research.”

The researcher believes that interviews with selected learners can be used to obtain rich data. In this study, individual interviews are used for data collection. The purpose of using individual interviews is to gather the data about how students effectively learnt about Instructional Design using WebCT in the Masters course. The best approach to find out what views students hold about how effectively they use WebCT for learning is to use a patterned interview in which all students are asked the same questions. The patterned interview questions in this study are mainly designed by focusing on attitudes, knowledge, skills, and behaviour changes of students.

An example of using attitude questions inquiry opinion of students is that in your opinion, “What are the most valuable about using WebCT for learning?” An example of using behaviour questions to measure whether or not students transfer their behavior to the workplace (Level 3) is that “Please tell me, if what you learnt in Theme 5 (Instructional Design Theory) influenced the way that you work at work?” If the answer is yes, then ask, “Could you please tell me how it influenced the way that you work at work?” If the answer is no, then ask the following questions: “Could you please tell me why?” “Do you plan to change some of your behavior in

future?” If the answer is yes, then ask, “What do you plan to do differently in future?” A tabulation of the responses of students will provide a good indication of changes in behavior.

During the interview, the data are recorded on a tape recorder and then they are transcribed. From the transcriptions and by using inductive reasoning, experience of learners with regard to using WebCT for learning is described and interpreted. The gathered data from the interviews is analysed and discussed in Chapter 5.

2.6.4 Document analysis

Document analysis can also be used as a data collection technique to capture the qualitative data. According to Guba and Lincoln (1988:232), documents are a stable, rich, and rewarding resource and represent a “natural” source of information in qualitative evaluation. In this study, document analysis mainly focuses on the students’ planning documents, which are a project plan about how to design an interactive learning package for learners with regard to Theme 5 - Instructional Design Theory. The results of the final practical design examination will also be analysed. All these documents are collected from the lecturer with permission. Through document analysis, the inquiry about how effectively students learnt about Instructional Design using WebCT can be interpreted.

2.7 DATA ANALYSIS

Data analysis is the process of systematically searching and arranging the interview transcripts, observation field notes and other sources or material that can accumulate to increase the researcher's own understanding and to enable him/her to present what the researcher has discovered to others (Creswell, 1994:153). Data analysis involves summarizing the mass of data collected and presenting the results in a way that communicates the most important features. To analysis and interpret the data, researchers must select a particular approach either an "ethnographic summary" or a "systematic coding through content analysis" (Welman & Kruger, 1999:201). In this study, the researcher chooses the latter by using "a process of line-by-line open coding" (Denscombe, 1998:208) for analysing qualitative data (see 2.7.2).

2.7.1 Preparing data

Once the data are collected, they must be produced in a way that they are interpreted and used by researchers. The initial step in analyzing qualitative data is the process of reducing the data, which is referred to as the process of "selecting, focusing, simplifying and abstracting the data there are collected" (Miles & Huberman, 1994). In this study, the researcher will first organize the collected raw data, and then transcribes them into a written format. According to the research needs, non-relevant data are then eliminated. The important data are mapped into tables and analysed.

2.7.2 Procedures for data analysis

Corbin (1990) proposes that data analysis for any type of qualitative research is made up of four phases, namely: defining analysis, classifying the data, making connections between the data, and conveying the messages. The basic process of analyzing qualitative data is to start by labeling or coding every item of information so that differences and similarities between all the different items are recognized. The process of analyzing data is called "coding" (Corbin, 1990:61). There are three ways in which data can be coded, namely: open coding, axial coding, and selective coding. Open coding is the process of breaking data down, examining, comparing, conceptualizing, and then categorizing. Axial coding negates themes and then

looks at instances in the data that supports those themes. Selective coding examines the themes for underlying connections to form one over-arching story line.

In this study, the researcher applies four data analysis phases as the above mentioned for analysing qualitative data. During data analysis, qualitative data are analyzed using qualitative techniques such as open coding. During the write-up of the research findings, numbers and narratives are presented to enhance the quantitative findings with richness and depth (Royse *et al*, 2001:88). The data that are analysed in this study firstly come from the survey questionnaires. Secondly, the data from the field notes made during observations are analysed. Thirdly, the transcripts from the verbal individual interviews are studied and also analysed. Lastly, the document analysis from the students' planning documents (assignments) and their examinations are scrutinised. All data analysed are based on the instrument formulated from the Kirkpatrick four level evaluation model. A detailed data analysis is presented in Chapter 5.

2.8 LITERATURE REVIEW

The literature review stresses the impact of theory in every stage of the study, from the problem statement through to data collection, data analysis and data interpretation (LeCompte & Preissle, 1993:151). Knowledge of literature helps the researchers to judge whether their research plans go beyond existing findings and might thereby contribute to their field of study (Glesne & Peshkin, 1992:17). Literature not only helps the researchers to find focus for their topic, but also informs the research design and interview questions. By focusing on the research inquiry, the theoretical framework for determining how to evaluate effective learning is provided in Chapter 3. The best evaluation model for effective learning is then formulated. The literature study will be used to analysis and interpret the data. The detailed relevant literature review is conducted in Chapter 3.

2.9 THE TRUSTWORTHINESS OF THE RESEARCH

Strauss and Corbin (1990:250) believe that the "usual canons of 'good science'...require redefinition in order to fit the realities of qualitative research." Lincoln and Guba (1985:300) then identify one alternative set of criteria that correspond to those typically employ to judge quantitative work (see Table 2.1).

Table 2.1: *Comparison of criteria for judging the quality of quantitative versus qualitative research*

Criterion	Quantitative Approach	Qualitative Approach
Truth value	Internal validity	Credibility
Applicability	External validity	Transferability
Consistency	Reliability	Dependability
Neutrality	Objectivity	Confirmability

The trustworthiness of this research is based on the terms of qualitative approach described as above.

2.9.1 The credibility of the findings

Both qualitative and quantitative researchers need to test and demonstrate that their studies are credible. The credibility in qualitative research is associated with the authenticity and trustworthiness of the data and the data analysis. While the credibility in quantitative research depends on instrument construction, in qualitative research, "the researcher is the instrument" (Patton, 2001:14). The credibility of a qualitative research depends on the ability and effort of the researcher. Therefore, qualitative researchers need to test and demonstrate that their studies are credible (Golafshani, 2003: [online]). In this study, the researcher, as the main instrument for data collection, has gained accurate data about "How effectively did Masters students in Computer-based Education learn about Instructional Design using an interactive learning system?"

2.9.2 The transferability of the findings

In the naturalistic paradigm, the transferability of a working hypothesis to other situations depends on the degree of similarity between the original situation and the situation to which it is transferred (Lincoln & Guba, 1985). In qualitative research, transferability related to the extent to which other researchers can apply the findings to other contexts or replicated the research by using other participants (Babbie & Mouton, 2001:277). In this study, the findings of the research can be transferable to other institutions of online learning. This study is accessible to all individuals who are interested in evaluating the effectiveness of an interactive learning system.

2.9.3 The dependability of the findings

In qualitative research, data must be reliable through checking. The dependability of the findings should be examined through reliability (Lincoln & Guba, 1985). Reliability is a crucial characteristic of measurement and refers to the consistency of a measuring device (Spector, 1981:13). In other words, "Does the instrument always come up with the same score or number when the true value is the same?" In qualitative research, reliability occurs when the recorded data accurately reflects what happened in the real-life situation (McMillan, 1992:223). Using many sources of data collection enhances the reliability of the findings in a study (Mouton, 1996:156). Triangulation is a method for improving the trustworthiness of qualitative research findings. In this study, several data collection methods are used and each method compensates for the weakness in any other method of data collection.

In qualitative research, dependability refers to the extent to which the researcher's categories and explanations correlate to what is actually true and it relates to how consistent the findings are (Krefting, 1991:221). In this study, the "code-recode" procedure is used to ensure dependability (Krefting, 1991:221). The findings of this study are a true reflection of what the participants said.

2.9.4 The confirmability of the findings

Lincoln and Guba (1985:320) use the term "confirmability" to refer to the degree to which the researcher demonstrates the neutrality of the research interpretations, through a "confirmability audit." This means providing an audit trail consisting of:

1) raw data; 2) analysis notes; 3) reconstruction and synthesis products; 4) process notes; 5) personal notes; and 6) preliminary developmental information. In other words, it is the degree to which the findings are the product of the focus of the inquiry and not of the biases of the researcher.

In this study, the researcher has ensured that the data supports the analysis and interpretation of the findings by providing the necessary relevant documentation.

2.10 ETHICAL CONSIDERATIONS OF THE RESEARCH

In the research, participants normally have certain generally accepted ethical rights. These are “privacy, voluntary participation, anonymity and confidentiality” (Bless & Higson-Smith, 1995:102). The researchers must respect the rights, needs, values, and desires of the participants. For instance, during the research, they need to consider whether their research procedures are likely to cause any physical or emotional harm. Harm may be caused, for example, by violating the right of participants to privacy by posing sensitive questions; allowing personal information to be made public which the participants will want to kept private; and failing to observe/respect certain cultural values, traditions or taboos by the participants. In order to avoid these issues happening, this research complies with ethical standards by:

- respecting the basic rights of the individual as a human being as well as the rights of the involved groups and communities. Participants participate voluntarily and are not disadvantaged by participating in this research project. Participants complete a consent form before the interview begins;
- respecting the dignity of the participants involved and not exploring sensitive issues. They are not exposed to intentions and motives not directly attached to the research project;
- considering the principles of reliability and validity in all aspects of the research, and by using methodical recording of processes and data, triangulation, and member-checking;
- ensuring the anonymity of the participants and the confidentiality of the data obtained; and

- ensuring the research findings and conclusions are made available for research participants and the wider education community.

2.11 SUMMARY

This chapter discussed the research design and the methodology used for conducting this particular study. It was pointed out that this study was a case study and followed the qualitative research approach. The mixed data gathering methods, such as the questionnaire, observations, individual interviews, and documentation analysis, were discussed. The procedures of the data analysis, literature review, trustworthiness and the ethical aspects of the research were also discussed. Chapter three contains a literature review relating to the research inquiry. It serves as a theoretical framework for this study.



CHAPTER 3

LITERATURE REVIEW - INQUIRY PARADIGMS AND EVALUATION MODELS FOR EVALUATING ONLINE LEARNING

“If anything exists, it can be measured.”

E. L. Thorndike (Scriven)

“A good evaluation measures the same thing from different angles.”

Robby Champion

3.1 INTRODUCTION

In chapter two, the research design and the methodology used for this study were discussed. This chapter conducts a literature review of what learning is, based on three basic learning theories. It then discusses how to measure the effectiveness of learning, through inquiring different paradigms and a review of several evaluation models.

3.2 WHAT IS LEARNING?

Learning is a complex phenomenon and has different meanings to different people. Individuals often define learning from their own perception. According to educational research (Oliver, 2002:[online]), the notion of ‘learning’ is contested. Different theories have different perspectives with this regard. In education, three basic learning theories (Behavioural Theory, Cognitive Theory, and Constructivist Theory) have had significant contributions to explain how humans learn. Understanding their principles of learning is essential to help a better understanding how they affect on the learning evaluation. A discussion of each theory follows.

3.2.1 Behavioural Theory

According to J. B Watson, a pioneer of Behaviourism, learning is defined as a sequence of stimulus and response actions in observable cause and effect relationships. The focus of behaviourism is on the conditioning of observable human behaviour (Forrester & Jantzie, 1999:[online]). Learning is based on observable behaviour of the learner in the environment in which the learner lives.

B. F. Skinner, a behaviourist, expands behavioural theory by focusing on “operant conditioning.” Skinner claims that voluntary or automatic behaviour is either strengthened or weakened by the immediate presence of a reward or a punishment. The learning principle behind operant conditioning is that new learning occurs as a result of positive reinforcement, and old patterns are abandoned as a result of negative reinforcement. Applications of Behaviourism in education are based on the principle that instruction should be designed to produce observable and quantifiable behaviours in the learner. For example, after completing a lesson, the learner should be able to do something. Many educators have found that using behavioural objectives is very effective because behavioural objectives are easy to develop and are related to improvement in student achievement (Simonson & Thompson, 1997:36).

The learning principles of Skinner to educational practice and to computer-based instruction both are significant. His techniques have an invaluable contribution to guide how to design and develop learning software. The key principles of his techniques include the followings: stating objectives in terms of desired outcome behaviours; assessing a student's previously acquired behaviours before any instruction; placing learners in a sequence of instruction; using teaching machines to reinforce and to strengthen desired behaviours, and recording a learner's progress to gain feedback for revising the lesson (Simonson & Thompson, 1997:38). Applying these principles to computing, the teacher can use them to design learning programmes to aim at producing desirable behaviours in learners. For example, learners are expected to achieve the desired objectives by following the instruction to do tasks, such as reading, memorizing and testing. To evaluate whether learners achieve the desired learning outcomes, they are expected to answer the assessment questions correctly. If the answer is given correctly, a positive response (feedback) will be given. Otherwise, they must follow the instruction, such as going back to review the content or re-answer the question, until they get the correct answer and achieve the desired objectives.

Identifying the outcomes of instruction is important for behaviourists. According to behavioural theory, three important principles need to be considered. Firstly, all instructions should be designed to produce observable and measurable outcomes in students. Instructions should be stated clearly what is expected of the learner. Secondly, the use of pre-assessment of students should be promoted so that

students can be placed in an instructional sequence at the point where they can achieve at a 90% level. Lastly, students learning should be measured (Simonson & Thompson, 1997:38). According to behavioural learning principles, to measure students learning, the most important thing is to see whether students have achieved the desired behavioural objectives after they complete the lesson. By applying this same principle to educational evaluation, it can be argued that learning is effective, if students achieve the desired learning outcomes. The researcher, however, believes that the outcomes of education and training must include more than just the learning achievement. Other factors, such as the learner satisfaction and creativity, must be included.

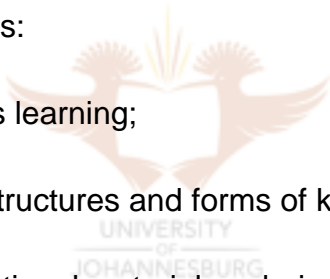
3.2.2 Cognitive Theory

In contrast, cognitive psychologists are moving away from the behaviourist approach and place emphasis on unobservable constructs for learning, such as the mind, memory, attitudes, motivation, thinking, reflection and other presumed internal processes (Alessi & Trollip, 2001:19). They believe that learning is the mental process of mind and the way information is received, organized, retained, and used by the brain. In other words, learning is an internal process that involves memory, thinking, reflection, abstraction, motivation, and meta-cognition. Individuals construct their own meaning through the interacting processes of assimilation, adaptation, accommodation and equilibrium, and the extension of schema, or ways of thinking (Teacher Education, 2002:[online]). Learning is what happened in people's heads.

According to Alessi and Trollip (2001:19), cognitive theorists look at learning from two different viewpoints. On one hand, from an information processing point of view, they believe that the learner use different types of memory during learning. They claim that information is stored initially in short-term memory and must be used or organized to become stored more permanently in long-term memory. The amount transferred to long-term memory is determined by the quality and depth of processing in working memory. Information transferred from short-term memory to long-term memory is either assimilated or accommodated. During assimilation, the information is changed to fit into existing cognitive structures. Accommodation occurs when an existing cognitive structure is changed to incorporate the new information (Ally, 2004:10).

On the other hand, they look at learning from a semantic network point of view in which each human brain cell is connected to many others in a vast spiderweb or network. Similarly, pieces of information or nodes are connected to many other pieces of information in a vast semantic network of interconnecting information and meaning. These nodes are connected by relationships or links. In a semantic network such as the brain, learning may be represented by removing or adding links between nodes or by creating or changing nodes. The assumption underlying this theory is that prior knowledge is critical. Learning is the incorporation of new knowledge into the network of prior knowledge. Incorporation of new knowledge may occur by assimilation, or accommodation, or a little of both (Alessi & Trollip, 2001:20).

Based on these beliefs, cognitive theorists believe that instructional design should take into account the cognitive structure of the learner and instructions must be based on a student's existing state of mental organization or schema. Bruner, an advocator of the cognitive approach, concludes that instructional design should take into account four major aspects:

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- 1) Predisposition towards learning;
 - 2) Consideration of the structures and forms of knowledge of the learner;
 - 3) Presentation of instructional material, as being the most effective sequence;
 - 4) Consideration of the form and pacing of reinforcement (Bruner, 1996: [online]).

The aspects of cognitive theory have given educators several interesting guidelines for designing and evaluating computer-based instruction. As Alessi and Trollip (2001:21) stated, the areas of cognitive theory are those relating to perception and attention, encoding of information, memory, comprehension, active learning, motivation, mental models, metacognition, transfer of learning, and individual differences that are most important to multimedia design. These categories reflect most of what is important when designing and evaluating interactive learning programmes.

Under these assumptions, the researcher believes that learning begins with attention to and perception of information in the learner's environment. Once the learner

attends to and perceived stimuli, information must be encoded and transformed into a format that can be stored in the brain. However, the learners must not only be stored and retrieved information, they must be able to classify it, apply it, evaluate it, discuss it, manipulate it, and teach it to other people. In addition, the most important is that the learner must be able to apply or use the learned knowledge or skills in the real world. Bransford *et al* (1990) call this “transfer of learning.” They emphasize that measures of transfer of learning play an important role in assessing the quality of learners’ learning experiences.

In order to ensure the transfer of learning to happen, motivation is essential to learning (Alessi & Trollip, 2001:24). In other words, the learner must be intrinsically motivated to learn and must take an active role to participate in the learning process. Clearly, the reason the cognitive approach has put increased emphasis on active learning and on learners’ activities being designed and selected is to enhance the transfer of learning. The meta-cognitive research stresses: “no matter how different each individual is, a significant part of effective learning is to be aware of, and in control of, one’s own learning” (Mestre, 2002:[online]). According to cognitive theory, to ensure effective learning occurred, all factors mentioned above should have been taken into account. To determine the effectiveness of learning, the measurement of the transfer of learning is very crucial because measures of transfer play an important role in assessing the quality of students’ learning experience.

3.2.3 Constructivist Theory

In recent years, constructivist learning psychologies have challenged the predominant cognitive approach. Cognitive constructivists believe that learning is an active process in which learners construct new ideas or concepts based on current and past knowledge (Bruner, 1996: [online]). All learners have the ability to construct knowledge in their own minds through a process of discovery and problem solving. Learning occurs and develops through interacting with one’s environment, exploring this environment and the active construction of knowledge from these experiences. Situating cognitive experiences in authentic activities is important for learning.

Based on these beliefs, current constructivists increase their emphasis on collaborative learning, instruction anchored in realistic contexts, communication

theory applied to learning, and a variety of new methodologies for online learning. They conclude that methodologies, such as hypermedia, simulation, virtual reality, and open-ended learning environments, allow learners to apply their own learning styles to explore information freely and use software as a resource rather than as a teacher (Alessi & Trollip, 2001:35). More importantly, the learning principles of constructivism have supported the use of computer-based tools with which learners can design and construct their own knowledge (Jonassen, 2000). Their viewpoints in computing have a broad implication for the use of multimedia software for teaching and learning. An example of using multimedia software includes using interactive learning systems such as WebCT for online learning.

According to social constructivists, all learning is social. Learning and development is a social and collaborative activity (Vygotsky). Learning should occur in a meaningful context. For instance, using authentic tasks and collaborative learning activities that must be personally relevant to learners; encouraging them actively construct knowledge by using discovery approaches. Following this assumption, the researcher argues that information technology (computers) can support social constructivist teaching and learning. For example, telecommunications tools such as e-mail and the Internet provide a means for dialogue, discussion, and debate - 'interactivity' that lead to the social construction of meaning. In addition, networked writing programmes provide a unique platform for collaborative writing. Moreover, simulations can make learning meaningful (Chen, 2003: [online]).

Through exploring different learning theories in terms of how humans learn, the question with regard to what learning is has answered. All these learning theories are equally important and make a large contribution to investigating the use of computers for teaching and learning. Current brain-based research, through using a multidisciplinary approach, has also contributed to explore learning by studying how people learn. The finding of brain-based research includes the following key points:

- Students come to school with pre-existing knowledge. Instruction must be based on a student's existing state of mental organization, or schema (Simonson & Thompson, 1997:41).
- Active learning is essential. Each student must be viewed as an independent learner and motivated to learn.

- Collaborative learning and communities of practice for student enhance learning and understanding of all subjects.
- Technology tools can enhance learning for students.
- It is necessary for teachers to rethink what is taught, how it is taught, and how it is assessed (GLEF Learning Interchange, 2001: [online]).

In conclusion, most learning aspects above are similar to the previous learning theories mentioned. Once again, the finding from the brain-based research shows that technology tools, such as computers, can enhance students learning. It also shows that conducting learning evaluation is important and rethinking how to measure learning is necessary. Understanding different learning perspectives not only helps evaluators/educators to design and develop a better interactive learning programme, but also serves how to guide the evaluation of that learning programme. In this study, to evaluate whether an interactive learning programme is effective for learning, the best way is to determine whether learning takes place. Before carrying on a learning evaluation, it is necessary to explore how to measure learning first.

3.3 HOW TO MEASURE EFFECTIVE LEARNING?

To measure the effectiveness of learning, it is crucial to select an appropriate evaluation model. One way of finding an appropriate evaluation approach is to review the relevant literature. In the following sections, the researcher first problematises the evaluation of learning by identifying four, often opposing, inquiry paradigms related to the evaluation of interactive learning which may influence the way that the evaluation of learning can take place. Then, different models of evaluating learning are presented and discussed, which further points to the diversity of methods by which learning can be measured. The aim of this section is therefore to conceptualize the difficulties associated with evaluating learning, and ultimately to select a paradigm and model for the evaluation of the learning that the participants in this research do.

3.3.1 Conflicting paradigms

According to Reeves and Hedberg (2003:27), there are four major inquiry paradigms related to the evaluation of interactive learning that influence contemporary

evaluation practice. A very brief sketch of each paradigm follows.

3.3.1.1 The Analytic-Empirical-Positivist-Quantitative paradigm

This is the most established of the paradigms that have guided evaluation and training in education. The assumptions of this paradigm are that complex social situations can be reduced to a string of variables. There is a reliance on controlled experimentation and events can be explained in terms of cause and effect. There can only be one 'right' interpretation that relies on statistical analysis of data.

