Using the Internet in Higher Education and Training: A development research study

Mini-dissertation by

**ETIENNE JACQUES STIGLINGH
(9460993)**

Submitted in partial fulfilment of the requirements for the degree

MASTERS IN EDUCATION

in the

SCHOOL OF CURRICULUM STUDIES

of the

FACULTY OF EDUCATION

UNIVERSITY OF PRETORIA

Supervisor: Prof JC Cronje   **December 2006**

Acknowledgements

- My Saviour – Without HIM nothing is possible

- Ammie Stiglingh – My Wife. My piece of heaven here on earth – I love you

- My parents - Their support, encouragement and sacrifices – Thank You

- Friends & Family – Who did not stop to believe in me

- Bernard van der Vyver – Giving me the opportunity to dream and realise it at the same time – Thank You

- Prof. J.C Cronje – My Supervisor for his patience and advice

- Work colleagues – for their support

Brief Table of Contents

Detailed Table of Contents

Abstract

The University of Pretoria offers the course *Use of the Internet in Education and Training (RBO 880)* since 1997. This module is presented as an online course with minimum face to face interaction between facilitator and learners. The research documents and analyses the activities, cyber artefacts, documentation, interactions and challenges, constructed and designed by the facilitator and learners' that formed part of this module. This literature review comprises an exploration into five different aspects of online learning under different headings specifically: learning theories, eLearning, virtual communities, adult Learning characteristics adult motivation and instructional design principles.

This research reports only on one main research question: **What can be learnt from the continuous presentation of the module Use of the Internet in Education and Training (RBO 880)?**

The research design and the methodology that will be followed during a properly development research approach is functional in this particular context (RBO 880) and enables the researcher to address the research question, that falls within the scope of this research study. The researcher explores multiple perceptions, to ensure trustworthiness of data and analyses of the module that is presented and analysed. The researcher analyses selected aspects of the design, development and implementation of the RBO 880 module from an exploration of a selection of its artefacts.

As a prelude to each facet of this analysis, the researcher will present and explore a cyber artefact retrieved from the cyber archives. In this archive is stored a great variety of electronic source documents representative of the six years during which the module RBO 880 were presented. The substantive reflection combines the findings with the literature review. The researcher

attempts to construct a balance by providing some critique against the presentation of the RBO 880 module as part of the conclusions..

The conclusions reached in this research answers the research question and might prove useful in future research, for researchers' organisational specialist, readers, online facilitators and curriculum designers, into training and learning that takes place through the medium of the Internet.

Key Words:
Online Learning, Virtual Settlements, Adult Learning, Motivation, Instructional Design Principles, Cyber artefacts , Cooperative learning, Collaborative learning, Constructivism, Virtual Classrooms

List of Figures

List