This 'scientific' study is characterized by the use of quasi-experimental methods, control groups, control of variables and investigator objectivity in which data gathered by means of standardized instruments and analyzed via statistical procedures. They are concerned with the gap between stated objectives and learning outcomes. Such scientific study is often called "quantitative research." Quantitative research generally "...supported by the positivist or scientific paradigm, lead us to regard the world as made up of observable, measurable facts" (Glesne & Peshkin, 1992:6). It allows the researcher to familiarize him/herself with the problem or concept to be studied and generated hypotheses to be tested by employing experimental methods and quantitative measures. This research is well suited to evaluations requiring data from large numbers of respondents.

The problem of such quantitative studies, however, is the difficulty to set up controlled conditions. They are possibly unethical and the tests themselves may be unrepresentative of important learning outcomes (Reeves, 1997:167). Most significantly, their investigations are primarily concerned with proving or disproving a hypothesis, not how a phenomenon occurred. Furthermore, Guba and Lincoln (1989:16) argue that the relativist constructivist does not agree with the positivist formulation and can not accept it as one of many possible constructions. They think that the constructivist paradigm provides a better "fit" in matters of human inquiry than does the positivist paradigm. They critique that those conventional practitioners are malevolent; deliberately dishonest, deceitful, unconcerned about human rights and human dignity and are always willing to put the interests of science ahead of the interests of their subjects.

3.3.1.2 The Constructivist-Hermeneutic-Interpretivist-Qualitative paradigm

The term *constructivist* reflects the belief that knowledge is constructed by the individual and is socially negotiated (Guba & Lincoln, 1989:13). Such investigations focus on the context of the setting and acknowledged the multiple perspectives of stakeholders. The *Hermeneutic* represents the analysis of curriculum, instructional programmes, and products, including attempted to reveal the values underlying these phenomena. The *interpretivist* nature means that such approaches are concerned with human observation and qualitative methods. They recognize that the investigator is bound up in the situation, rather than being a separated, objective observer. The *qualitative* represents the emphasis on the human being as the primary evaluation instrument (Reeves & Hedberg, 2003:32). This paradigm is also called the *naturalistic, interpretive or hermeneutic paradigm* (Guba & Lincoln, 1989:83).

The assumption of the interpretive paradigm is that there is a focus on exploring the dynamics of interactions with the emphasis on the world as a socially constructed reality involving multiple perspectives. The perceptions and values of all the participants in a situation are needed in order to explore the various possible interpretations. The interpretive paradigm offers an alternative approach for investigating complex social processes, without resorting to a single viewpoint or mathematical model (Reeves, 1997:168). This paradigm is relevant to evaluation and instructional development studies, seeking rich information to inform decision-making. Guba and Lincoln (1989:82) believe that interpretive studies are generally an attempt to understand phenomena through the meanings that people assign to them. This interpretive paradigm provides the best “fit” whenever it is human inquiry that is being considered.

Although this qualitative paradigm has enriched humans’ understanding of social situations, the main problem with the qualitative approach is that it does not necessarily focus on the areas that need change. Descriptions are made, but often without any form of judgment attached. Another problem is that findings produce from interpretivist studies are too subjective, lacking in generalisability or being too difficult to produce (Reeves, 1997:169). Patton (1990) argues that, of course, qualitative methods are not appropriate for every evaluation. The key point is that knowing when to use them alone and when to consider using both quantitative and

qualitative techniques conjointly. Key (1997:[online]) states “qualitative research can be positivist, interpretive, or critical. The point is that, ideally, qualitative researcher draws on some combination of techniques to collect research data, rather than a single technique.”

3.3.1.3 The Critical Theory-Neomarxist-Postmodern-Praxis paradigm

The term 'Neomarxist' in this paradigm means that Neomarxist evaluators seek to expose the 'hidden curriculum' underlying instructional technology and other educational reforms. The 'Postmodern' perspective question the conception of instructional technology 'as neutral or as leading inevitably to progress' (Hlynka & Yeaman, 1992:2). Postmodernists deconstruct the 'texts' inherent in the products and programmes develop by instructional designers, seeking to reveal contradictions and the exclusion of minority interests. Deconstruction is a primary strategy within this paradigm. The 'praxis' aspect represents a desire to abandon the search for truth or understanding in favour of seeking 'little truths which are situationally appropriate' (Anderson, 1993:1). Critical researchers assume that social reality is historically constituted and is produced and reproduced by people.

The assumptions of critical theory paradigm are that:

- Critical theory aim to transcend the positivism of the traditional approach and the relativism of the interpretive approach by placing the process of critical reflection at the centre of the research process.
- The focus is on changing the world, not only describing it.
- The concept of praxis is important. Praxis is action that is informed by theoretical ideas and by the process of reflection on existing practice. Theory and reflection feed into the formulation of new practice.

Reeves (1997:170) concludes that this postmodern paradigm emerge as an alternative to the reductionist view of the positivist paradigm and the subjective views of interpretivist paradigms and is focused on action, rather than analytical modeling or description. Critical theory contends that power and oppression are the fundamental concerns of inquiry in social settings. Within instructional development, it encourages developers to question the cultural, political and gender assumptions

behind an educational project. Proponents will see hidden agendas behind instructional technology and education reforms, which can be revealed through criticism or deconstruction of texts. Participants in a setting are central to the inquiry and improvement is generated through reflective work practice.

In the Critical Theory-Postmodern approach, action inquiry has strong links to critical theory. Understanding the dynamics and multiple perspectives of those involved is important. Qualitative strategies are used in both a Constructivist-Interpretive-Qualitative approach and Critical Theory-Postmodern approach, but the distinction lies in the purpose to which the evaluation will be put. Reeves and Hedberg (2003:33) comment that this postmodern paradigm may be difficult to conceive, much less apply, from the perspective of the evaluation of interactive learning systems. Hlynka and Yeaman (1992) conclude that evaluation should be regarded as a strategy for improving the effectiveness and efficiency of instructional design, critical theorists promote criticism as having the more important role of “constantly rethinking and deconstructing our beliefs, tools, and technology.”

3.3.1.4 The Eclectic-Mixed Methods-Pragmatic paradigm

Reeves (1997:173) proposes that this paradigm as a practical way of dealing with the complexity involves in instructional development in contemporary society and technology in general. The approach here is to 'borrow' methods of the other paradigms to collect information to and solve a problem. Viewed as tools, paradigms are meaningful only within the context of their use and one approach is not necessarily preferable to another when it comes to particular problem-solving requirements.

In this paradigm, the 'eclectic' aspect refers to its openness to borrowing the methods of the other three paradigms to collect information and solve a problem. The 'mixed methods' aspect relates to the recognition that multiple perspectives are necessary to 'triangulate' or 'bracket' information and to draw conclusions regarding complex phenomena. The 'pragmatic' aspect reflects the practical orientation that, although ultimate prediction and control may never be achieved in education and training through instructional design or any other approach, things can get better (Reeves & Hedberg, 2003:35).

Reeves and Hedberg (2003:36) believe that this approach is more capable of handling the complexity of modern society and technology. The focus is on practical problems rather than on issues of reality and theories of society. It acknowledges the weakness of current evaluation tools. Complex evaluation plans can result. The strength of this approach is the acknowledgment of the current state of the art of evaluation; there are no 'right' approaches and maintaining an open approach is essential. For these reasons, Reeves and Hedberg argue that the mixed methods paradigm has the most potential for enhancing interactive learning systems and providing evidence of their effectiveness and worth.

However, such studies have been criticized that proponents of this paradigm rarely concerns themselves with ultimate conceptions of reality, preferring to deal with the practical problems that confront them as educators and trainers. They view modes of inquiry as tools to better understanding and more effective problem solving, and they do not value one tool over another any more. They recognize that a tool is only meaningful within the context in which it is to be used. Pragmatists accept their interconnectivity with the phenomena they seek to understand and change (Bruce & Rubin, 1992). They also recognize the weaknesses of their tools, and struggle against the odds that either science or creativity will affect decision-making more than politics, ignorance, intuition, habit and prejudice. Finally, they are honest with themselves and their audiences about the tentative and probabilistic nature of the recommendations they make.

Overall, each paradigm has advantages and disadvantages with regard to evaluation and educational research. The value of educational research is not in need of research of finding out how the programme works, it is in need of creative invention to make it to work better. A wiser course will be to support development research (aim at making interactive learning work better) using a wider range of quantitative, qualitative, critical, and mixed methods.

In addition, the main purpose of this study is to find out how effective technology-based learning programmes, such as WebCT, are for learning. Since technology-based learning programmes are complex, one method alone can not easily capture their internal functioning and productivity. Mixed methods can provide the evaluation a unique strength - the capacity for breadth and depth. It can also provide the best of both worlds if carried out effectively (Patton, 1990). By using a

form of triangulation of method (Royse *et al*, 2001:88), the researcher can take advantage of the strengths and offset the weaknesses of each.

For all these reasons, the researcher believes that the mixed methods will be more suitable for this particular study. The purposes for using mixing methods include an examination of overlapping and different facets, to use the methods sequentially, to find contradictions and new perspectives and to add scope and breadth to a study (Creswell, 1994:189). Therefore, in this study, the research will mainly be based on the Eclectic-Mixed Methods-Pragmatic paradigm - because this paradigm provides a variety of qualitative and quantitative strategies/techniques and approaches (yielding a variety of quantitative and qualitative data), and users are led through a series of steps in order to select those strategies that best meet their evaluation needs.

3.3.2 Competing models

Paradigms refer to a general orientation toward inquiry, while models are much more specific and prescriptive in nature (Reeves & Hedberg, 2003:36). Instructional evaluators usually concern themselves with completely separate models rather than paradigms. According to Reeves and Hedberg (2003:36), several evaluation models have the potential for helping evaluators to evaluate technology-based innovations. These evaluation models that relate to evaluating interactive learning systems are described as follows.

3.3.2.1 Tylerian objectives-based evaluation model

According to Madaus, Scriven and Stufflebeam (1983:8), Tyler's evaluation model has enormous influence on educational evaluation and testing in particular. The essence of his evaluation model is that evaluation should measure whether an educational programme is good and whether the objectives are achieved. A major benefit asked for specifying objectives during Instructional Design is that they provide the basis for the development of measurement procedures and instruments, and they can also be used to evaluate the effectiveness of instruction (Reeves & Hedberg, 2003:37).

Tyler's emphasis upon the importance of objectives has influenced many aspects of education, including the design of interactive learning systems by using behavioural

learning principles. However, some critics claim that his objectives-oriented descriptive approach is deceptively simple and has some serious flaws (Guba & Lincoln, 1989:29). The first problem is that many goals can not be specified in terms of easily measured behavioural objectives. Second, the measurement of the most behavioural of objectives is often a difficult process involving complex issues of feasibility, reliability, and validity. Third, educational programmes often have unintended outcomes that are more important than the stated goals of a programme. Furthermore, focusing on the specific objectives of a programme under evaluation may obscure the most important results. Fourth, focusing on whether or not objectives have been attained does not address the worth of the objectives themselves (Scriven,1974). Because of these problems, Tyler’s evaluation model has been supplanted by other models.

3.3.2.2 Experimental evaluation model

This model is based upon basic scientific methods. It is a widely accepted model and a frequently employed approach to evaluation within education and training (Reeves & Hedberg, 2003:38). Variations on this approach include "quasi-experimental" approaches that are used, when it is impossible or too difficult to randomly assign students to different programmes, and therefore students must be assigned in pre-existing groups, e.g., whole classrooms of students using one or the other programme.

According to Reeves and Hedberg (2003:38), the most familiar version of this approach is represented in Figure 2.1.

	Time		
		1 (pre)	2 (post)
Experimental Group	R	O	X
Control Group	R	O	O

R=Random assignment

O=Observation

X=Treatment

Figure 2.1: The true control group, pre-test and post-test evaluation design

To conduct the experimental evaluation, the following experimental methods need to be used:

- locate a population (or sample) of students for the programme which evaluators wish to evaluate,
- randomly assign students from the population (or sample) to the programme or to no programme at all,
- administer tests and other measurement instruments to the students before the programmes are implemented,
- implement the programme, e.g., half the students used the WWW to conduct research and the other half used traditional media centre resources in their research,
- re-administer tests and other measurement instruments after the programmes are implemented, and
- compare the results measured for the two groups in hope of finding that the students in the innovative programme (usually called the experimental group) outperformed the others (usually called the control group).

However, this evaluation model, with experimental and quasi-experimental approaches, also consists of several problems. Firstly, the control of treatment variables is not practical in most contexts where interactive learning systems are implemented. Secondly, the emphasis on measuring educational outcomes via tests is almost never matched by a serious effort to establish the reliability and validity of the measures. In addition, the tests used in this evaluation are often poor indicators of the important outcomes of instructional programmes (Stake, 1990).

Thirdly, the experimental approach can only support or fail to support pre-stated hypotheses. It can not discover unexpected effects of a programme within an educational context. In fact, the unanticipated results of educational innovations are often much more interesting than the intended outcomes. Fourthly, randomized experiments are extremely difficult to conduct and can be unethical in some situations. Lastly, the major approach used in the evaluation is "quasi-

experimental" which introduces many difficulties with respect to the analysis and interpretation of findings (Reeves & Hedberg, 2003:39). Due to all these reasons, the researcher believes that this traditional experience evaluation method is not suitable for this study.

3.3.2.3 Patton's qualitative evaluation model

Patton's evaluation model is basically to use qualitative methods for evaluation. The primary goal of qualitative methods is improving the programme prior to full implementation. Patton (1987) focuses on identifying and working with key participants in organizations who can develop a vision for the value of gathering information and using it to improve the functions of the organization in ways responsive to each situation. Qualitative methods for educational evaluation are increasingly popular. The advantage of using the qualitative method is that it allows the researcher to examine complex phenomena without relying upon structured data collection necessitated by quantitative designs. Patton (1987:13) stresses that qualitative methods are "particularly useful for studying variations in programme implementation." Various methods of qualitative evaluation, such as observations, case studies, interviews, and document analysis, can be used.

However, Patton's model also has its deficiencies. Many people believe that the methods of this model are too "soft" or unscientific, and anyone can employ them without special training. Cizek (1995) criticizes that qualitative evaluation approaches are too subjective and the results of qualitative inquiry lack generalizability. In contrast, qualitative evaluators recognize their subjectivity and try to make it as explicit as possible by exposing their biases and expectations. Others claim that qualitative evaluators have a bias against the precision and accuracy of numerical data. Patton, however, claims that the numbers derive from quantitative methods are seductive because they "convey a sense of precision and accuracy even if the measurements yield the numbers are relatively unreliable, invalid, and meaningless" (Reeves & Hedberg, 2003:40). Reeves (1992) emphasizes that qualitative methods are particularly appropriate in instructional design projects within school settings, where more formal, more controlled methods may be unfeasible.

3.3.2.4 Fourth generation evaluation model

The fourth generation evaluation model is a form of evaluation in which the claims, concerns, and issues of stakeholders serve as organizational foci (the basis for determining what information is needed), that is implemented within the methodological precepts of the constructivist inquiry paradigm (Guba & Lincoln, 1989:50). This model is different from any above mentioned evaluation models. The big difference is that Guba and Lincoln (1989:7) do not treat evaluation as a *scientific* process. They believe that to approach evaluation scientifically is to miss completely its fundamentally social, political, and value-oriented character. They claim that a mature approach to evaluation must move beyond mere science-just getting the facts-include the myriad human, political, social, cultural, and contextual elements that are involved. They, thus, use this new approach fourth generation evaluation to signal their construction. This new construction form moves beyond previously existing generations, characterizable as measurement-oriented, description-oriented, and judgment-oriented, to a new level whose key dynamic is negotiation (Guba & Lincoln, 1989:8).

According to Guba and Lincoln (1989:11), the four generation evaluation model relies on two elements, namely: responsive focusing and constructivist methodology. The former determines what questions are to be asked and what information is to be collected on the basis of stakeholder inputs such as their claims, concerns, and issues. The latter carries out the inquiry process within the ontological and epistemological presuppositions of the constructivist paradigm. The posture of this evaluation begins with the assumption that realities are not objectively "out there" but are constructed by people, often under the influence of a variety of social and cultural factors that lead to shared constructions. A methodology of evaluation that reflected such assumptions must be grounded in an inquiry paradigm radically different from scientific positivism. They call such existing paradigm *the constructivist paradigm*.

Seven principles underlie this model. These are:

- 1) evaluation is a socio-political process;
- 2) evaluation is a collaborative process;

- 3) evaluation is a teaching and learning process;
- 4) evaluation is a continuous and divergent process;
- 5) evaluation is an emergent process;
- 6) evaluation is a process with unpredictable outcomes;
- 7) evaluation is a process that creates reality (Guba & Lincoln, 1989).

Nevertheless, the fourth generation model also has its shortcomings. Advocates of the quantitative, positivist paradigm who believes in the ultimate perfectibility of humanity criticize the lack of emphasis on generalizability within this model. Critical theorists who believe in social action and political commitment criticize the hopelessness of Guba and Lincoln's perspective. Constructivists will respond to their critics that the burden of generalizability and action should be placed on the consumers of an evaluation rather than the evaluators themselves.

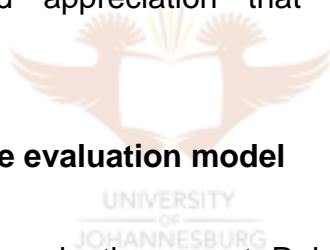
Furthermore, a main outcome of "Fourth Generation" is "rich, thick" description based upon extended observation and careful reflection. Constructivists look for more effective ways to understand the world, but ultimately regard the prediction and control so integral to the quantitative measurement perspective as irrelevant. Guba and Lincoln's pessimistic perspective about the possibilities of evaluations have led to the ultimate resolution of social problems (Reeves & Hedberg, 2003:40).

3.3.2.5 Eisner's art criticism evaluation model

Eisner's evaluation model is to use critical approaches to evaluation. His approach has two primary aspects. The first aspect is that Eisner invents the term "educational connoisseurship" to describe his art-based evaluation model (1977, 1985). Eisner argues if there are connoisseurs in the worlds of literature, drama, and art, education should also have its own connoisseurs with refined tastes and sensitivity to educational phenomena. The second primary aspect is educational criticism which has three major dimensions, namely: description, interpretation, and assessment. The assessment dimension distinguishes Eisner's approach from traditional qualitative inquiry.

According to Eisner, educational connoisseurs or critics are expected to appraise features of the programme being evaluated according to explicit educational criteria. A critic has the responsibility to convey his/her value to the public so that they may judge the worth of his/her critique. The purpose of connoisseur-based studies is to describe critically, appraise, and illuminate the particular merits of a given object (Madaus *et al*, 1983:35).

However, as Eisner (1977, 1985) proposed, educational connoisseurship and criticism have not been widely implemented. Opponents of educational criticism claim that it is too subjective. The reason is that connoisseur-based studies dependent on the expertise and qualifications of the particular expert doing the evaluation, leaving much room for subjectivity, bias, and corruption. Another weakness of Eisner's ideas is the difficulty in training people to be connoisseurs and a lack of venues for expression of educational criticism. Eisner (1985) argues that anyone involved in education has the right and responsibility to be a critic, but that certain people must be trained in the approach and eventually establish a reputation for the refined tastes and appreciation that are indications of authentic connoisseurship.



3.3.2.6 Stake's responsive evaluation model

This model is proposed by an evaluation expert, Robert Stake. His idea for naming *responsive evaluation model* is that the approach for responsive evaluation is negotiated by the "stakeholders", all stakeholders have the right to place their claims, concerns, and issues on the table for consideration (response), irrespective of the value system to which they adhere (Reeves & Hedberg, 2003:44). The methods used for responsive evaluation are "subjective" and qualitative rather than quantitative (Guba & Lincoln, 1988:31). Responsive evaluation is a client-centred study (Madaus, Scriven & Stufflebeam, 1983:34). The purpose of this study is to take the local autonomy view and help people who are involved in a programme to evaluate it and use the evaluation to improve it. Typical methods used in the client-centred study are the case study (Madaus *et al*, 1983:35). In fact, responsive evaluation is evaluation based on what people do naturally to evaluate things such as they observe and react. The purpose of this evaluation is to produce information that can guide decisions concerning the adoption or modification of an educational programme.

According to Stake (1990:77), the main difference of this model is that the methods used and data collected should emphasize the issues, language, contexts, and standards of stakeholders. "Stakeholders" refers to any people who are affected by or interested in the results of an evaluation. Evaluators themselves are also viewed as critical stakeholders, and their judgments are given equal weight as are the perspectives of others in the planning and reporting of the evaluation. More often, responsive evaluators will attempt to "triangulate" issues and findings using multiple methods. The most important is that they must try to expose the subjectivity of their own judgments as rigorously as they do those of other stakeholders.

Another basic element of this evaluation is the continuous nature of observations and reporting. For instance, responsive evaluators begin to provide feedback to stakeholders as early as possible within an evaluation, fully expecting to please some people and displease others. Both the questions and methods of evaluation are modified throughout the evaluation period in response to the evolving concerns of the stakeholders.

The main strength of this approach is that it is an action-research approach, in which people implementing programmes are helped to conduct their own evaluation (Madaus *et al*, 1983:35). Reeves and Hedberg (2003:45) claim that using Stake's evaluation model within the context of interactive learning systems is to try to be responsive to the multiple audiences affected by an innovation programme. Innovations require lots of time and effort to develop and implement. The responsiveness of an evaluation is important. Evaluation methods that suppose programmes are implemented exactly the way they are designed. The value of Stake's approach is that it recognizes the "fluid" nature of most innovations, and deals with it by constantly modifying its methods as the innovations evolve.

However, critics of this model argue: "Too much attention is given to subjective data, for example, the testimony of participants" (Stake, 1990:76). Stake defends the approach by maintaining that subjectivity is inherent in any type of observation or measurement. Stake claims that responsive evaluators try to expose the origins of their subjectivity, whereas other types of evaluators may disguise their subjectivity by using objective tests and experimental designs. In addition, responsive evaluation is criticized that requiring a level of trust and cooperation that may be unrealistic in some contexts, especially when the financial or political stakes are high. Guba and

Lincoln (1989:12) conclude that responsive evaluation is created as the antithesis of pre-ordinate evaluation, which assume that the evaluator and client together possess sufficient information and legitimation to design and implement an evaluation completely, without the need to consult other parties.

3.3.2.7 Multiple methods evaluation model

In 1987, Mark and Shotland published the new directions for programme evaluation series which is called "multiple methods in programme evaluation." This evaluation is not so much a unitary model for evaluation as a set of guidelines for applying an eclectic approach to evaluate the inputs, processes, and outcomes. The primary benefits of "multiple methods" are addressing different but complementary questions in an evaluation and reducing the inappropriate certainty associate with traditional experimental methods.

Two key issues in Mark and Shotland's (1987) approach are "triangulation" and "bracketing." According to Mark and Shotland (1987), "triangulation" involves using multiple measures to meet a more accurate estimate of the "true" value of a variable. If an evaluator needs to determine the motivation of students to engage in online learning, a questionnaire, interviews, and a personality scale may be used so that gain a more accurate of their motivation. "Bracketing" involves using multiple measures to provide a range of estimates of the value of a variable. The evaluator may use the same measures (such as questionnaires, interviews, and personal scales) to measure the students' motivation, but the results can be interpreted differently.

The benefits of considering this approach and employing aspects of it are considerable. However, using multiple methods is not just a simple matter of two or more methods being better than one. Mark and Shotland (1987) stress that two poorly designed and not well-conducted evaluation strategies will produce no better picture of the findings than one poor strategy. Multiple methods are only appropriate when they are chosen for a particular purpose. For instance, investigating a particularly complex programme, such as interactive learning systems, can not be adequately assessed with a single method. The approach "triangulation" may be used in this case.

The critics conclude that this multiple measures approach is so complex in terms of design, implementation, analysis, and interpretation. Most evaluators will not be able to apply this approach if they are without the assistance of methodologists and statisticians. In addition, Clark (1992) claims that evaluations focus on the effectiveness of technology-based innovations in comparison to other programmes have often led to findings of no significant differences. Reeves and Hedberg (2003:46) further argue that methodological issues may have invalidated many of these studies, but there is a strong possibility that a single weak outcome measure is used. Bracketing the outcomes of innovations with multiple methods can yield a more realistic portrayal of effectiveness and impact.

In summary, several evaluation models used for guiding evaluation and educational research are reviewed and also discussed. The purpose of reviewing them is to discover their strengths and weaknesses and to obtain direction for devising better approaches. As Madaus *et al* (1983:36) stated, a critical analysis of these models not only can help evaluators to consider and assess optional frameworks which they can use to plan and conduct their studies, but also has important implications for the evaluator who is concerned with devising better concepts and methods for programme evaluation. Finally, it is imperative to remember that no single model consistently is the best in evaluating education.

Madaus's statement may be true because each evaluation model has both strengths and weakness with regard to evaluating a particular complex programme. It is unlikely that any single existing evaluation model is sufficiently comprehensive to guide the effective and efficient evaluation of interactive learning systems. However, comparing the rest of the other models, the researcher prefers the multiple methods evaluation model more. One single method can not assess the complex interactive learning systems; multiple data collection methods such as triangulation must be used.

In order to choose the best-fit evaluation model to measure online learning, there is clearly a need for more literature studies. In the following section, the Kirkpatrick evaluation model is reviewed and discussed.

3.4 THE KIRKPATRICK EVALUATION MODEL

The four levels of Kirkpatrick’s learning evaluation represent a sequence of ways to evaluate programmes. This model provides a conceptual framework to assist in determining what data should be collected for evaluation purposes. Each level is important. Kirkpatrick (1994:21) believes that the evaluation, as moving from one level to the next, becomes more difficult and time-consuming, but it also provides more useful information. This four level evaluation model is presented at the Table 3.1. The detailed discussion of each level follows.

Table 3.1: The Kirkpatrick evaluation model

Level	Issue	Measurement focus	Questions addressed
1	<i>Reaction</i>	Learners' perceptions	What did learners think of the training?
2	<i>Learning</i>	Knowledge/skills gained	Was there an increase in knowledge or skill level?
3	<i>Behaviour</i>	Worksite implementation	Is new knowledge/skill being used on the job?
4	<i>Results</i>	Impact on organization	What effect did the training have on the organization?

3.4.1 Level 1 - Reaction

The first level of the Kirkpatrick evaluation model is “Reaction.” Reaction is the term that Kirkpatrick uses to refer to how participants react to the instructional programme. This level answers the question “Did learners like the training programme?” According to Winfrey (1999: [online]), evaluation on this level measures the extent to whether learners liked a particular training programme with respect with to its content, delivery, the training methods, the instructor, and the environment. In fact, evaluating learners’ reaction of the training is the same thing as measuring their satisfaction with the course. Kirkpatrick (1994:21) calls it “a measure of customer satisfaction.”

In this level, reaction of participants is often measured with attitude questionnaires. Some trainers call the forms that are used for the evaluation of reaction “smiley sheets” or “happiness sheets.” The reason for calling them “happiness sheets” is because these simplest forms measure how well students liked the training (Kruse, 2002: [online]). The purpose of using happiness sheets is to help evaluators to determine how effective the training programme is for learning as well as assist them to determine how the training programme can be improved. Sometimes, evaluators can also use focus groups and similar methods to receive more specific comments; this is called “qualitative feedback” on the course (Kirkpatrick, 1994). In order to assess reaction of trainees, trainees are asked to evaluate the training once they have completed the training programme. Kirkpatrick (1994:27) said: “If the training is going to be effective, it is important that trainees react favourably to it, otherwise, they will not be motivated to learn.” In other words, to evaluate whether a training programme is effective for learning, it is essential to measure whether students like that training programme. If they like, they will be motivated to learn. Otherwise, they will lose interests for their studies. Measuring reaction is important because reaction of students will present a clear perception of their satisfaction with the course.

Evaluating reaction can reveal valuable data if the questions asked are more complex. For instance, participants may be asked how well they like the instructor's presentation techniques; how completely the topics are covered; how valuable they perceive each module of the programme, or the relevance of the programme content to their specific job. Furthermore, they may be asked how they plan to use their new skills or knowledge on returning to work.

However, this level of evaluation differs from surveys used in formative evaluation in that the questionnaires are distributed to the entire student population. In computing, the questionnaires are moving beyond how well the students like the training to questions about:

- the relevance of the objectives;
- the ability of the course to maintain interest;
- the amount and appropriateness of interactive exercises;
- the ease of navigation; and

- the perceived value and transferability to the workplace.

According to Kirkpatrick (1994:27), measuring reaction of participants is important for several reasons. Firstly, it provides valuable feedback on a lesson. Secondly, it shows that the trainers are there to help the trainee do their job better and that they need feedback to make this happen. Thirdly, it provides quantitative information about the training for management review. Finally, it provides quantitative information that can be used to establish standards of performance for later classes.

In this study, the reason of measuring reaction of Masters students is to find out how they effectively learnt about Instructional Design using an interactive learning system. Their reaction to the course will help to understand how an interactive learning system impacted on students' learning. In addition, the reaction level of evaluation will provide some useful information which will help the course instructor or administrators to improve the course and the training programme.

In order to effectively measure reaction, Kirkpatrick (1994:28) recommends eight guidelines which can be used.



- 1) Determine what is to be found out

In every training programme, it is crucial to get a reaction to both the lesson subject and the leader. It is also important that keeping questions dealing with these two ingredients separate (Kirkpatrick, 1994:28). For instance, evaluators may want to get trainees' reactions to one or more of the following: the facilities (location, comfort, convenience); the schedule (time, length of programmes); exercises and handouts (how helpful, amount); and audiovisual aids (how appropriate, effective). Once evaluators decide what they want to find out, they can build questions on these items into the evaluation instrument.

The aim of this study is try to find out how Masters students effectively learnt about Instructional Design using WebCT. In order to find out the answer, the researcher will build the same survey questions to get students' reaction to the followings: the usability and the accessibility of WebCT; the learning outcomes; the presentation of the instructor; the relevance of the course content; the instructional strategy; the

learning environment; and the behaviour change. Reaction of students will indicate whether they satisfy the course and the training programme.

2) Design a form that should quantify student reaction

Evaluators usually have their own ideas about the form that should be used. Whether or not they use an open questions form or a checking boxes form, the principle is that the form must be quantified and used to establish standards for future evaluations. When questions are designed, it is better to use a range of quantitative responses rather than a simple “yes-no” answer. For example, if evaluators ask "How worthwhile is the course for students?" A range of responses must be provided, such as: ‘very worthwhile,’ ‘worthwhile,’ ‘not very worthwhile,’ and ‘a waste of time.’

In order to quantify students’ reaction, a closed questions form is used in the questionnaire survey. A range of quantitative responses, such as “strongly disagree,” “disagree,” “neither agree nor disagree,” “agree,” and “strongly agree,” are adopted.



3) Encourage written comments and suggestions

Comments and suggests of participants are valuable information for evaluation. Evaluators must allow them "open space" to comment on certain aspects of the programme and on the programme in general. Open-ended questions can be used to accomplish this goal because they can provide an opportunity for students to say what they feel. However, their disadvantage is that they are more difficult to summarize in a statistical sense. Kirkpatrick (1994), thus, suggests that the reaction level instrument should be a blend of subjective and objective questions.

In this study, the researcher has encouraged students to write down some comments and suggestions about both the training programme and the course. Enough space is offered for them to freely write down their opinions.

4) Get a 100 percent immediate response

Once the training programme has been finished, reaction sheets should be distributed to participants to complete them. In order to make sure participants turn in their reaction sheets before they leave the class, it is suggested that giving enough time on the final day of a course for students to fill out the questionnaire or answer interview questions before they are leaving. This time should plan into the lesson or the course. However, if a participant took an end-of-course critique home with him/her, the result is a set of responses that are not an "immediate reaction" to the training.

In order to get more accurate data, the questionnaire is distributed to 18 students who involve in this Masters course study.

5) Get honest responses to questions

Get honest responses to questions is the most important. To be certain that reactions are honest, evaluators should not ask participants to sign the forms. Bearing this in mind, the researcher has announced that students' responses are anonymous and confidential.

6) Develop acceptable standards

If enough reaction level evaluations are available, standards can be built from them. The five-point scales, such as: Excellent=5, Very good=4, Good=3, Fair=2, and Poor=1, is one standards example, which can be used. These scales can be used to rate the responses on a form and so to establish a standard of acceptable performance. In this study, the standard five-point scale is adopted.

7) Measure reactions against standards and take appropriate action

Once realistic standards are established, evaluators should evaluate the various aspects of the programme and compare the findings with the standards. The researcher will do the detailed data analysis in Chapter 5.

8) Communicate reactions as appropriate

The evaluation forms should be reviewed by both the instructors involved in a training event and management supporting the training. This process will help trainers improve their presentation and provide management with information on how well the training is conducted. However, it is important to note that they do not get caught up in chasing individual comments. Over a series of training events, comments will show a spectrum of responses. Any conclusions derived from the evaluation forms should be based on statistics from a series of courses.

In summary, in the Kirkpatrick evaluation model, reaction is the first level in the evaluation process. Measuring reaction is important. Reaction should be evaluated for all training programmes. Though this level neither measure what new skills the learners have acquired nor that what they have learned will transfer back to their working environments, the interest, attention and motivation of the participants are critical to the success of all training programmes. A reaction level evaluation can be accomplished by an end-of-training questionnaire or an end-of-training interview. In both cases, the list of questions should be kept short and relevant to the training. The responses to reaction sheets should be tabulated, and the results should be analyzed. Finally, the comments received from the participants should be considered carefully, and training programmes should be modified accordingly.

3.4.2 Level 2 - Learning

The second level of the Kirkpatrick evaluation model is “Learning”. This level answers these questions: “Did trainees learn anything?” and “How much did they learn (Carliner, 2002: [online])?” According to Kirkpatrick (1994:22), learning has taken place when one or more of the following occur: attitudes are changed; knowledge is increased; and/or skill is improved as a result of attending the training programme. Written or performance tests can assess change in knowledge and skills. The best way to measure changes in knowledge and skills is to test the learners before and after the training. However, if it is not possible to test them before the training, their performance can be tested after the training. They can be asked whether or not their understanding or skills come from the training.

Evaluation on this level also assesses the extent to whether trainees achieve the learning objectives of a learning programme. However, it is important to remember that although sometimes trainees may have a satisfied learning experience; it does not necessarily mean they have learned new knowledge or skills. In order to assess learning, a criterion-referenced test can be used and the criteria which are objectives for the course should be measured. The criterion-referenced test usually involves answering questions or demonstrating competence through observations. Since online education is concerned with transferring knowledge and skills to individuals, the researcher believes that online learning is well-suited to measure performance in this area.

In order to effectively evaluate learning, learning measures should be both objective and quantifiable. The specific objectives must be determined and a criterion-referenced test must be accomplished. Several methods, including formal and informal testing, team assessment and self-assessment, performance or skill practices, and simulations, can be used to evaluate learning. According to Kirkpatrick (1994), to determine the occurrence of the amount of learning, pre-test and post-test usually can be used. For example, participants take a pre-test or assessment before the training and a post-test after the training to determine the change in skills or attitudes. A comparison of the results from before and after the training will indicate what changes have taken place.

According to Winfrey (1999), assessing at this level moves the evaluation beyond learner satisfaction and it attempts to assess the extent students have advanced in skills, knowledge, or attitude. Kirkpatrick (1994) points out: "Measurements at this level may indicate that a programme's instructional methods are effective or ineffective, but it will not prove if the newly acquired skills will be used back in the working environment." He further indicates: "Measuring learning is more difficult and more time-consuming than measuring reaction."

In order to evaluate learning, Kirkpatrick (1994) suggests that the following four guidelines should be used.

1) Use a control group if practical

On one hand, Kirkpatrick (1994:43) uses the term "control group," which refers to a group that does not receive the training. On the other hand, he uses the group that receives the training, calling it the "experimental group." The reason he uses the control group is to provide better evidence if change has taken place. He indicates that any difference between these two groups can be explained by the learning that takes place because of the training programme. However, caution must be taken to be sure that the two groups are equal in all factors that can have an effect on learning. Otherwise, comparisons are not valid.

2) Evaluate knowledge, skills and attitudes both before and after the programme. Use a paper-and-pencil test to measure knowledge and attitudes, and use a performance test to measure skills. The difference will indicate what learning has taken place.

- Evaluating increase in knowledge and changes in attitudes

These can be evaluated by using pre-test and post-test. An example of pre-test and post-test scores on students' attitude change follows.

Table3.2: Pre-test and post-test scores on students' attitude change

	Experimental Group	Control Group
Pre-test	46.8	47.3
Post-test	54.3	48.5
Gain	+7.5	+1.2
	Net Gain $7.5-1.2=6.3$	

The example in Table 3.2 shows the average score of the experimental group on the pre-test (that was, on the test given before the programme started) is 46.8. The average score of the experimental group on the post-test (the same test given at the conclusion of the programme) is 54.3. A net gain is 6.3.

It also shows that the average score of the control group on the pre-test is 47.3 and that the score of the control group on the post-test is 48.5. This means that factors other than the training programme causes the change. Therefore, the gain of 1.2 must be deducted from the 7.5 gain of the experimental group to show the gain resulting from the training programme. The result is 6.3. This comparison of total scores on the pre-test and post-test is one method of measuring increased knowledge and changes in attitudes. Kirkpatrick (1994:45) emphasizes that this evaluation of learning is important because it measures the effectiveness of the instructor in increasing knowledge and changing attitudes, and it also shows how effective the instructor is. If little or no learning has take place, little or no change in behaviour can be expected.

The above example has illustrated how a control group can be used. However, in most organizations, such as in education, it is not practical to have a control group. The evaluation will include only figures for those who attend the training programme. For this reason, once again, the researcher announces that a control group test will not be used in this study. Instead, the document analysis and individual interviews will be used to measure the increased knowledge of students.

- Evaluating increase in skills

Evaluating the increased skills requires a "performance" test. The performance test is to use clear criteria to assess a student's ability to apply the knowledge and/or skills he/she has learned in an observable and measurable demonstration. Writing assignments is one example of one form of an observable and measurable demonstration. Another example is to use the pre-test and post-test. For instance, if a training programme is to aim at teaching students to design an interactive multimedia learning programme, the increased Instructional Design skills must be evaluated. Therefore, an instructor should let students design an interactive learning programme, basing on any learning areas, and choosing any topics of their choices, before any Instructional Design Theory lesson has been given. The instructor can measure their design skills and assign them a grade. During the training, the instructor provides the design principles for guiding Instructional Design. Once the training has been completed, the same task can be given to students to test their performance again. The comparison of students' design skills on the pre-test and post-test, thus, can be measured. In this study, students' increased design skills will be evaluated through analysing their project planning documents.

3) Get a 100 percent response

This means that it is best to evaluate everyone involved in a training programme, if there is small number of trainees in a typical training programme. However, in some cases, particularly with a large group of trainees, it may more practical to select a sample group and focus the learning evaluation on them.

4) Use the results of the evaluation to take appropriate action

The important point is that the effectiveness of an instructor is measured by how well students learnt. If the trainee has not learned anything, the instructor can not only blame him/her. It may be the instructor's fault. The instructor should ask: "What can I change or do better to improve learning?"

In summary, Level Two in the Kirkpatrick evaluation model measures learning. It answers the question "Did the students actually learn the knowledge, skills, and attitudes the programme was supposed to teach?" In order to show achievement,

students must complete a pre-test and post-test, making sure that test items or questions are truly reflective the learning objectives. By summarizing the scores of all students, trainers can accurately see the impact that the training intervention has.

Evaluating learning is important and must be part of all training. It is believed that without learning, no change in behaviour will occur. Sometimes, the learning objective is to increase knowledge. Increased knowledge is relatively easy to measure by means of a pre-test (before the training) and post-test (after the training). If the knowledge is new, there is no need for a pre-test. However, if the instructor is teaching concepts, principles, and techniques that trainees may already know, a pre-test is necessary for comparison with a post-test. Attitude change can be measured with a paper-and-pencil test. The increased skills can be measured by using a performance test.

3.4.3 Level 3 - Transfer/Behaviour

The third level of the Kirkpatrick evaluation model is “Behaviour.” This level asks these questions: “Did trainees change their behaviour based on what was learned?” “Has the job performance of the trainee improved because of the training?” “How much transfer of knowledge, skills, and attitudes occurred because trainee attended a training programme?” The questions pose at this level check on how the training affects job performance, and whether trainees apply the knowledge learned in work after taking the course. According to Kirkpatrick (1994), post-training testing or observations can assess use of skills on the job. Behaviour can be assessed through tests, observations, surveys, and interviews with co-workers and supervisors. The assessment of behaviour must base on the objectives of the course. However, this level must be completed outside of the classroom after trainees have had an opportunity to use what they have learned. This level is more difficult to measure because it requires trainers or some other evaluator to follow-up months after the training.

In compare evaluating at the first two levels, the questions asked at this level are more complicated and difficult to answer. One reason is that trainees can not change their behaviour until they have an opportunity to do so. For instance, if the training programme is designed to teach students how to use the *Fireworks MX* to make the beautiful buttons for a tutorial, students cannot design the buttons until the

appropriate programme is learnt. The other reason is that it is impossible to predict when a change in behaviour will occur. For example, a trainee may not apply the learnt new knowledge or skills immediately to the work environment, even though he/she has an opportunity to do so. In fact, change in behaviour may occur at any time after the first opportunity, or it may never occur. The third reason is that the trainee may apply the learning to the work environment and come to one of the following conclusions: "I like what happened, and plan to continue to use the new behaviour." "I don't like what happened, and will go back to the old behaviour." "I like what happened, but the boss or time restraints prevent me from continuing it." All these reasons make it more difficult to evaluate behaviour.

Kirkpatrick (1994:58), thus, suggests that ideally, this measurement is better to conduct three to six months after the training programme. By allowing some time to pass, students have the opportunity to implement new skills and retention rates can be checked. In addition, when evaluating change in behaviour, some important decisions must be made, namely: when to evaluate, how often to evaluate, and how to evaluate.

In this level, it is important for evaluators to note that a trainee can have learned significant new knowledge or skills, without ever applying them during the course of their employment. The reason for causing this to happen is very complex. In order for behaviour change to occur, Kirkpatrick (1994:23) points out those four conditions are necessary: the person must have a desire to change; must know what to do and how to do it; must work in the right climate; and be rewarded for change. In order to accomplish the first two requirements, the training programme must create a positive attitude toward the desired change and teach the necessary knowledge and skills.

The third condition, "right climate," refers to the participant's immediate supervisor. Kirkpatrick (1994:23) identifies five different kinds of climate which will influence the participant's behaviour. These are: "Preventing," the boss does not allow the participant from doing what he/she has been taught to do in the training programme. "Discouraging," the boss does not say, "You cannot do it," but he/she make it clear that the participant should not change behaviour because it will make the boss unhappy. "Neutral," the boss ignores the fact that the participant has attended a training programme. "Encouraging," the boss encourages the participant to learn

and apply what he/she learnt on the job. "Requiring," the boss knows what the subordinate learnt and make sure that the learning transfers to the job. It is clear that there is little or no chance that training will transfer to job behaviour if the climate is preventing or discouraging. As stated, it is important to evaluate both reaction and learning in case no change in behaviour occurs.

In order to evaluate behaviour, Kirkpatrick (1994) recommends that seven guidelines can be followed:

- 1) use a control group if practical

In Level 2, the guidelines for evaluating learning are outlined in detail by using a control group. The same guideline for using a control group can be applied in Level 3. A comparison of the change in behaviour in a control group and an experimental group can add evidence that the change in behaviour occurred because of the training programme.

- 2) allow time for behaviour change to take place

As already mentioned, evaluation should not be attempted if trainees have not had an opportunity to use the new behaviour. However, sometimes a participant may have an immediate opportunity to transfer the training to the job; evaluators should still allow some time for this transfer to occur.

3) evaluate both before and after the programme if practical

If evaluation before and after a programme is practical, it is recommended to do so. Through comparing the behaviours observed before and after the programme, any change that has taken place can be determined. Kirkpatrick (1994:55) points out that an effective alternative approach can be used to measure behaviour only after the programme. In order to identify any behaviour that is different before the programme, an interviewing or a surveying approach can be used.

4) survey or interviewing trainees

As the evaluation guidelines suggested, using a survey or an interview can measure trainees' behaviour. To do this, it is important to make sure that the selected trainees know their own behaviour and are willing to spend the time needed to complete the survey. In addition, they should know that a questionnaire and an interview both had their advantages and disadvantages. For instance, using the interview can provide an opportunity to evaluators to get more information. A patterned interview, in which all interviewees are asked the same questions, can be used to gather quantitative data on behaviour change, but interviews are very time-consuming, and only a few trainees can be conducted. The small samples may not be representative of the behaviour change that takes place in all trainees. This makes more difficulty for evaluators drawing conclusions about the overall change in behaviour.

In contrast, using a survey questionnaire is usually more practical and the questionnaire can be completed by trainees. If the questionnaire is designed properly, it can provide the data on behaviour change. The problem using the questionnaire is that it takes the time to get people to complete the questions. In order to overcome this problem, evaluators have to try to use some strategies to motivate the people who are asked to complete the survey. Overall, before trying to gather data from trainees, a considered decision to use a questionnaire or an interview must be made. In this study, both the questionnaire and the interview will be used in order to get the rich data.

- 5) get 100 percent response or a sampling

When evaluating change in behaviour, evaluators can choose a few 'typical' trainees at random and interview or survey them. If they find that some trainees have changed their behaviour, their conclusion may be that everyone has. However, this conclusion may or may not be true. Clearly, the best approach is to measure the behaviour change in all trainees. However, in most cases, this is not practical. Kirkpatrick (1994:58) claims that each organization must determine the amount of time and money that it can spend on Level 3 evaluation and proceed accordingly.

- 6) repeat the evaluation at appropriate times

Each trainee's behaviour change is different. Some may change their behaviour as soon as they return to their job. Others may wait six months or a year or never change. For those who changed their behaviour immediately, they may revert to the old behaviour after they try out the new behaviour for a period of time. Bearing these in mind, it is important to repeat the evaluation at an appropriate time (Kirkpatrick, 1994:58).

- 7) consider costs versus benefits

In Level 3, when evaluating behaviour changes, two factors, such as costs and benefits, need to be considered. In many organizations, much of the cost of evaluation at Level 3 is the staff's time. The proverb said: "Time is money." Another factor is the 'benefit' which can also be derived from evaluation, including changes in behaviour and final results. A greater potential benefit raises from spending more time and money, not only on the evaluation of behaviour change in Level 3, but also on Level 4. Kirkpatrick (1994:60) states: "It is important to understand that change in behaviour is not an end in itself. Rather, it is a means to an end: the final results that can be achieved if change in behaviour occurs." Therefore, evaluators must compare the cost of evaluating with the benefits that can result from the evaluation, when they decide whether to evaluate changes in behaviour.

In summary, the Level 3 evaluation attempts to answer whether or not participants' behaviour actually changed as a result of new learning. No final results can be expected unless a positive change in behaviour occurs. Therefore, it is important to see whether the knowledge, skills, and attitudes learned in the programme transfer to the job. As Kirkpatrick early mentioned, the process of evaluating in Level 3 is complicated and often difficult to do. Evaluators have to decide whether to use interviews, survey questionnaires, or both to gather the rich data on behaviour change.

3.4.4 Level 4 - Results

The fourth level of the Kirkpatrick's evaluation model is "Results." It assesses the financial impact of the training course on the bottom line of the organization 6 months to 2 years after the course. The final results can include increased production, improved quality, decreased costs, reduced accidents, increased sales, reduced turnover, and high profits and return on investment (Kirkpatrick, 1994:25). Since this level looks at the real business results delivered as a result of learning, it is important to recognize that the result is probably the most important measure for the business, although in the field of education, this may not be the same case.

In order to determine what final results occurred because of attendance in a training programme, evaluators can ask these questions: "How much did quality improve because of the training programme?" "How much had it contributed to profits?" and "What was the return on investment for all the money spent on training?" However, these questions are difficult to answer. One reason is that trainers do not know how to measure the results and compare them with the cost of the programme. Another reason is that even if they do know how, the findings are not clear proof that the positive results come from the training programme.

To find out what final results are accomplished because of the training programme, Kirkpatrick (1994:65) suggests that the following guidelines should be used:

- 1) use a control group if practical;
- 2) allow time for results to be achieved;
- 3) measure both before and after the programme if practical;
- 4) repeat the measurement at appropriate times;
- 5) consider cost versus benefits; and
- 6) be satisfied with evidence if proof is not possible.

These guidelines are actually the same guidelines listed for evaluating change in behaviour (Level 3). Guideline three is easier than the others, but the reminders have the same evaluation principles and difficulty. Kirkpatrick (1994:70) emphasizes that if the programme aims at tangible results rather than teaching management concepts, theories, and principles, then it is desirable to evaluate in terms of results.

According to Kirkpatrick (1994:86), the training programme is a success if it accomplishes the following four objectives: participants liked the programme; they gained needed knowledge and skills; they applied what they learned to their jobs; and they assisted the company in achieving its mission and objectives. The purpose of the programme is to improve performance. The purpose of evaluation is to verify and improve the effectiveness of the training. The evaluation design includes ways and means of measuring the effectiveness of the programme in achieving each of the four objectives just defined.

In the researcher's view, the Kirkpatrick four level learning evaluation model is more practical for this study, both qualitative and quantitative data collection methods which Kirkpatrick advocated can be used for gathering the rich data. The Kirkpatrick evaluation model can be used for all the training, whether classroom-delivered Instructor Led Training (ILT) or online learning, to yield continuous measurements. On learner-based education, to capture data, the main

measurement should focus on these levels in order to judge students' satisfaction, learning effectiveness, behaviour change and the results of learning.

3.5 SUMMARY

In this chapter, by focusing on the topic of requiring evaluation models for online learning, the following relevant literature are studied and discussed.

- what learning is;
- how to measure effective learning;
- four conflicting paradigms;
- several competing evaluation models; and
- the Kirkpatrick four level evaluation model.

For the purpose of evaluating learning, it is important to understand what learning is first. The concept of learning is explored by using three basic learning theories (Behavioural Theory, Cognitive Theory, and Constructivist Theory), and the current brain-based research. All these theories and the brain-based research have given an explanation of how humans learn from their own leaning perspectives. Their contribution for supporting and guiding use computers for online learning in education is significant.

The reason for conducting an effective evaluation is to find out how effectively students learnt using an interactive learning system. The purpose of such an evaluation will serve as a guideline to make decision about how to improve the training programme and the quality of learning.

However, to measure the effectiveness of learning and to determine whether learning has taken place in any situation are not a simple task. A literature review of four conflicting paradigms and several competing models for learning evaluation have been done. It is clear that each paradigm and model has its own advantage and disadvantage in terms of evaluation and educational research. Although none of them is perfect, the researcher believes that the mixed methods paradigm and the multiple methods evaluation model are more valid than the rests for this study.

According to Kirkpatrick (1994), learning can be measured at four levels: Reaction, Learning, Behaviour change in the workplace, and Results/Organizational impacts. In the researcher's opinion, the Kirkpatrick evaluation model encompasses many of the attributes of the models discussed above. This model is easy to use and more practical. For instance, Kirkpatrick recommends a clear guideline for how to evaluate each level. In addition, it also includes aspects related to the transfer of learning and the use of authentic evaluation methods (Qualitative data collection instruments - such as observations, interviews, the pre-test and post-test, and the documents analysis. Quantitative data collection instruments - such as questionnaires). Since this model can be applied to the technology-based training as well as to more traditional forms of delivery, the researcher thinks that this model is the most suitable evaluation model which can be selected for evaluating online learning. In this study, the researcher will adopt the Kirkpatrick learning evaluation model as framework against which the efficacy of learning can be determined. These four levels - Reaction, Learning, and Behaviour change in the workplace, and Results will be assessed in this study.



CHAPTER 4

PROGRAMME DESCRIPTION

4.1 INTRODUCTION

In chapter three, a broad literature review was presented. This chapter describes the programme used in the Masters course in Computer-based Education at RAU. The research findings are presented in chapter five.

4.2 OVERVIEW OF THE MASTERS IN COMPUTER-BASED EDUCATION COURSE

In this section, an overview of the Masters course which is the focus of this investigation is presented.

4.2.1 The course

The Magister Educationis in Computer-based Education (MED in CBE) is a two year Masters degree course in Computer-based Education offered at the Rand Afrikaans University in Johannesburg, South Africa. The course consists of four modules: *Computer-based Education and Educational Multimedia Development* (the first semester); *The Internet in Education and Educational WWW Development* (the second semester). These four modules are completed in the first year of study prior to the completion of a mini-dissertation. As this study is based on activities during the first semester of the course, only those modules are described here.

The course starts at the beginning of February, 2004. There are 18 students who are registered for this course. Most students are part-time students who are either in full-time teaching positions at secondary schools or are employed at higher education institutions as lecturers or instructional designers. The course uses a blended learning strategy which is learning that combines online and face-to-face approaches. For example, some parts of the course are offered using WebCT. However, students also need to attend face-to-face sessions that are used for discussion of theoretical themes and the acquisition of skills with regard to software

packages. The face-to-face lectures are scheduled weekly and last between 3 and 4 hours.

Several assessment strategies are employed in the course, for example:

- The writing of articles.
- Collaborative assignments where students are allocated to partner groups and collaboratively construct knowledge representations of selected themes and share that knowledge in the allocated times.
- Students have to submit a project plan with regard to Theme 5. The project plan must be based on the principles and processes of underlying Instructional Design Theory. This plan underpins the design and development of an actual multimedia learning package that has to be designed for the module - Educational Multimedia Development.
- Students must, using *Macromedia Authorware*, *Flash* and *Fireworks*, design and develop a multimedia learning package situated in authentic South Africa curricula.

4.2.2 Module outcomes

The general objectives of this course are that, by the end of module one and two, students will be able to:

- write a coherent rationale for the use of computers in educational settings.
- identify, explain and apply different perspectives on learning (Behaviourism, Cognitive psychology and Constructivism) as they relate to Computer-based Education.
- identify and describe the general features of software for learning and apply these features to develop educational software using software development tools (*Macromedia Authorware 6.5* and *Macromedia Flash MX*).
- identify and describe the specific features of *tutorial software* and apply these features to develop educational tutorials using software development tools (*Macromedia Authorware 6.5* and *Macromedia Flash MX*).

- identify and describe the tools of open-ended electronic learning environments and develop such a learning environment using software development tools (*Macromedia Authorware 6.5* and *Macromedia Flash MX*).
- record digital sound and video, and use these multimedia elements in educational software.
- instructionally design educational software by means of processes and methods derived from Instructional Design Theory.

4.3 OVERVIEW OF WEBCT

WebCT is a collection of WWW based course tools that facilitate teaching and learning on the Internet (University of Canberra, 2003: [online]). WebCT includes a variety of features that are designed to deliver online learning opportunities to students in classes. The interface allows the course instructor to design the presentation of the online course, including colour scheme, icon selection, and page layouts. The educational tools provided with the programme include chat rooms, e-mail, opportunities for students to create personal home pages, discussion forums, content modules, quizzes, presentations, student grouping devices, and resource links. It also provides administrative tools for the instructor to manage student information and oversee student tracking within the course (Hendes, 1999: [online]).

WebCT is one of course management systems used in this Masters course. It is created by the course presenter using a *Courseware Authoring Tool (CAT)* to facilitate online learning. The course materials, such as syllabi, assignments, lectures, and presentations are made available on web-based course environments. Students can access their coursework and submit their assignments anywhere, anytime, 24/7/365 through the web browsers. WebCT is individually paced and presents student-centered learning, relying heavily on self-motivated learners who must actively participate in the knowledge building process. The purpose of using WebCT is not only for the support of learning; it aims to promote effective learning.

4.4 THE STRUCTURE OF THE WEBCT PROGRAMME

The components of the WebCT programme used in this course are described below.

4.4.1 The homepage of the course

The homepage of the WebCT programme contains the primary structures of the online learning environment. The following components appear on the screen when students log onto the Masters in Computer-based Education course through edulink:

- Study guide
- Discussions
- Email me
- Calendar
- Search
- Resources
- Authorware examples
- Content (Themes)
- Student marks
- Upload presentation



Figure 4.1 below is a screen shot of the course homepage of the electronic learning environment. All the primary structures in the homepage are interactively linked to the second level of the hierarchy. To study any section of students' choice, simply click on the graphic or text to access.



Figure 4.1: The course homepage

4.4.2 The study guide page

The study guide page provides the general information of the course and aims to guide students to succeed on the course. It includes a welcome, a list of course presenters, module outcomes, the course schedule, the method of assessment, the method of work, the electronic learning environment and the available resources that can be used for this course.

4.4.3 The discussion page

A discussion forum is a communication tool used in the online environment and required user discipline to remain on topic. In this course, the discussion page includes announcements, group activities, assignments submissions, discussions of specific themes, topics and student inquiries. Figure 4.2 below is a screen shot of the discussion page used for this course.

Discussions			
Compose message Search Topic settings			
Click on a topic name to see its messages.			
Topic	Unread	Total	Status
Main	0	4	public, unlocked
Notes	0	0	public, unlocked
Kamogelo	0	20	public, unlocked
Theme 1: Discussions	0	31	public, unlocked
Announcements	0	20	public, unlocked
Group A	0	25	public, unlocked
Group B	0	22	public, unlocked
Group C	0	55	public, unlocked
Assignment 1 Submit	0	22	public, unlocked
Clark-Kozma Debate	0	176	public, locked
Ask here ...	0	9	public, unlocked
All	0	384	

Figure 4.2: The discussion page

4.4.4 The e-mail page

The e-mail is also a communication tool created to facilitate online communication between the lecturer and students, or between students. The e-mail domain is local closed group preventing attack from external spamming. Besides using e-mail for communications, it also can be used for students to submit their assignments.

Figure 4.3 below is a screen shot of the e-mail page.

E-Mail			
Compose message Search Message settings			
You have no new messages in your Inbox.			
	Folder	Unread	Total
<input type="checkbox"/>	Inbox	0	5
<input type="checkbox"/>	Outbox	0	9
<input type="checkbox"/>	Draft	0	0
	All	0	14

Figure 4.3: The e-mail page

4.4.5 The calendar page

The calendar is a useful tool used for creating/administering a routine in the learning process and for communicating general information related to time and venue to the learners. The learners can use the calendar page to personalize their calendar inscriptions. A screen shot of the calendar page is shown in figure 4.4 below.

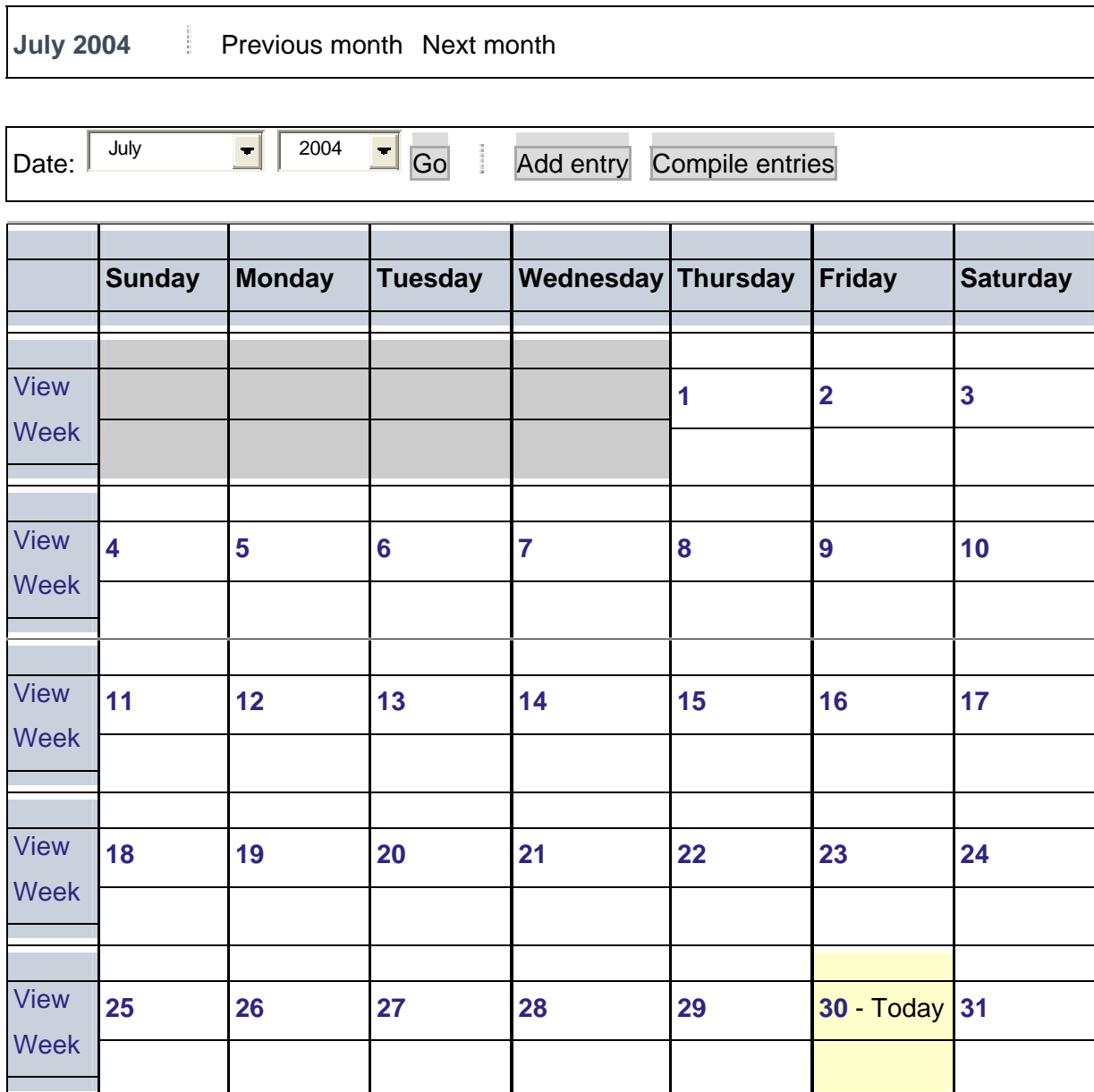


Figure 4.4: The calendar page

4.4.6 The search page

The search tool in this course is used for finding the course-related topics or assignments. An example of the search page is shown below.

Search the course



The image shows a search interface within a light blue rectangular box. On the left, the text "Search:" is followed by a long, empty search input field. To the right of this field is the text "Contains:" followed by a small, empty dropdown menu. Further to the right is a rectangular button with the text "Search" inside it.

Figure 4.5: The search page



4.4.7 The resource page

All the course-related resources are made available in the resource page. The learners can access them anytime and anywhere through web browsers. To study the resources, the learners simply click the links and either read from the computer screen or from printouts. An example of a screen shot of the resource page is presented below.

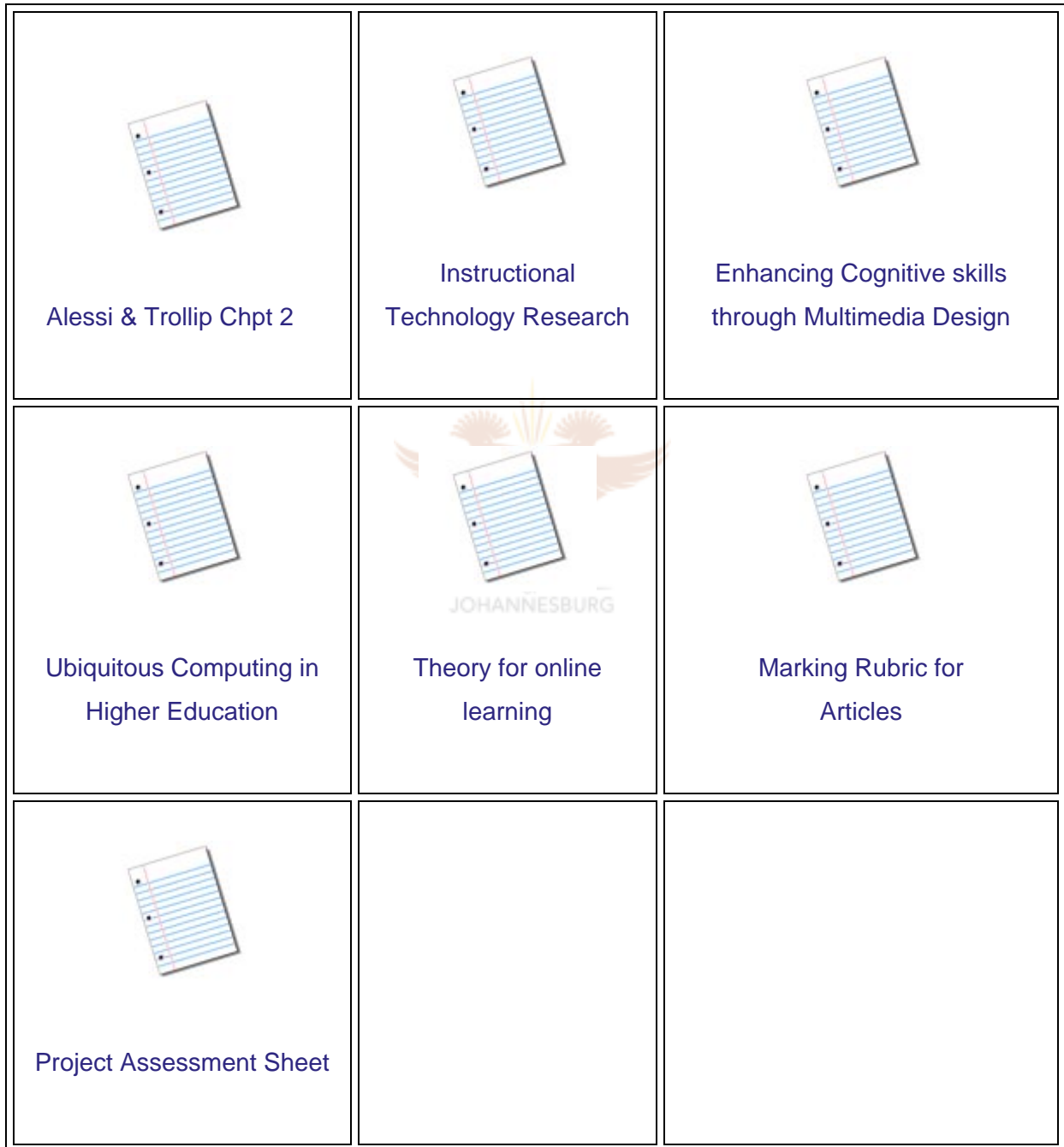


Figure 4.6: The resource page

4.4.8 The *Authorware* example page

It provides navigation examples from both *Authorware* version 4 and 6. The basic design examples, including sound and navigations, are offered. This page serves as a basic design model (as a tutor) to help/guide the learners to design and develop an interactive software using *Authorware*.

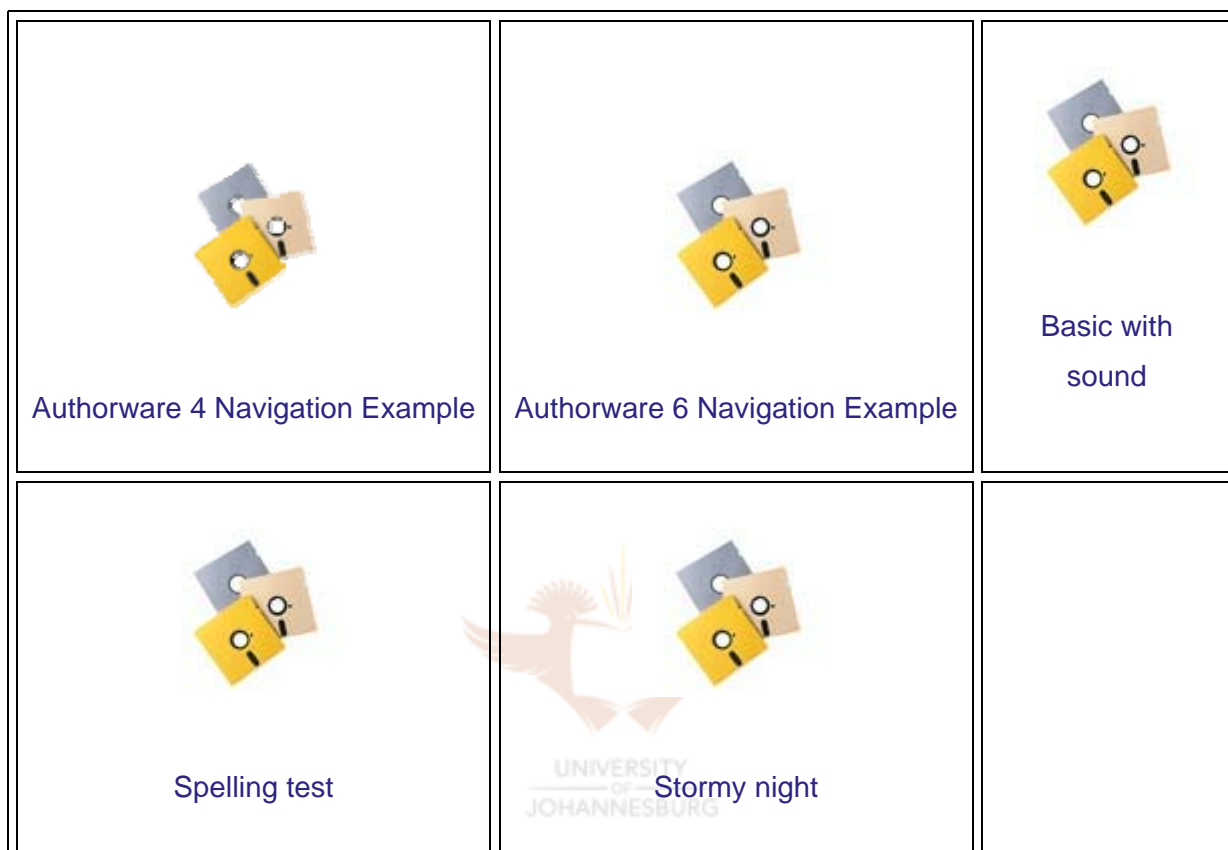


Figure 4.7: The *Authorware* example page

4.4.9 The content (theme) taught in the Masters course

Table 4.8 below reflects the themes and topics taught in the Masters course. Each theme has its own assignment that is submitted or posted electronically making use of various WWW-technologies. The specific activities and assignments given to the learners are covered in the study guide.

Table of Contents

1. Theme 1 2004: Theories of Learning and Computers
2. Assignment 1
3. Theme 2: Software for Learning and Tutorials
4. Assignment 2
5. Theme 3: Media Will Never Influence Learning
6. Assignment 3
7. Theme 4: Instructional Games, Simulations, and Tools & Open-ended learning environments
8. Assignment 4
9. Theme 5: Instructional Design Theory
10. Assignment 5

Figure 4.8: The content (theme) taught in the Masters course

4.4.10 Your marks page

On this page, students can access their marks that are allocated for assignments. Student performance and marks allocated to each individual assignment can be accessed. Individual student performance can also be compared with the rest of the classmates using the “view statistics” functionality. A detailed class mark statistic diagram is provided. The following screen shot is an example of the student’s mark page.

My Grades

X ZHANG (9805740)		
Assignment 1 (Out of 100)	87	View statistics
Assignment 2 (Out of 100)	80	View statistics
Assignment 3	88	
Assignment 4	70	

Figure 4.9: The student's mark page

4.4.11 The upload presentation page

It stores the plan documents of students with regard to Theme 5 (Instructional Design Theory). There are three purposes to set up this page:

- to let the lecturer to review what the previous plan knowledge of the student has got (pre-test) so that he can plan the lecture accordingly;
- to allow the lecturer to compare the progress of the student; and
- to allow the student to share or learn other students' ideas.

4.5 DESCRIPTION OF THEME 5 - INSTRUCTIONAL DESIGN THEORY

4.5.1 Define instructional design

According to McNeil (2004:[online]), instructional design is the systematic process of translating general principles of learning and instruction into plans for instructional materials and learning to achieve specified learning objectives. Instructional design includes the development of instructional materials and activities, and evaluation of the instruction and the learner activities.

4.5.2 Overview of theme 5 (content)

Theme 5 is about Instruction Design Theory which aims to equip students with knowledge and skills needed to develop educational multimedia software. According to Alessi and Trollip (2001), there are three major processes in instructional design, namely: planning phase, design phase and development phase. Theme 5 provides the details of the steps in each phase during design. All aspects in each phase need to be taken into account when starting to design learning packages.

4.5.3 Learning outcomes of theme 5

By the end of the lesson of Theme 5, the student should be able to:

- define what instructional design is.
- describe and explain three major design phrases.
- plan an educational multimedia project with regard to Instructional Design Theory in a systematic manner.
- apply knowledge/skills gained in Theme 5 to design and develop an interactive multimedia learning package for learners.

4.6 SUMMARY

This chapter provided a broad overview of the Masters course and the programme WebCT used for this course. The functionality of WebCT and how it is used for this Masters course was described. The components of WebCT used in this course were also described. Finally, a brief description of Theme 5 (Instructional Design Theory) selected for this study was given. The next chapter describes the research findings followed.

CHAPTER 5

THE RESEARCH FINDINGS - DATA ANALYSIS OF HOW EFFECTIVELY MASTERS STUDENTS LEARNT ABOUT INSTRUCTIONAL DESIGN USING AN INTERACTIVE LEARNING SYSTEM

Only by evaluating the effectiveness of software programmes can we justify their use and continue to develop their quality.

- Barbara Lockee, Mack Moore, and John Burton

5.1 INTRODUCTION

This chapter describes the findings of the case study with regard to the research question. The data that are used in this study are derived from the questionnaire survey, the field notes made during observations, the transcript of verbal individual interviews, and the analysis of students' project planning documents. The data are analyzed and described based on the Kirkpatrick four level evaluation model. The details of the findings are discussed and reported in the following paragraphs.

5.2 DATA ANALYSIS - HOW EFFECTIVELY MASTERS STUDENTS LEARNT ABOUT INSTRUCTIONAL DESIGN USING AN INTERACTIVE LEARNING SYSTEM

5.2.1 A framework for data analysis

According to Kirkpatrick (1994), evaluation that verifies and improves the effectiveness of an interactive learning system is conducted at four levels: Reaction, Learning, Behaviour change, and Results. In this study, the researcher contends that the effectiveness of WebCT will best be determined when the effectiveness of learning has been determined. Evidence to determine the effectiveness of learning must be gathered at each level of the Kirkpatrick model.

Table 5.1 below represents that the questions needed to be answered at each level of evaluation as well as data collection tools that are used in answering each question.

Table 5.1: Evaluation questions and data collection tools

Evaluation Questions		Data Collection Tools
Reaction	How did learners react to the programme?	Questionnaires Observations/Interviews
Learning	How much did they learn from the training?	Interviews Document analysis
Behaviour	Is what was learned being applied on the job??	Interviews/Questionnaires
Results	Did the training impact on the organization?	Interviews

In this study, the table above will be used as an evaluation instrument to analyze the data. The data analysis of each level is presented as follows.

5.2.2 Level One - Students' reaction (satisfaction)

Evaluation at Level One measures how students feel about the training programme and how well they liked the training session. Students' reaction will show whether they are satisfied with the training programme as well as the course. The results of reaction evaluation will aim to find out whether the course has challenged students and motivated them to learn. In order to evaluate students' reaction, three data collection instruments, such as: questionnaires, observations and individual interviews, are used.

Reaction evaluation in the survey questionnaire is separated into six main categories by the analysis of data. These categories are: the course objectives, the relevancy of the content and the learning materials, the amount of instruction and the effectiveness of the instructional method, the course instructor, the overall evaluation of the course and the training programme. In the first part of the survey questionnaire, a five-point scale is used to scale the response of students, with 5

being the strongest agree and 1 the strongest disagree. In the second part, open-ended questions are provided for students to feel free to fill in. The survey questionnaires are distributed to 18 Masters students and 12 completed survey questionnaires are returned.

In terms of 12 completed survey questionnaires, the transcripts of individual interviews and the field observations, an analysis of the feedbacks from students is described and discussed in the following paragraphs.

5.2.2.1 The course objectives

In any educational institutions and at any courses, it is required that the course objectives are made clear to students and every student should be able to achieve the learning outcomes by the end of the lesson. However, to achieve the desired learning outcomes, an individual student must be motivated to learn and to take an active participatory role in the learning process.

Table 5.2 indicates the responses of students to the course objectives.

Table 5.2: Evaluation of the course objectives

<u>Items</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or disagree</u>	<u>Agree</u>	<u>Strongly agree</u>
The course objectives were clear to me.			8.4%	58.3%	33.3%
I think that the learning objectives of this course had been met.			8.4%	41.6%	50.0%

According to the responses of students on the course objectives survey, the findings showed that 91.6% of students either agreed or strongly agreed that the course objectives were clear to them and that the learning objectives of this course were met. These positive findings indicated that students in this Masters course were positively motivated to learn. The evidence was that students achieved what was expected from this course.

5.2.2.2 The relevancy of the content and the learning materials

Online learning is learner-centered and depends heavily on self-motivated and independent learners who must actively participate in the construction of knowledge. The more “quality” time students spend engaging in the content, the more of that content they can learn (Pelz, 2004:33). However, in accordance with the learning principles of constructivism, to change/motivate a student to learn, the content taught must be relevant to the student’s real life situation. In this study, the relevancy of the content taught is evaluated by focusing on the student’s job.

Table 5.3 indicates the responses of students to the relevancy of the content of the Theme 5 taught in this course.

Table 5.3: Evaluation of the relevancy of the theme 5 content

<u>Item</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or disagree</u>	<u>Agree</u>	<u>Strongly agree</u>
The content of Theme 5 - Instructional Design Theory was relevant to my job.	8.4%		33.3%	8.3%	50.0%

The findings of Table 5.3 above showed that 8.4% of students strongly disagreed that the content of Theme 5 was relevant to their job; 33.3% of students were not sure whether the content of Theme 5 was relevant to their job or not; and 58.3% of students either agreed or strongly agreed that the content of Theme 5 was relevant to their job. The findings from individual interviews exposed those students who agreed that Theme 5 was relevant to their job either were the instructional designers or the schoolteachers. The findings from one third of students who were unsure whether the content of Theme 5 was relevant to their job indicated that the relevance of the content to students’ job needed to be reinforced in future. To do this, the researcher believes that it is necessary to do a broad field survey before the course instructor decides what content should be selected to teach.

In terms of evaluation of the learning materials, the researcher, as a participator in the study of this course, found that the learning materials of Theme 5 such as *Multimedia for Learning - Methods and Development* were very useful for students.

Students obtained a great benefit from them in learning how to design/develop interactive multimedia learning packages for learners. From individual interviews, the researcher found that students had a positive attitude about the learning materials used for this course. For example, one student said: **“Learning materials used for this course will be useful in my job.”**

From the field observations, the researcher experienced that except for one textbook that the students had to buy, all the other learning materials and the additional resources were made available on WebCT. The students could access them at anytime and anywhere. Most students reported that in this way it was very convenient for their study.

In conclusion, from evaluation of the relevancy of the content, the findings showed that more than half of the students agreed that the content of Theme 5 was relevant to their job. The survey of the relevancy of the content was a positive implication for improving the performance of students' job. However, the findings also showed that one third of students held a doubtful standpoint in this regard. This unsure response of students implied that the relevancy of the content needed to improve. From evaluation of the learning materials, the findings showed that the learning materials used in this course were very useful for students' study. Some students reported that they would use these learning materials in their work environment. In addition, the findings showed that students were happy about the learning materials and the additional resources that were made available on WebCT. In this way, WebCT is an added convenience in their study.

5.2.2.3 The amount of the instruction and the instructional method

Regardless whether it is face-to-face lectures or the online course lecture, an adequate amount of the instruction is essential to students' learning.

Table 5.4 below shows the responses of students to the amount of the instruction received from WebCT.

Table 5.4: Evaluation of the amount of the instruction

<u>Item</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or disagree</u>	<u>Agree</u>	<u>Strongly agree</u>
The amount of instruction I received by using WebCT was adequate.			33.3%	50.0%	16.7%

According to the responses of students in Table 5.4, the findings showed that 66.7% of students either agreed or strongly agreed that they received sufficient instruction from WebCT for their learning. The findings indicated that the responses of students to the amount of instruction received were not negative. However, the findings also presented that 33.3% of students were not sure whether or not they received adequate instruction from this course. The findings indicated that the instructional method used for this course perhaps needed an examination.

Effective instructional method is crucial to students' learning. The instructional method offered for this Masters course is a blended teaching/learning method. On one hand, students are required to attend weekly face-to-face lectures for the theoretical study. On the other hand, they have to attend the online course study which includes study learning materials and additional online resources, participating in discussions/debates using the WebCT forum, posting/submitting assignments using e-mail facilities, and interacting with fellow students in a specific online environment.

According to the field observations, the researcher found that this blended teaching/learning method was appropriate for this course because it accommodated the different preferences of the learners' diverse needs. However, according to the questionnaire survey comparing face-to-face lectures with the online course, the result of the evaluation was surprising.

Table 5.5 indicates the responses of students to face-to-face lectures and the online course.

Table 5.5: Evaluation of the instruction method

<u>Item</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or disagree</u>	<u>Agree</u>	<u>Strongly agree</u>
Compared to face-to-face lectures, I enjoyed the online course more.	16.7%	33.2%	16.7%	25.0%	8.4%

The findings from the responses of students in Table 5.5 showed that 49.9% of students either strongly disagreed or disagreed that they enjoyed the online course more. 16.7% of students held a neutral view. 33.4% of students either agreed or strongly agreed that they enjoyed the online course more. The reasons for such a strong reaction are perhaps the negative aspects of using WebCT for learning (see 5.2.2.5 - an overall evaluation of the training programme WebCT).

The findings from evaluation of the amount of instruction and the instructional method showed that nearly half of students in this course did not agree that they enjoyed the online course more. They seem to prefer to face-to-face lectures. The reasons for causing this result are various. According to the questionnaire survey, the researcher found that the negative aspects of the online course, such as not providing immediately feedback and insufficient tasks/activities on WebCT, are major factors which lead them to enjoy face-to-face lectures more. Another factor is that the learning style of each individual student is different. Some students prefer to the online course more while others prefer to face-to-face lectures. In order to accommodate the diversity needs of students, the researcher believes that the blended teaching/learning method should continue to be used.

In addition, in order to challenge the students to better enjoy the online course, the course instructors and the courseware developers need to work together to improve the courses. To improve the courses, the researcher believes that one possible solution may be to overcome the existing problems in WebCT. Another solution may be to engage more effective online pedagogies into WebCT to accommodate the diversity needs of learners. Furthermore, consideration should be given to provide more interesting activities and the meaningful tasks on WebCT.

5.2.2.4 The course instructor

The course instructor plays an important role in students' learning. With an increased emphasis on constructivism in education, the role of the instructor is no longer simply to present the information for digestion by the students. Rather the instructor becomes a facilitator to challenge and inspire the students to learn.

Table 5.6 below indicates the responses of students to the course instructor in this Masters course.

Table 5.6: Evaluation of the course instructor

<u>Items</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or disagree</u>	<u>Agree</u>	<u>Strongly agree</u>
The course instructor was well-prepared.			33.3%	25.0%	41.7%
The course instructor facilitated class discussion effectively.			25.0%	50.0%	25.0%

The findings from Table 5.6 showed that 66.7% of students either agreed or strongly agreed that the course instructor was well-prepared for the lessons and 33.3% of students were unsure. 75.0% of students either agreed or strongly agreed that the course instructor facilitated the class discussion effectively and 25.0% students held a neutral view in this regard. The findings from the evaluation of the course instructor showed that the responses of students to the course instructor were positive.

From the field observation, the researcher found that the course instructor facilitated both face-to-face class activities and the online discussion very effectively. One example was a face-to-face class activity which was called "The Weakest Link." 76 quiz questions were prepared by the course instructor and each question counted 1 point. Students were allocated into groups of three and the groups were given 5 seconds to answer each question. If the first group could not answer the question or answered it incorrectly, the second group would get a chance to answer the question (once only). As a researcher and also a participator in the study of this

course, the researcher observed that most students enjoyed this class activity very much. The researcher found that “The Weakest Link” activity was very interesting and really challenged students to get involved in the construction of knowledge.

5.2.2.5 The training programme - WebCT

An overall evaluation of the training programme - WebCT in this study includes measuring its accessibility, functionality and usability, and the best and the worst aspects of using it for learning.

Table 5.7 presents evaluation of the accessibility, functionality, and usability of WebCT in the online learning environment. The experience of students with regard to the use of WebCT and its effectiveness for learning are also evaluated.



Table 5.7: Evaluation of WebCT

<u>Items</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or disagree</u>	<u>Agree</u>	<u>Strongly agree</u>
The WebCT tools were easy to use. It was easy to find info in this WebCT environment.			8.3%	41.7%	50.0%
WebCT provided all the tools for my learning.	8.3%	16.7%	33.3%	25.0%	16.7%
WebCT was an appropriate delivery tool for the selected content, e.g.: Theme 5.		8.3%	25.0%	58.4%	8.3%
I felt the course delivery tool “WebCT” affected my ability to learn.	8.3%	25.0%	25.0%	16.7%	25.0%
I found that the bulletin board feature in WebCT was useful for my study.		8.3%	50.0%	25.0%	16.7%
I was able to access the materials without much difficulty.				66.7%	33.3%
I always knew where I was in the WebCT environment.			8.3%	66.7%	25.0%

<u>Items</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or</u>	<u>Agree</u>	<u>Strongly agree</u>
			<u>or</u>		

			<u>disagree</u>		
I found that using WebCT for learning was effective in my current course.		8.3%	25.0%	50.0%	16.7%
I enjoyed learning in this electronic learning environment.				58.3%	41.7%
My overall satisfaction rating for using WebCT for learning was very good.			33.3%	41.7%	25.0%

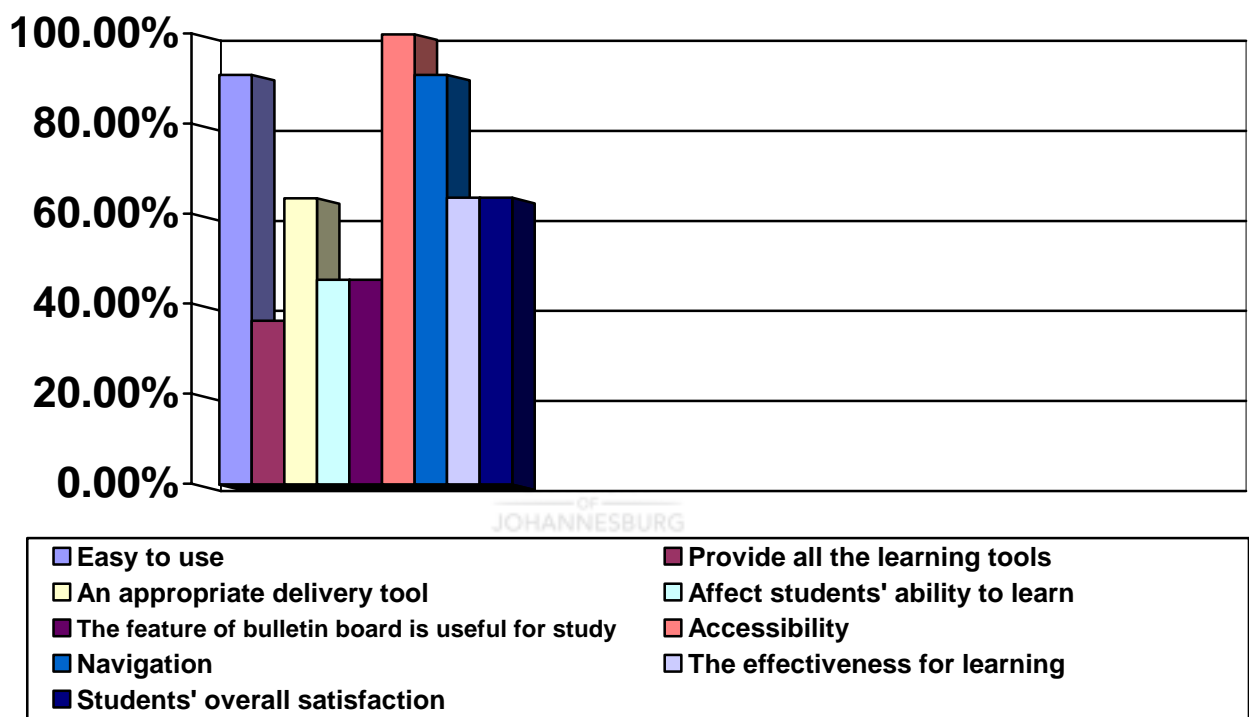


Figure 5.1: Summary of evaluation of WebCT

According to the responses of students in Table 5.7, 91.7% of students either agreed or strongly agreed that the training programme WebCT was easy to use and it was easy to find the information in the WebCT environment. 100% of students said that they were able to access the materials and additional resources without much difficulty, and that they enjoyed learning in this online learning environment. The researcher experienced that the online learning environment was able to stimulate a broad range of “authentic” group and interpersonal challenges for students in this course.

The findings also showed that 91.7% of students always knew where they were in the WebCT environment. The findings indicated that students did not meet any navigation problems in WebCT. 66.7% of students believed that WebCT was an appropriate delivery tool for the selected content (Theme 5). They found that using WebCT for learning was effective in their current course and their overall satisfaction for using WebCT for learning was generally good. The findings showed that only 41.7% of students either agreed or strongly agreed that WebCT provided all the tools for their learning. WebCT positively affected students' ability to learn and the bulletin board in WebCT was viewed as a useful tool for their study.

According to individual interviews, in terms of how WebCT affected students' time, the findings showed that the responses of students were very positive. For example, one student said: **“I find that WebCT definitely saves me time and influenced my time positively, because information is readily accessible, I can link to the WebCT environment at any time that is convenient for me.”** Another student said: **“I find that WebCT for this course is useful. It's quite quick and fast. It doesn't take up unnecessary time.”**

With regard to the learning experience of using WebCT for learning, the findings showed that students had a very positive attitude about its availability, accessibility, some functionality, and the online learning environment. For example, one student said: **“I don't feel alone and can ask questions at any time. I find the informal email facilities are very valuable for creating a forum for discussions with fellow students and for cooperative and collaborative learning activities. Additional resources are also readily available in the WebCT environment. Overall, I like the WebCT programme. I find that it is very user-friendly and very accessible. It makes me feel I'm a part of a community of learners.”** Another student said: **“I think that WebCT is usefully used for our learning. I enjoy learning in this electronic learning environment.”**

The findings from the above showed that students liked the training programme WebCT and they had a very positive attitude about how it affected their time and learning experience. Their overall satisfaction using WebCT for learning was generally good.

However, according to the analysis of the second part of the survey questionnaires and individual interviews in accordance with the worst aspects of using WebCT for learning, the findings showed that students did not like the slow access, especially when the server was down. They also did not like the high connection cost, particularly dial-up costs. Moreover, one student critically pointed out: **“I find that the least valuable thing of using WebCT for learning is that it doesn’t provide enough discussion opportunities for students.”**

In order to address this issue, the student suggested that more discussion opportunities needed to be provided on WebCT for students. In addition, some important questions should be posted on WebCT for reflection before the contact session. In this way students could discuss these questions critically in class rather than simply having a lecture on the topic. WebCT should not be used only for distributing information or posting assignments, but should also be used to guide students through the whole course. For example, giving students exercises to do and offering more opportunities for students to practice the skills that they had learnt. There was a desire amongst the group to experience more of the functionality of WebCT for learning.

Another student critically said: **“About the learning experience, one occasion would be a class debate/discussion regarding to the Clark/Kozma issues. I find that WebCT is mostly just used for presenting, distributing information and posting our assignments. I would like to see more learning activities and tasks within WebCT.”** The student suggested that these activities and learning tasks should be used to guide students through their work. More opportunities should be given to them to practice the skills acquired, for example, the skills regarding software applications such as *Authorware*, *Dreamweaver*, *Flash* and *Fireworks*. The student would also like to see what they learnt in the theory (Alessi & Trollip: 2001) modelled in WebCT. In this way students would not just obtain knowledge about web-based learning, but also gain the skills. For instance, for students who were supposed to learn making tables using *Dreamweaver*, examples of how to make tables should be provided on WebCT for students to practice. Through the information and exercises, students could improve their table-making skills. Finally, this student emphasized: **“WebCT really helped my learning and increased my learning experience. However, I would like to see more discussions/activities on WebCT.”**

The findings from individual interviews in terms of the worst aspects of using WebCT for learning indicate that although WebCT has advantages that were useful for students' learning, it also has a number of disadvantages that has a negative influence on students' learning. The findings suggest that in order to make WebCT more practical and useful for students' study, the worst aspects of using WebCT for learning need to be addressed.



Table 5.8 below presents a brief summary of the best and the worst aspects of using WebCT for learning found in this Masters course.

Table 5.8: The best/the worst aspects of using WebCT for learning as provided by the student sample

<u>The best aspects of using WebCT for learning</u>	<u>The worst aspects of using WebCT for learning</u>
<ul style="list-style-type: none"> • Accessibility 24x7x365 	<ul style="list-style-type: none"> • Slow system response times
<ul style="list-style-type: none"> • Convenience, anywhere, even at work 	<ul style="list-style-type: none"> • The cost issue
<ul style="list-style-type: none"> • Immediate availability (additional resources were available) 	<ul style="list-style-type: none"> • Not enough opportunities for critical thinking/practice
<ul style="list-style-type: none"> • User friendly 	<ul style="list-style-type: none"> • Didn't provide all the tools for learning
<ul style="list-style-type: none"> • Distribute information & post assignments 	<ul style="list-style-type: none"> • Didn't affect students' abilities to learn
<ul style="list-style-type: none"> • Useful links to class activities 	<ul style="list-style-type: none"> • Didn't correspond with all students' learning style
<ul style="list-style-type: none"> • Forum for discussion with the lecturer and the fellow students & collaborative learning 	<ul style="list-style-type: none"> • Didn't provide enough learning tasks/discussion opportunities for students
<ul style="list-style-type: none"> • Save students' time 	<ul style="list-style-type: none"> • Issue of synchronous communication
<ul style="list-style-type: none"> • Communication (interaction) 	<ul style="list-style-type: none"> • Didn't receive immediately feedback on the posting/email/discussion
<ul style="list-style-type: none"> • Opportunity for debating/discussing important sections of the course/excises 	<ul style="list-style-type: none"> • Didn't model the theory/programme to students properly

The table above illustrates the feedback from students about the best and the worst aspects of using WebCT for learning in this Masters course. Results captured in Table 5.8 tend to suggest that the best aspects of using WebCT for learning should be fully utilized. The worst aspects of using WebCT for learning and the existing problems found in WebCT need to be addressed.

5.2.2.6 An overall evaluation of the course

The purpose of evaluating this Masters course is to find out how well students enjoyed the course. The course evaluation will be used to improve the quality of learning (Kirkpatrick, 1994).

Table 5.9 indicates the responses of students to the course.

Table 5.9: Evaluation of the course

<u>Items</u>	<u>Strongly disagree</u>	<u>Disagree</u>	<u>Neither agree or disagree</u>	<u>Agree</u>	<u>Strongly agree</u>
The course activities stimulated my learning.			8.3%	41.7%	50.0%
This course lived up to my expectations.		8.3%		58.3%	33.4%
I believed that this course would help me to do my job better.	8.3%	8.3%	16.7%	16.7%	50.0%

The findings from the responses of students in Table 5.9 showed that 91.7% of students either agreed or strongly agreed that the course activities stimulated their learning and this course lived up to their expectation. The findings also showed that 66.7% of students either agreed or strongly agreed that this course would help them do their job better. The findings from this questionnaire survey indicate that the majority of students are positive about the current course. This positive attitude will enhance their learning. However, the findings also show that one third of students are uncertain or disagreed that the course will help them to do their jobs better.

In conclusion, the findings from Level One - Reaction evaluation indicate that students in this Masters course react very favourably to the WebCT programme. However, in order to make this training programme more practical and useful to students' study, it is suggested that some good recommendations made by students

need to be taken into a consideration. In addition, the findings indicate that the course evaluations received from the questionnaire survey confirm that students react positively to this Masters course. The researcher found that these positive reactions increased students' receptivity to the knowledge and skills presented in this course. The reasons why some students disagreed that the course will help them to do their jobs better are explored in the section of the transfer of learning (see the section 5.2.4).

5.2.3 Level Two - Learning gains

According to Kirkpatrick (1994), Level Two evaluation is used to test participants' learning. However, measuring learning require a more rigorous process than the reaction survey. In this study, to determine what/how much knowledge/skills students learnt as a direct result of the Instructional Design training, two data collection instruments, namely: individual interviews and the document analysis, are used. The data are analyzed by focusing on three important domains: The increased knowledge, improved skills and the changes in attitude. Analyzing these three domains follows.



5.2.3.1 The increased knowledge

With regard to Theme 5, the increased knowledge of students in this training is very broad. For example, one student said: **“I have broadened my knowledge of learning theories. My knowledge of Instructional Design is much improved. Now, I can apply design principles I learnt from Theme 5 systematically into my planning documents.”** Another student said: **“My increased knowledge is that I now know that a designer must have a plan before he/she starts to design a project because it is difficult to design without a plan. I also know that before producing the learning package, the designer must build a broad picture such as a storyboard or a prototype that will help him/her to complete the whole project.”** The findings from individual interviews illustrated that the training of Instructional Design broadened students' understanding of the learning theories. They knew how important the plan was and how to follow the design principles systematically to plan, design and develop their projects.

From analyzing students' project planning documents, the findings showed that the increased knowledge of students consisted of three main parts. Firstly, students were equipped with a broad knowledge of learning theories. These theories were Behavioural Theory, Cognitive Theory, and Constructivist Theory. Students were able to apply different learning principles into their design. For example, they used sound or video clips to attract learners' attention. They used positive feedback to motivate learners to learn. Secondly, students mastered general features of software for learning. The evidence was that the planning documents of students included the following features: introduction of a programme, learner control of a programme, presentation of information, providing help and then ending a programme. Thirdly, the planning documents of students showed that their Instructional Design knowledge was much improved. They were able to follow the three main Instructional Design phrases such as planning, design and development to design their projects. A report of how well students applied these phrases into their learning packages followed.

In the planning phase, the findings showed that students demonstrated their increased planning knowledge. The majority of students were able to apply the following plan aspects into their learning packages:

- **Defining the scope of the content to be learnt:** In the project planning documents of students, the researcher found that students defined the followings: What were the desired outcomes of the project? Who was to learn what, and what was the level of competence of the learners?
- **Identifying characteristics of learners:** Students demonstrated that they identified the followings: Who were their learners? What were their ages and educational levels? What were the needs of learners? What did they want to learn and how were their motivation to learn? What was their entry situation? (Such as: prerequisite knowledge/skills, the reading level, and the typing level.)

In the design phase, the planning documents of students demonstrated that their design knowledge was much improved. The evidence was that students were able to follow the listed design steps to design their learning packages.

- **Developing initial content ideas to help learners learn, using a two-step process:**
 - 1) **Brainstorming the content and learning approaches:** In this session, the findings showed that ideas of students about *what* information was to be learned and *how* to use the learning methodologies to facilitate learning were both generated.
 - 2) **Elimination of some initial ideas:** The brainstorming generated unedited ideas about both content and techniques to facilitate learning. These unedited ideas needed to be eliminated. In the project planning documents, the majority of students demonstrated that they eliminated irrelevant ideas about content and instructional techniques.

- **Conducting task and concept analyses:** The remaining ideas that students would include in their programmes should be analyzed. In the students' planning documents, the findings showed that students utilized two methods of analysis, namely: task analysis and concept analysis. They used task analysis for analyzing the things that a learner ought to learn to do, such as behaviour and skills; and concept analysis for analyzing the content itself, the information that the learner ought to understand.

- **Doing a preliminary programme description:** Alessi and Trollip (2001) referred to Hoffman and Medsker (1983) who called this activity "instructional analysis." Instructional analysis included identification of types of learning, choosing a methodology, making decisions about instructional factors, and producing a preliminary description of the sequence of the programme. During analyzing students' planning documents, the findings showed that the documents of all students included choosing a methodology. However, not all students covered identification of types of learning and decision factors, and they did not cover producing a preliminary description of the sequence of the programme.

- **Preparing a prototype:** According to Alessi and Trollip (2001:502), prototyping was a power tool for both brainstorming and communicating ideas. The prototype showed how a programme might look and work. It

was a good way to communicate ideas to a client. The findings from students' planning documents showed that only a few students demonstrated that they prepared the prototype. The remaining students did not cover preparing the prototype.

- **Creating flowcharts and storyboards:** Flowcharts showed how the programme progresses and/or flowed. Storyboards provided a visual representation of the design (like separate computer screen displayed or parts) and most of the details that programmes would need to implement. In the students' planning documents, the findings showed that all students created both flowcharts and storyboards. The flowcharts and storyboards of each individual student were most creative.
- **Preparing scripts:** In multimedia products, preparing scripts included producing audio or video. The findings from students' planning documents showed that the projects of most students included either audio or video, or both. However, they did not provide details of preparing scripts.

In the development phase, it was essential to follow the following steps. However, the findings showed that not all students applied these steps into their planning documents.

- **Preparing the text components:** In general, a word processor was viewed as the best way to produce text materials because it allowed people to make changes easily to wording and structure. The planning documents of students demonstrated that the word processor was used by students for preparing the text.
- **Creating the graphics and the animations:** In multimedia, both graphics and animations were effective for attracting attention. The findings from students' planning documents showed that all students created graphics and animations by using *Fireworks MX* and *Flash MX* in their learning packages.
- **Producing audio and video:** The findings showed that only a few students produced both audio and video in their planning documents. A proportion of students only produced video and other students only recorded audio.

- **Preparing support materials:** According to Alissi and Trollip (2001: 541), the support materials included learner manuals, instructor manuals, technical manuals, and adjunct instructional material. The findings showed that the majority of students did not include support materials in their planning documents. Only a few students prepared learner manuals, but they left out the rest of the support materials.
- **Doing an alpha test:** The alpha test was the major test of the programme and was done by the designer or his/her team. Alpha testing should be based on the evaluation form and the style manual. The evaluation form addressed the following areas: subject matter, affective considerations, interface, navigation, pedagogy, robustness, supplementary materials and so forth. The style manual included the look and feel of the programme, style conventions and functionality. From an analysis of their documents, the findings showed that most students did the alpha test.
- **Doing a beta test:** A beta test was a full test of the final product and was done by the client. In this study, it should be done by learners. The data obtained from learners should be used to decide whether the programme needed further revision. The analysis of students' planning documents showed that only a few students mentioned that their programmes were tested by the tutor or their classmates. The remaining students did not include the beta test in their learning packages.
- **Validating the programme (summative evaluation):** For educational multimedia, validation was the process of checking whether the users had accomplished the learning goals of the programme (Alissi & Trollip, 2001: 553). In other words, it tested "did learners learn?" Validating the programme was the last step in the development phase and was very important. However, the findings showed that most students did not include validating the programme in their planning documents.

Comparing the analysis of the increased knowledge from both individual interviews and students' project planning documents, the research findings consistently showed that students were equipped with a broadened understanding of learning theories and were able to apply the different learning principles to their projects. The

findings also showed that students mastered the general feature of software for learning and they were able to apply these features into their learning packages. Moreover, the findings showed that the Instructional Design knowledge of students was much improved. Students were able to apply the equipped design principles into their project plans. However, in the development phase, the findings showed that most students ignored evaluation of the programme.

5.2.3.2 Improved skills

From analyzing students' planning documents, the researcher found that one of the improved skills of students was decision-making. During design, students were able to make their own judgment on screen colours, which graphics should be selected to match the specific content, the types of assessment that should be given, and so forth. Another improved skill was students' planning skill. The findings showed that students could follow each step systematically to plan their projects. For example, one student said: **“My planning skill was much improved. Instructional Design definitely helps you to think analytically. It also helps you to structure your information in a very specific way. Now, I can systematically and logically plan my learning package.”** In addition, the findings showed that students' high-order thinking skill and creative talents such as writing, drawing and design were much increased. For example, one student said: **“I think that my thinking skill is much improved, especially my creative thinking skill. I can use my creative thinking skill to draw diagrams and flowcharts to make my programme look nice.”** Furthermore, the findings showed that students' problem-solving skill was improved. For instance, one student said: **“My problem-solving skill has improved. During the design, I meet a lot of different problems. Sometimes, if I really cannot solve them, I ask the tutor, Ruth, for help. Through her help, I learn how to solve that problem.”** Besides the above mentioned, one student said that after the Instructional Design training, her improved skill was to write the storyboard and to do the whole design for the computer-based environment. This student could also apply the increased Instructional Design knowledge to design an interactive multimedia learning tutorial for her learners using *Authorware*.

From analyzing students' planning documents and individual interviews, the findings showed that improved skills of students consisted of the decision-making skill, the

planning skill, the higher-order thinking/creative thinking skill, and the problem-solving skill.

5.2.3.3 Changes in attitude

To evaluate learning, it was essential to find out whether students had/held a positive attitude. From the questionnaire survey, the findings showed that 66.7% of students believed this course would help them do their job better (Appendix F: Q17). 100% of students agreed or strongly agreed that they enjoyed learning in this electronic learning environment (Appendix F: Q19). 91.7% of students agreed or strongly agreed that this course lived up to their expectations (Appendix F: Q21). 66.7% of students agreed or strongly agreed that using WebCT for learning was effective in their current course and their overall satisfaction rating for using WebCT for learning was good (Appendix F:Q24). The findings indicated that the satisfaction of students with the course and the training programme WebCT both strongly impacted their attitude change.

From individual interviews, the findings showed that the lessons of Instructional Design changed students' attitudes in a positive way. For example, one student said: **“Instructional Design really helps me and changed me in a positive way to share information with others. I really enjoyed the group work experience because I can learn other skills from my fellow classmates.”** The findings indicated that the group-work enhanced students' learning experience on Instructional Design. Another student said: **“Instructional Design definitely helps you to think in an analytically way and also helps you to structure your information in a very specific way.”** A third student added: **“The project plan is extremely helpful because it shows you that you can plan the project in a systematic and logical way. The training of the Instructional Design lessons gives me more confidence for doing my job better.”** All these positive comments showed that students had a positive attitude in terms of the training of Theme 5.

In conclusion, the findings of the Level 2 - Learning evaluation indicated that students made gains in the knowledge and skills needed in Theme 5. Their Instructional Design knowledge and skills were much improved. Students achieved

their current performance level in terms of Theme 5 and also changed their attitude in a positive way.

5.2.4 Level Three - Behaviour changes/Transfer of learning

Applying what was learnt on the job was very important. To measure whether students transferred the learned knowledge and skills to their work environment, or whether they planned to do the job differently after the Instructional Design training, both questionnaires and individual interviews were used for data collection.

According to the survey questionnaires, the findings showed that most students believed that they would be able to apply Instructional Design skills and all the design aspects that they learnt from Theme 5 to their work environment. However, a few students did not think that they could apply learnt Instructional Design skills to their work environment at this moment. One of the reasons was because of their schools had no computers resources. This restricted resource had influenced their behaviour change.

According to individual interviews, in terms of the question **“How did Theme 5 change your behaviour based on what was learned?”** one student said that Theme 5 had changed her attitude (behaviour) from being negative to being positive. One part of her behaviour change was that the knowledge of Instructional Design had changed her perception when this student saw things. For example, this student said that she had no prior Instructional Design knowledge. Subsequent to the training while she was watching a TV programme she noticed that at the commencement of the TV programme, the presenter showed audiences a broad picture as a means of introduction before going to the detail of the whole film, this was similar to a prototype or a storyboard. This student now fully understood what she had just learnt from Theme 5.

With regard to the question **“Did what you learnt in Theme 5 (the Instructional Design Theory) influence the way that you work at work?”** the findings showed that students held two different answers. From the positive side, one student said: **“The Instructional Design Theory definitely influenced my work.”** This student described that as an instructional designer, she had been doing design job since 1995. She got opportunities to apply the design principles and practices of the

Instructional Design Theory on a daily basis. What she had learnt in theory in this course definitely confirmed that what she was doing at work was correct, particularly the tasks on planning a document for computer-based learning packages. This student said that the project plan was extremely helpful because it showed how to plan the project in a systematic and logical manner. You could plan the project ahead and use evaluation strategies. You could also measure what you were doing against what you had planned. In fact, it saved a lot of time when planned ahead.

In contrast, another student said: **“Due to the fact that I am an instructional designer, Theme 5 doesn’t really change the way that I work at work, but it has reinforced that I am doing the right thing in my workplace. Something new to me is the storyboarding as part of the instructional design plan. I will definitely use that in my work environment. With theories in Theme 5, I also feel more comfortable with learning theories, because we had to work through it intensely.”** With further interviews with the third student, the student said that Theme 5 (Instructional Design) did influence the way that she worked at her work environment. The reason was because this student was working at a poor township school and her school had no computers resources. She was not able to apply what was learnt from Theme 5 to her work environment. However, this student said that if she worked at different situations, for instance at a school which had computer resources, the training of Theme 5 would influence her work and she would be able to transfer the acquired knowledge and skills to her workplace.

According to the question **“How does the training of Instructional Design affect your job performance?”** there were two different types of answers received. On one hand, some students said that the training of Instructional Design did not affect their job performance. For example, one student said: **“At this stage, it hasn’t really affected my job performance, because I haven’t had the opportunity to work with computer-based projects in my work environment yet.”** Another student said: **“It doesn’t really affect my job performance at the moment because my school has no computers. This means that there is no opportunity to allow me to practice what I learnt from the training.”**

On the other hand, some students said that the training of Instructional Design lessons had affected their job performance. For example, one student said: **“I can justify my design decisions by reflecting on Instructional Design principles**

and theories. I do not have to rely on a 'feeling' that what I am doing is right. The training of Instructional Design makes me feel more confidence in doing my job better (all the design I made I base on that theory). Now, I don't have to think about whether what I am doing is wrong or not. I know that's right because I can refer to the theory."

With regard to the question "To what extent do you plan to do your job differently in the future?" one student said: "The assignment task on compiling a project plan for the *Authorware* learning package has convinced me to prepare a detailed plan for all future development projects. I would undertake this in my workplace and definitely do my plan in more detail." In addition, this student mentioned that they worked in teams with other people; she believed that the better she could do her job, the better they could function as a team. She could adopt other people's input and could also add that information. Another student said: "I will definitely plan to do my job differently in the future if I get a chance to design in a computer-based learning environment or an online learning environment. I will apply all the design aspects that I have already applied and also learnt in Theme 5. I will definitely add the storyboard to my work because it is very valuable." A third student said: "If I have a chance, I will apply the Instructional Design Theory to my work because this theory has given me proper skills about how to design/develop an interactive multimedia learning package for learners."

The analysis of the Level Three - Behaviour change evaluation revealed that some students did or would be able to apply the knowledge and skills acquired from the lessons of Theme 5 to their work environment. The training of Instructional Design did change students' behaviour. However, the findings showed that some student didn't think that they would be able to apply the learnt knowledge and skills from Theme 5 to their work environment. The main reason was that students had no opportunity to practice or to do what they learnt in their workplace. For example, one student said: "Of course, I would like to apply Instructional Design Skills to my job, especially, for designing an interactive multimedia learning package for my learners. However, the problem I meet is that my school has no computers and the relevant software like *Authorware*. I can only apply the acquired design skills once my school has got money to purchase

computers.” The findings presented here indicated that students would not be able to transfer their learning immediately to their work environment unless they had an opportunity to do so. This opportunity in almost every case equated to the availability of computer resources at the workplace.

5.2.5 Level Four - Results/Organizational impacts

According to Kirkpatrick (1994), measuring “Results” was more difficult than measuring the other three levels mentioned above. However, measuring Results was very important. In this study, the researcher found that measuring Results was very difficult for two reasons. One reason was that the Results measurement was mainly indicators used in business, especially by those who were interested in business results like reduced employee turnover, reduced costs, improved quality, increased sales/production, and higher profits and return on investment. Measuring Results was probably the most exciting from a business organizational perspective. Another reason was that measuring Results took time. Like Kirkpatrick (1994) said, the evaluator or the researcher could start to measure Results once the training was finished. In order to get more accurate evaluation results, it was necessary to conduct the Results measurement in a two-year period. In this way, it would give trainees more opportunities to practice and apply what was learnt in their work environment. In fact, it was true that the more time the researcher spent on the Results evaluation, the more successful result he/she could get. However, in this study, it was not possible for the researcher to spend two years to measure Results/Organizational Impacts. In this study, the researcher only used a short time to evaluate Results/Organization Impacts through using individual interviews.

From individual interviews, according to the Results evaluation question “**Please tell me, did you notice changes at work which affected your colleagues or the organisation?**” one student said that at the moment their institution was merging with UNISA. They had lots, a lot of talk about instructional design. They all believed that group designers still had a lot to learn. This instructional design training gave her more confidence to talk about the theories. This student now had the knowledge to say how they were going to do their job and what exactly they were going to do, so she did feel that she could make a contribution. The student also mentioned that, about a week ago, she had an interview with her director. The director asked about this course. This student informed her director about this MED

course and also showed her some of the assignments she did, for example, the project planning documents (the assessment task). Her director copied her assignment and also stated that her project-planning document was very valuable for the new institution and it should be shared with other instructional designers in their workplace.

Another student said: **“My study has influenced my colleagues at my school. Due to my study, my colleagues have asked for lots of help and assistance from me. I have pushed my school management to buy computers and the relevant software. I also tell my principal about how good online learning is for both students and teachers and what the benefits of using computers for teaching and learning are.”** The findings showed that this student noticed that his study had influenced his colleagues and the organization.

In contrast, some students said that they did not notice changes at work that affected their colleagues or the organisation. The reason was the same as Level Three evaluation because they had no opportunities to practice or apply what was learnt immediately to their work environment. In fact, without the transfer of learning, no organizational impacts would occur. The findings indicated that the different work environments and less-than-ideal conditions, such as no computing resources at school, perhaps were the major factor that limited students to transfer what they learnt.

The findings of the Level Four - Results evaluation showed that the majority of students did not notice their changes at work that affected their organizations and colleagues. This finding result was not surprising. One reason was that the external conditions such as the work conditions or the work environment influenced the Results evaluation. The second reason was that evaluating Results did take /need time. Due to these reasons, the researcher found that the Results evaluation conducted in this study was not so successful.

In order to make the Level 4 - Results evaluation more meaningful, the researcher decided to evaluate students' assignments results and the final project examination results.

Table 5.10 listed the marks of 18 Masters students, their project planning documents and the final project examinations with regard to Theme 5.

Table 5.10: Results of students’ planning documents and the final project

Items	Marks																	Average	
Project plan	0	0	40	52	52	52	54	61	64	66	68	70	70	72	72	75	76	76	63.8
Final Project	0	A	A	23	40	42	45	50	50	53	58	63	64	72	75	75	75	75	57.3

0=didn't submit or absent

A=absent

Table 5.10 showed that there were 2 students who did not submit their project planning documents, 1 student failed (6.3%), and 15 students passed (93.7%). The average mark of students’ project planning documents was 63.8%. The marks of students’ final project examination showed that 3 students were absent from exam, 4 students failed (26.7%), and 11 students passed (73.3%). The average mark of students’ final project examination was 57.3%. The marks of students showed above reflected their learning knowledge results of Theme 5. Their mark results consistently confirmed that the Instructional Design knowledge of students was much improved and students were able to apply the acquired knowledge from Theme 5 to their final projects. However, their final projects marks were still a little low. The findings suggested that the practical skills of students, such as how to use *Authorware* to design the project, needed to be improved.

5.3 SUMMARY

In this chapter, the qualitative research findings were reported. The collected data for the research were analysed based on the Kirkpatrick four level evaluation model - Reaction, Learning, Behaviour change/Transfer of learning, and Results/Organizational impacts. Analysis of the first level “Reaction” evaluation showed that students were generally satisfied with this Masters course and the training programme WebCT used for this course. Analysis of the second level

“Learning” evaluation indicated that students’ Instructional Design knowledge and skills were much improved. Students had a positive attitude in terms of the training of Theme 5. The findings confirmed that the positive attitude of students had enhanced their learning.

Analysis of the third level “Behaviour change” evaluation showed that some students did change their behaviour in their work environment based on what was learnt from Theme 5 while some students didn’t. However, the majority of students said that they would transfer their learning to their work environment if they had an opportunity which allowed them to do so. Analysis of the fourth level “Results” evaluation showed that only a few students noticed changes at work that affected their organizations and colleagues. In the next chapter, an overview of the study, conclusion, deficiencies in the research and recommendations for further research would be given.



CHAPTER 6

OVERVIEW OF THE STUDY - CONCLUSION, DEFICIENCIES IN THE RESEARCH AND RECOMMENDATIONS FOR FURTHER RESEARCH

6.1 OVERVIEW OF THE STUDY

The aim of this study was to determine how effective an interactive learning system was for learning in the Masters course in Computer-based Education at RAU. In order to achieve the research aim, the following objectives were formulated to guide the research:

- to carry out a literature review in order to determine how the effectiveness of learning could be established;
- to generate an evaluation instrument for determining the effectiveness of learning by using the Kirkpatrick model for learning evaluation; and
- to evaluate, by means of an evaluation case study research, how effectively students in this inquiry learnt about Instructional Design using an interactive learning system.

The rationale of the study led to the research question as follows: **“How effectively did Masters students in Computer-based Education learn Instructional Design using an interactive learning system?”** In order to answer the research question, the following sub-questions were posed:

- How could the effectiveness of learning be determined?
- How could it be determined if an interactive learning software was effective for learning?
- How effectively did Masters students in Computer-based Education at RAU learn?

Chapter two described the research design and methodology of the study in detail. A qualitative research approach was followed and discussed. The research method

used in this study was a *case study* that provided an in-depth understanding of learner experiences of how they effectively learnt using WebCT. Methods of data collection used for conducting this particular research consisted of a *literature study*, which established a conceptual and theoretical framework for this study; and a *triangulation*, which employed a mixed data collection method such as: observations, questionnaires, interviews, and the document analysis. This chapter also contained a brief introduction of the data analysis, the strategies used to ensure the trustworthiness of the study, and a concise description of the ethical aspects consideration for this research.

Chapter three presented a broad review of the relevant literature with regard to the research enquiry. In order to answer the research question, the concept of learning was firstly explored and explained using three different learning theories - Behavioural Theory, Cognitive Theory, and Constructivist Theory. Secondly, through focusing on the enquiry of “how to measure effective learning,” four paradigms and several evaluation models were studied and discussed. Finally, the Kirkpatrick four level evaluation model was also studied as well as discussed. This model was selected as an appropriate evaluation model used for this study.

Chapter four outlined the programme description. An overview of the Masters course and the training programme WebCT was given. The functionality of WebCT and its components used for this course were briefly described. The selected theme (Theme 5 - Instructional Design Theory) used for this study was also described and discussed.

Chapter five described the research findings. The qualitative findings that were driven from the data analysis were reported. The collected data were analyzed and discussed based on the Kirkpatrick four level evaluation model.

6.2 CONCLUSION

In terms of the research question posted in chapter one, “**How effectively did Masters students in Computer-based Education learn about Instructional Design using an interactive learning system?**” the relevant literature study was presented in chapter two. The literature study helped the researcher to select an

appropriate evaluation model – the Kirkpatrick four level evaluation model for learning evaluation.

In this study, the effectiveness of learning was measured based on these four levels - Reaction, Learning, Behaviour changes, and Results. The conclusions in this section were drawn directly from the derived evidence as discussed in chapter five. A summary of the findings from each level followed.

The findings of Level One - *Reaction* evaluation showed that the course objectives were met and students achieved the desired learning outcomes with regard to Theme 5. The learning materials used for this course were viewed as being very useful for students' study and students were happy with the learning materials and the additional resources made available on WebCT. According to the questionnaire survey, the findings showed that the responses of students to the course and the course instructor both were positive. The amount of the instruction the students received was adequate. Students' overall evaluation of the training programme WebCT was generally good.

However, according to evaluation of the relevance of the content of Theme 5, the findings showed that Instructional Design was not entirely relevant to every student's job. The findings suggested that the relevance of the content needed to be related to students' job. In terms of evaluation of the instructional strategy, the findings showed that half of students preferred face-to-face sessions more than using WebCT for learning. In order to challenge students to enjoy using WebCT for learning, the researcher pointed out that the effectiveness of WebCT needed to improve. To do this, the suggestions and recommendations of using WebCT for learning made by students needed to be considered. For example, more interesting learning activities needed to be provided on WebCT and authentic learning tasks needed to be built into that learning environment. The existing negative aspects of using WebCT for learning found from this research needed to be resolved.

The findings of Level Two - *Learning* evaluation showed that after the training of Theme 5, the Instructional Design knowledge of students was much increased. From the analysis of students' planning documents, the findings showed that the increased knowledge of students was focused on the ability to systematically and logically prepare a project plan by following planning phrase, design phrase, and

development phrase. In their project plans, students demonstrated that they mastered the knowledge of the different learning principles and the general features of software for learning and they also accordingly applied them to their learning packages. The improved skills of students from Theme 5 were identified and these were the planning skills, the decision-making skills, the creative thinking/drawing skills, and the problem-solving skills. In terms of the changes in attitude, the findings from individual interviews showed that the majority of students had a positive attitude with regard to what was learnt from Theme 5. This positive attitude had enhanced students' learning.

The findings of Level Three - *Behaviour change/Transfer of learning* evaluation showed that the majority of students changed their behaviour in a positive way in terms of what was learnt from Theme 5. The findings from individual interviews showed that some students already transferred what was learnt from Theme 5 to their work environment whilst others did not. Further interviews with those who did not transfer their learning to the work environment found that the response of these students was nevertheless positive. However, they said that they would plan to apply what was learnt to the work environment if they had an opportunity to do so. A few students reported that the lessons of Theme 5 did not change their behaviour yet at this stage. For example, one student said that she already knew what the Instructional Design Theory was before she was taught. However, she said that the training provided in the Instructional Design lessons had confirmed that she was applying best practice at work and provided added confidence. She now knew that she was on the right track. Another student said that due to the fact her school had no computers, this lack of work environment resource was a major factor which had influenced her behaviour change. This student was very negative in her outlook about what had been learnt from Theme 5 and how inappropriate it was to her work. The findings of Level Three evaluation indicated that the skills and knowledge gained during the training needed to be reinforced in the workplace.

The findings of Level Four - *the learning results evaluation of Theme 5* showed that 6.3% of students failed to do the planning documents assignments and 93.7% of students succeed. The findings also showed that 26.7% of students failed their final project design examinations and 73.7% of students passed. The learning results of Theme 5 as an indication of the lecture knowledge showed that students achieved the desired learning outcomes after the Instructional Design training. The findings

of the learning results evaluation confirmed that students in this Masters course effectively learnt about Instructional Design.

However, the findings of Level Four - *Results/Organizational impacts* evaluation showed that the training of Theme 5 did not have a strong impact on the organization of students. The researcher found that the main reason perhaps was that the Results evaluation took time. The researcher could only measure Results/Organizational impacts once the transfer of learning had occurred because without the transfer of learning, there would be no Results. In addition, the researcher found that the workplace environment of students had influenced the accurate evaluation rate of the organizational impacts. According to Kirkpatrick (1994), in order to improve the accurate evaluation rate of the fourth level, it was necessary for the researcher to allow at least two years to elapse before commencing the Results evaluation. However, in this study, this two year time period was not available to the researcher to follow this suggestion to evaluate Results/Organizational impacts on students' workplace.

In conclusion, from this four level learning evaluation, the researcher found that the Kirkpatrick evaluation model not only should be used as an evaluation tool after the programme, but also before the programme, to determine initial training needs and to design the training programme. From the data analysis presented in chapter five, the researcher discovered that evaluation of the last two levels-*transfer of learning* and *organizational impacts* were very difficult in this study. The findings revealed that although students gained a broader knowledge and skills from the training, without a good work environment, the transfer of learning would never happen.

The researcher found that in order to effectively use the Kirkpatrick evaluation model, it was essential for the course instructors and the instructional developers design better training programmes to ensure their functionality was fully utilized. To do this, for front-end analysis, the Kirkpatrick evaluation model should be turned around. The instructional designers and the course developers should begin by asking Level 4 questions. Level 4 questions should include "what are the organization indicators that need improvement?" Level 3 questions should ask "what changes of behaviour are they expecting to see on the job?" Level 2 questions should include "what is the most appropriate design to increase acquisition and transfer of the required skills and knowledge?" Level 1 questions should ask "what is the most appropriated intervention design to ensure that participants would

be motivated and satisfied?” The answers to these questions would establish the most appropriate intervention and provided baseline data that could be used to determine training success during the evaluation phase (Kirkpatrick, 1994:102).

6.3 ACTION TAKEN, CONCLUSIONS AND RECOMMENDATIONS

In order to make WebCT more practical and helpful for students' learning, the negative aspects of using WebCT for learning needed to be addressed.

The following listed was a summary of the worst aspects of using WebCT for learning identified from this research and some recommendations for corrective actions taken.

- **The online course didn't provide enough opportunity for critical thinking/debate:** The solution was that more opportunities for students to debate/stimulate critical thinking needed to be offered.
- **The online course didn't model the theory/programme to students properly and didn't offer enough opportunities to practice newly acquired skills:** The theory and the programme needed to be modeled to guide students to learn. More meaningful activities should be provided.
- **The online course doesn't correspond with some learners' learning style:** The instructional designers and the course developers had to resort to sound pedagogy and design rationale and tried to design a training programme to accommodate different learning styles, learner preferences, and the needs of students.
- **Students didn't receive immediate feedback on posting/email/discussion:** The suggestion was that the course instructor needed to make sure that a more immediate feedback loop is in place if only to acknowledge receipt of an item and promising a more comprehensive response at a later date. Automated "Acknowledge Receipt" functionality should be coded into WebCT. Discussion rubrics should be provided to students and the progress of students should be judged by grades.

- **The online course didn't provide all the tools for learning:** Try to provide more tools; as many as possible for learning. For example, the online assessment (e.g.: quizzes).
- **Not enough tasks were provided on the WebCT platform:** Complex and sustained activity could motivate students to learn. Authentic activities could be incorporated into the design of online courses to enhance learning online (Herrington, Reeves, Oliver & Woo, 2004:3). More authentic and conceptualized learning tasks/learning activities for students to do/practice/apply should be provided in WebCT.

In terms of recommendations about how to use WebCT for learning, one student suggested using WebCT in a way that the learner should be more engaged in skills development activities rather than mainly for distributing information. The theory and the knowledge taught to Masters students from text books should be modelled on WebCT. For example, for students who learn to use *Authorware* to design learning packages, information should put on WebCT to guide students step by step through the tasks. Exercises should be given to students beforehand, so that students in class could discuss the difficulties experienced. This student believed that WebCT could be used very effectively for the purposes of guiding students and provided them opportunities to practice what was learnt.

6.4 DEFICIENCIES IN THE RESEARCH

The deficiencies in this research are as follows.

- 1) The limitation of this study is its small sample size, with only eighteen students involved in this Masters course.
- 2) The study only surveyed students who are in the Masters course in Computer-based Education. The results of the findings can not be generalized to non-Computer-based students at different course levels. Students in other fields or different course levels may have different views and experiences about how effective an interactive learning system is for learning.
- 3) Students surveyed in this study are only at one university (RAU) and these results can not be generalized to students at other universities.

- 4) This research only focuses on one module (Theme 5) study. The conclusions made from the research findings may not represent other modules study.
- 5) According to Kirkpatrick (1994), evaluation of Results/Organizational impacts needs at least a two years evaluation period. In this study it is not possible for the researcher to delay evaluation for this two year period.

6.5 RECOMMENDATIONS FOR FURTHER RESEARCH

Further research should include non-computer-based students in different course levels and students from other universities. Doing so will enable the researcher to generalize the findings more broadly.

In addition, future research needs to consider other issues like varying educational backgrounds, individual and cultural differences and focus on how these factors impact online learning.

Furthermore, the success of online courses depends on effective online pedagogies. In order to better challenge students with online courses, the researcher believes that there is a need to determine the extent to which the course instructors may need to develop new pedagogies and approaches to managing online courses. More research on **“How can we prove that students will learn more effectively with computer-based learning?”** and **“What should be done to enhance such courses in the future?”** need to be further investigated.

6.6 FINAL WORD

Online learning is a developing trend in higher education in South Africa. Using interactive learning systems such as WebCT for online learning appear to be the teaching methodologies of the future. Universities are moving more and more courses to online education using interactive learning systems. As they do so,

administrators and educators should remain cognizant of student perceptions. To improve the delivery of online education, it is crucial to understand the needs and demands of learners (Purnell & Harvey 1996: [online]). To succeed with students' learning, the negative aspects of using an interactive learning system for learning must be minimized. To improve the online course, new pedagogical strategies need to be developed and a continually evaluation of the course and the training programme should be carried out.



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APPENDICES

APPENDIX A

Individual Interview Questions

1. How do you like the programme WebCT that is used for this Master degree course? (Sub-questions: Please tell me your opinion of using WebCT for learning. How does WebCT affect your time and learning experience? In your opinion, what are the most valuable/the least valuable about using WebCT for learning? Can you please tell me how you will recommend the use of WebCT?)
2. Please tell me if what you learnt in Theme 5 - the Instructional Design Theory, influenced the way that you work at work? Why? How has the training in the Instructional Design lessons affect your job performance? And to what extent do you plan to do your job differently in the future? And How?
3. Did you notice changes at work which affected of the people or the organisation?

Thank you for participating in answering these questions. Your feedback is much appreciated.

APPENDIX B

Transcript of Individual Interview

Interviewer: “Hi, XXX. Good afternoon.”

Interviewee A: “Hello, XXX.”

Interviewer: “Could you please tell me what your job is?”

Interviewee A: “I work at a higher education institution at UNISA. In the department I compile and prepare the studying materials and most studying materials are the printer-based.”

Interviewer: “How long have you been employed in design?”

Interviewee A: “Since 1995. It is almost 10 years plus.”

Interviewer: “Really. That’s a long time.”

Interviewer: “XXX, could you please tell me how do you like the programme WebCT that was used for this Masters course?”

Interviewee A: “The moment I find that WebCT provides a useful link to class activities. But its function at present as used, I would not be able to say whether we use its all features and possibilities because I don’t know all the features and possibilities of WebCT and how they can be used yet.”

Interviewer: “And how does WebCT affect your time and learning experience?”

Interviewee A: “Well, I find that WebCT for the course is useful. A part from the link is the distribution information. It’s quite quick and fast. It doesn’t take up unnecessary time. About the learning experience, one occasion would be a class debate/discussion regarding to the Clark/Kozma issues. I find that WebCT is mostly

just used for presenting, distributing information or posting our tasks. I would like to see more activities regarding guiding us through our work and giving us opportunities to practice skills regarding to software applications, such as *Authorware*, *Dreamweaver*, *Flash* and *Fireworks*. I would like to see what I learnt in the theory (Alessi and Trollip) to be modelled to me. I believe in that way I will also gain skills and not just knowledge about the web-based learning. For example: when we learn about tables in Dreamweaver, examples should provide on WebCT, guide us through the information and provide us with exercises to practice the skills. Through the information and exercises, students can improve their table-making skills. I would say that WebCT really helps my learning and increases my learning experience. However, I would like to see more discussions/activities on WebCT.”

Interviewer: “In your opinion, what are the most valuable about using WebCT for learning?”

Interviewee A: “WebCT is good for distributing information. I appreciated the “debate” opportunity. As I mentioned, I think that the most valuable is the excises. We could participate the debate. I also find that it provides a good link, although we do not use the e-mail and discussions opportunity much, but it still provides that link, you can see what other people do, what assignments they already done, whether you are on the right track, and so forth.”

Interviewer: “In your opinion, what are the least valuable about using WebCT for learning?”

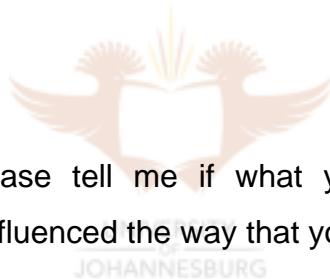
Interviewee A: “The least valuable about using WebCT for learning is that WebCT didn’t provide enough discussion opportunities. Before the contact session, the lecturer should post some important questions on WebCT for reflections; students can then discuss these questions critically in class rather than only having a lecture on the topic. What I would like to see is that we learn online, WebCT should not be used for just distributing information or posting assignments, but also it should guide us through our course. For example, giving us exercises to practice, practicing the skills that we are taught. In other words, I would like to see more is that those functions would be modelled to us as well.”

Interviewer: “Can you please tell me, how would you recommend using WebCT for this course?”

Interviewee A: “I would definitely recommend that WebCT should be used for this course. But using WebCT in the way that the learner should be more engaged in skills, development activities rather than mainly for distributing information - what I expected from the Masters level, I would recommend that the outcomes that we suppose to reach, the theory, knowledge part that taught to us from the text books, that should be modelled. For example, if I say something we are doing *Dreamweaver* at the moment, perhaps is they put up something information and guide us step by step through tasks. Then, give us exercises beforehand, so that time we are going to the class with the contact section, we could discuss the difficulty we experienced we went to the track. I think that WebCT can be used very effectively for those purposes to guide us and give us opportunities to practice.”

Interviewer: “That’s a very good recommendation.”

Interviewee A: “Thanks.”



Interviewer: “Can you please tell me if what you learnt in Theme 5 - the Instructional Design Theory influenced the way that you work at work?”

Interviewee A: “The Instructional Design theory definitely influenced my work. As an Instructional designer, I get opportunities to apply the principles and practices of Instructional Design theory on daily basis. As I said, I have been doing this work since 1995, what I have learnt in theory (have been taught here) definitely confirms what I am doing at work which is the right thing. Specially, the task we did on that planning document for web-based learning package in *Authorware* that was extremely helpful because it shows you that you can plan your project in the systematically way and logical way. You can plan your project ahead and use evaluation strategies. You can also measure what you are doing against what you have planned. It saves a lot of time if you plan ahead.”

Interviewer: “How the training of the Instructional Design lessons affect your job performance?”

Interviewee A: “I can justify my design decisions by reflecting to Instructional Design principles and theory. I do not have to rely on a “feeling” that what I am doing is right. The training of the Instructional Design lessons gives me confidence and makes me feel that I can do my job better because all the design sessions I made I come basing on that sound of theory. I know that’s right because I can refer to the theory.”

Interviewer: “And to what extent do you plan to do your job differently in the future?”

Interviewee A: “The assignment task on compiling a project plan for our *Authorware* learning package has convinced me to prepare a detailed plan (on a similar basis) for all future materials development projects. I would undertake in my workplace and definitely do my planning in more detail. You know that we also work in teams with other people. The better I can do my job the better we can function as a team. This is a plan. I can use other people’s input and I can also add that information.”

Interviewer: “XXX, Please tell me did you notice changes at work which affected of the people or the organisation?”

Interviewee A: “As you know at the moment our institution is merging with UNISA. We have lots and a lot of talk about Instructional Design. We all believe that group designers have still to learn. In that this course also gives me confidence to talk about the theory. In a knowledge way, so how we are going to do our job now, what exactly we are going to do, I do feel that I can make a contribution. About a week ago, I have an interview with our director and she also asks this course, I informed her about our MED course and even showed her some of assignments we’ve done, such as my project-planning documents (the assessment task). She copied that and also stated that was very valuable for the new institution and it should be shared with other instructional designers in our workplace.”

Interviewer: “And how did this Master degree course change your behaviour based on what was learned?”

Interviewee A: “My behaviour in the sense of I learnt I feel confident. I believe I can do my job better living in a proved way.”

Interviewer: “In your opinion, with regards to theme 5, what knowledge did you increase?”

Interviewee A: “Definitely the sound of theory, mainstream of behaviourism, cognitive theory, and constructivism. But the depth definitely increased also stimulated something I inquiry my job, either go to behaviourism or constructivism. I do feel that I appreciated behaviourism more, you know in before, my reading on behaviourism. I do realize behaviourism give a direction to reach the outcomes.”

Interviewer: “And what skills did you enhance?”

Interviewee A: “First of all, definitely the knowledge based because my knowledge based are broad, do better design decisions, according to the learner (audience) better combine the theories, able to look at outcomes, outcomes will be reached, but activities that to able to do in a block way.”

Interviewer: “Please tell me a little bit more about how did Instructional Design affect your problem-solving skills and high level thinking skills?”

Interviewee A: “Well, as I said I have been doing this for a quite while, it’s just confirmed the way I solve the problems. I do meet the problem when I produce the learning package. Then I use the theories and the Instructional design model we learnt here and others as well, to guide my solution and satisfy the learners in that specific subject area. Instructional design is reflecting more, the decision is more than one angle. I would try to test on.”

Interviewer: “How did the group work enhance your learning experience on Instructional Design?”

Interviewee A: “I believe group work. To me, the input reaches your own learning experience. If you want me to talk about the group work, I found that I appreciated it enhanced my learning experience. However, the tutor needs to help, give some directions and ideas, and helps the group function well.”

Interviewer: “XXX, Thank you for the interview! Your participating is much appreciated. Once again thank you for your time!”

Interviewee A: “It’s my pleasure.”



APPENDIX C

Transcript of Individual Interview

Interviewer: “Hi, XXX. Good afternoon. Can you please tell me what your job is?”

Interviewee B: “I’m an instructional designer at UNISA.”

Interviewer: “How long do you do the design job?”

Interviewee B: “Nearly 10 years.”

Interviewee B: “Oh, I’m sure that you already have lots of design experiences before you enrol this Masters course.”

Interviewee B: “Yes. Definitely.”

Interviewer: “XXX, could you please tell me how do you like the programme WebCT that was used for this Master degree course?”

Interviewee B: “I like the WebCT programme. I find that it is very user-friendly and very accessible. It makes me to feel that I’m a part of community of learners.”

Interviewer: “And how does WebCT affect your time and learning experience?”

Interviewee B: “I find that using WebCT definitely saves me time, because information is readily accessible, and you can link to the WebCT environment at any time that is convenient for you. WebCT definitely influences my time positively.”

Interviewer: “In your opinion, what are the most valuable about using WebCT for learning?”

Interviewee B: “With regard to the learning experience, I don’t feel alone and can ask questions at any time. I find that the informal e-mail facilities are very valuable for creating a forum for discussions with fellow students and for cooperative and collaborative learning activities. Additional resources are also readily available in the WebCT environment.”

Interviewer: “In your opinion, what are the least valuable about using WebCT for learning?”

Interviewee B: “The least valuable is definitely the communication asynchronous.”

Interviewer: “What’s that mean?”

Interviewee B: “There is no provision for chats in a synchronous manner at the same time. “

Interviewer: “Can you please tell me how would you recommend using WebCT for this course?”

Interviewee B: “Yes. I would definitely recommend using WebCT for this course. Maybe I would recommend the most valuable WebCT aspects. The most valuable about using WebCT for learning is to create a forum to discussion with the lecturer and the fellow students.”

Interviewer: “Please tell me if what you learnt in Theme 5 (the Instructional Design Theory) influenced the way that you work at work?”

Interviewee B: “Due to the fact that I am an instructional designer, Theme 5 didn’t really change the way that I work, but it reinforced that I am doing the right thing in my work. Something new to me was storyboarding as part of the instructional design plan. I will definitely use that in my work environment. With theories in Theme 5, I also feel more comfortable with the learning theories which we learnt because we had to work through them intensely.

Interviewer: “How the training of Instructional Design lesson affect your job performance?”

Interviewee B: “At this stage, the training hasn’t really affected my job performance, because I haven’t had the opportunity to work with computer-based projects in my work environment yet.”

Interviewer: “And to what extent do you plan to do your job differently in the future?”

Interviewee B: “I will definitely plan to do my job differently in the future if I get the chance to design in computer-based learning environment or online learning environment. I will apply all the design aspects that I have already applied, that I also learnt in Theme 5. I will definitely add the storyboard in my work because it is very valuable.”

Interviewer: “XXX, Please tell me did you notice changes at work which affected of the people or the organisation? “

Interviewee B: “I didn’t notice. But I think that my studies can affect people and the organization. At the moment, I’m in the position to motivate specific learning principles in the best way to help the lecturer to include that in the learning materials.”

Interviewer: “And how did this Masters course change your behaviour based on what was learnt?”

Interviewee B: “As I said, I’m basically doing the same thing. Instructional design wasn’t really new to me. So I basically apply the same principles that I studied in this course, except the storyboard. I think for this semester that online learning will definitely add to my learning experience.”

Interviewer: “In your opinion, with regard to Theme 5, except the storyboarding, what knowledge did you increase?”

Interviewee B: “The knowledge of the learning theories.”

Interviewer: “And what skills did you enhance?”

Interviewee B: “Definitely the *Authorware* skills that I didn’t have that skill before. And also the skills to write the storyboard and to do the whole design for the computer-based environment.”

Interviewer: “Please tell me a little bit more about how did Instructional Design affect your problem-solving skills and high level thinking skills?”

Interviewee B: “Instructional design definitely helps you to think in an analytically way and to structure your information in a very specific way. But those skills I already gained before this course.”

Interviewer: “How did the group work enhance your learning experience on Instructional Design?”

Interviewee B: “I most say that I prefer to work on my own usually. But I really enjoy the group work experience because I could learn other skills from my fellow classmates.”

Interviewer: “Can you please give me some examples?”

Interviewee B: “XXX, for example at that stage, knew all about *Authorware*. In that way I could learn from her. I think that I have more deigned background, in that way other students could learn from me.”

Interviewer: “XXX, Thank you for the interview! Your participating is much appreciated. Once again thank you for your time!”

Interviewee B: “It’s my pleasure!”

APPENDIX D

Transcript of Individual Interview

Interviewer: “Hi, XXX. Good afternoon.”

Interviewee C: “Hello, XXX.”

Interviewer: “What’s your job?”

Interviewee C: “I’m a Primary school teacher and teach Grade 6 & 7 English and Geography at a township school.”

Interviewer: “Please tell me how do you like the programme WebCT that was uses for this Masters course?”

Interviewee C: “It is very accessible. You can study at anytime and anywhere. I like the forum which offers the opportunities for students to discuss and debate the interesting topic.”

Interviewer: “Could you please tell me how does WebCT affect your time and learning experience?”

Interviewee C: “It is convenient for my study and actually saves my time. I think that WebCT is usefully used for our learning. I enjoy learning in the electronic learning environment.”

Interviewer: “In your opinion, what are the least valuable things about using WebCT for learning?”

Interviewee C: “The least valuable things are the cost issue and the slow access. I don’t like when you want to access the WebCT but the server is down. And also if you have not got a computer at home or at work, you have to go to the University for studying. The Internet-café cost is too much.”

Interviewer: “Can you please tell me what did you learn with regard to Theme 5 - the Instructional Design Theory?” “And what knowledge did you increase?”

Interviewee C: “I learnt that a designer must have a plan before he/she starts to design a learning package, because it’s difficult for him/her to design a project without a plan. So in order to avoid mistakes to happen, or to change at the later stage, the designer must plan ahead. In Theme 5, I learnt how to plan a multimedia learning package, and how to follow the Instructional Design strategies step by step to design and develop the project. The increased knowledge is that before you produce the project, you must build a broad picture like a storyboard. The storyboard or prototype will help you to complete the learning package.”

Interviewer: “In your opinion, what skills did you enhance after Theme 5?”

Interviewee C: “I think that I have enhanced the following skills: my planning skills (like following each step to plan a project), thinking skills (particularly the creative thinking, like how to draw the diagrams, how to make the programme looks nice), design skills and problem-solving skills (avoid mistakes to happen). “

Interviewer: “Please tell me, if what you learnt in Theme 5 influenced the way that you work at work?”

Interviewee C: “It does not influence the way that I work at work, because I am working at a poor township school and my school has no computers resources. However, if I work at the different situations, for instance at a school that has computers resources, I think that what I learnt from Theme 5 will influence the way that I work. I will be able to transfer what I learnt to my work environment.”

Interviewer: “How the training of Instructional Design lesson affect your job performance?”

Interviewee C: “It doesn’t really affect my job performance, because my school has no computers resources which mean there are no opportunities allow me to practice what I learnt.”

Interviewer: “And to what extent do you plan to do your job differently in the future?”

Interviewee C: “If I have a chance, I will apply Instructional Design to my work situation because the Instructional Design theory has given me proper skills about how to design/develop interactive multimedia learning packages for learners.”

Interviewer: “Please tell me did you notice changes at work which affected of the people or the organisation?”

Interviewee C: “I didn’t notice. But my work performance will influence my colleagues and my organisation because the knowledge now has changed me. If I implement them in my work environment, people will notice that, and these changes will also influence them. For example, they want to know why you are doing that. They will be influenced after my explanation.”

Interviewer: “And how did the Theme 5 lessons change your behaviour based on what was learnt?”

Interviewee C: “My attitude (behaviour) has changed from being negative to being positive. That’s a good implication. The lessons of Theme 5 also influence I see things. For example, before I have no Instructional Design knowledge, after learnt that, the knowledge changes my perception. When I am watching a TV programme, at the commencement of the TV programme, it shows you a broad picture about what’s going on before going to the detail of the whole film that likes the prototype or the storyboard, I now understand that is exactly like what I just had learnt.”

Interviewer: “XXX, Thank you for the interview! Once again thank you for your time!”

Interviewee C: “You’re welcome.”

APPENDIX E

Transcript of Individual Interview

Interviewer: “Hi, XXX. Good afternoon.”

Interviewee D: “Hello, XXX.”

Interviewer: “What’s your job?”

Interviewee D: “I’m a Secondary school teacher.”

Interviewer: “Can you please tell me how do you like the programme WebCT that was used for this Masters course?”

Interviewee D: “I like its accessibility and interactivity. I can study at my own time. It’s very convenient for posting our assignments. Students can communicate with each other.”

Interviewer: “How does WebCT affect your learning experience?”

Interviewee D: “I like this training programme. It has influenced my learning. The debate of Clark/Kozma issues is very good. I wish that we can have more debates/discussions like this. For example, giving us more tasks to do on WebCT. “

Interviewer: “Can you please tell me if what you learnt in Theme 5 (the Instructional Design Theory) influenced the way that you work at work?” “Why?” “How?”

Interviewee D: “Yes. The planning foundation skills I gained have influenced the way at my work. Now I know that I must spend time to do a complete plan before I start to design any interactive multimedia learning packages for my learners. I will use what I learnt from Theme 5 in my work environment. At the moment, I also have used this Instructional design knowledge to prepare my lessons in daily based because the plan is very important.”

Interviewer: “How the training of the Instructional Design lessons affect your job performance?”

Interviewee D: “The Instructional Design lessons improved my job performance. They give me more confidence. I can use these new skills to my work environment.”

Interviewer: “And to what extent do you plan to do your job differently in the future?”

Interviewee D: “I will apply the Instructional Design Theory and use the *Authorware* programme to my class to complement the traditional teaching method if I have a chance. I have already told my school management about my motivation and push them to buy the *Authorware* programme.”

Interviewer: “Please tell me did you notice changes at work which affected of the people or the organisation?”

Interviewee D: “Yes, I noticed. Since my colleagues heard I’m studying this Masters course in Computer-based Education at RAU, they seek to help and guidance from me. Because they know that I have gained some new knowledge and skills.”

Interviewer: “And how did Theme 5 lesson change your behaviour based on what was learned?”

Interviewee D: “I have a very positive attitude in terms of what I learnt. My behaviour is changed. For example, my school principle doesn’t care these new technology-computers, even I told him how good about the Gauteng online for students. I have worked very hard and pushed my principle to buy the new computers and software so that I can integrate these new knowledge and skills into my class.”

Interviewer: “XXX, Thank you for the interview!”

Interviewee D: “It’s pleasure.”

APPENDIX F

Questionnaire

Instructions: Please circle your responses to the following statement using these scales. 1=Strongly disagree 2=Disagree 3=Neither agree or disagree 4=Agree 5=Strongly agree

Items	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE / DISAGREE	AGREE	STRONGLY AGREE
1. The course objectives were clear to me.	1	2	3	4	5
2. The WebCT tools were easy to use. It was easy to move around the WebCT environment.	1	2	3	4	5
3. The content of Theme 5 - the Instructional Design Theory was relevant to my job.	1	2	3	4	5
4. The course instructor was well-prepared.	1	2	3	4	5
5. The course activities stimulated my learning.	1	2	3	4	5
6. I found that it was easy to find information in the WebCT environment.	1	2	3	4	5
7. The amount of instruction I received in using WebCT was adequate.	1	2	3	4	5
8. WebCT provided all the tools for my learning.	1	2	3	4	5
9. Compared to face-to-face lectures, I enjoyed the online course more.	1	2	3	4	5
10. WebCT was an appropriate delivery tool for the selected content e.g. Theme 5.	1	2	3	4	5
11. I received sufficient instruction in the use of WebCT for learning.	1	2	3	4	5
12. I felt the course delivery tool "WebCT" affected my ability to learn.	1	2	3	4	5
13. I found that the bulletin board feature in WebCT was useful for my study.	1	2	3	4	5

Items	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE / DISAGREE	AGREE	STRONGLY AGREE
14. The course instructor facilitated class discussions effectively.	1	2	3	4	5
15. I will be able to apply Instructional Design skills which I learnt in this course to my job.	1	2	3	4	5
16. I was able to access the materials without much difficulty.	1	2	3	4	5
17. I believe that this course will help me do my job better.	1	2	3	4	5
18. I always knew where I am in the WebCT environment.	1	2	3	4	5
19. I enjoyed learning in this electronic learning environment.	1	2	3	4	5
20. My knowledge of Instructional Design was much improved.	1	2	3	4	5
21. This course lived up to my expectations.	1	2	3	4	5
22. I found that using WebCT for learning was effective in my current course.	1	2	3	4	5
23. I think that my Instructional Design skill was improved.	1	2	3	4	5
24. My overall satisfaction rating for using WebCT for learning was very good.	1	2	3	4	5
25. I think that the learning objectives of this course had been met.	1	2	3	4	5
26. What is the best thing about using WebCT for learning?					
27. What is the worst thing about using WebCT for learning?					

Items	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE / DISAGREE	AGREE	STRONGLY AGREE
<p>28. In this course the following learning activities were used: formal classes, assignments, online discussion groups, face-to-face discussions, and informal small group activities.</p> <p>What activities had the most desirable learning impact?</p> <p>Why do you think they were the most appropriate or effective?</p>					
<p>29. Please write some comments for making WebCT more practical and helpful for your learning.</p>					



Thank you for participating to answer this questionnaire. Your feedback is highly valued and your responses are anonymous and confidential. Your input will help to plan/develop better interactive tools for learning in a Masters Computer-based Education course in future. Thank you for your time.

APPENDIX G

Questionnaire Results

Items	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE / DISAGREE	AGREE	STRONGLY AGREE
1. The course objectives were clear to me.			1	7	4
2. The WebCT tools were easy to use. It was easy to move around the WebCT environment.			1	5	6
3. The content of Theme 5 - the Instructional Design Theory was relevant to my job.	1		4	1	6
4. The course instructor was well-prepared.			4	3	5
5. The course activities stimulated my learning.			1	5	6
6. I found that it was easy to find information in the WebCT environment.			1	5	6
7. The amount of instruction I received in using WebCT was adequate.			4	6	2
8. WebCT provided all the tools for my learning.	1	2	4	3	2
9. Compared to face-to-face lectures, I enjoyed the online course more.	2	4	2	3	1
10. WebCT was an appropriate delivery tool for the selected content e.g. Theme 5.		1	3	7	1
11. I received sufficient instruction in the use of WebCT for learning.		1	4	4	3
12. I felt the course delivery tool "WebCT" affected my ability to learn.	1	3	3	2	3
13. I found that the bulletin board feature in WebCT was useful for my study.		1	6	3	2

Items	STRONGLY DISAGREE	DISAGREE	NEITHER AGREE / DISAGREE	AGREE	STRONGLY AGREE
14. The course instructor facilitated class discussions effectively.			3	6	3
15. I will be able to apply Instructional Design skills which I learnt in this course to my job.			1	4	7
16. I was able to access the materials without much difficulty.				8	4
17. I believe that this course will help me do my job better.	1	1	2	2	6
18. I always knew where I am in the WebCT environment.			1	8	3
19. I enjoyed learning in this electronic learning environment.				7	5
20. My knowledge of Instructional Design was much improved.		1		4	7
21. This course lived up to my expectations.		1		7	4
22. I found that using WebCT for learning was effective in my current course.		1	3	6	2
23. I think that my Instructional Design skill was improved.		1		4	7
24. My overall satisfaction rating for using WebCT for learning was very good.			4	5	3
25. I think that the learning objectives of this course had been met.			1	7	4

<p>26. What is the best thing about using WebCT for learning?</p>	<ul style="list-style-type: none"> • Accessibility 24X7 (own time & convenience) • Anywhere (even at work) • Immediate availability • Opportunity to debate/discuss important sections of the course • Communication (with lecturer & fellow students) • Interactivity • Collaborative learning (group work) • Find information easily • Post assignments
<p>27. What is the worst thing about using WebCT for learning?</p>	<ul style="list-style-type: none"> • Costs telecoms • Slow access (slow system response times/when the server is down) • Not e-mail privately • Not enough opportunities for critical thinking/debate
<p>28. In this course the following learning activities were used: formal classes, assignments, online discussion groups, face-to-face discussions, and informal small group activities. What activities had the most desirable learning impact? Why do you think they were the most appropriate or effective?</p>	<ol style="list-style-type: none"> 1) Formal classes: 3 students agree (The reasons are : learning from other knowledgeable students; stimulating the acquiring of knowledge; and corresponds with an individual learning style) 2) Assignments: 3 students agree (The reasons are because of stress, challenge/force you work to complete it) 3) Online discussion groups: 4 students agree (The reasons include sharing students' view & experiences, stimulating critical thinking, corresponding with an

	<p>individual learning style, and seeing different perspectives)</p> <p>4) Face-to-face discussions: 4 students agree (The reasons are that they can receive feedback immediately and see different perspectives)</p> <p>5) Informal small group activities: 2 students agree (The reasons are that students are free to participate than in class/ gives an individual to collaborate & share ideas with other people & learn from each other)</p>
<p>29. Please write some comments for making WebCT more practical and helpful for your learning.</p>	<ul style="list-style-type: none"> • Make it always accessible • Sort out the cost problem • Immediate feedback on postings/email/discussions • Use it to promote interactivity among classmates • Model the theory/programme to students, give them opportunities to practice skills • Should provide more tasks to do in WebCT • Inclusion of Synchronous communication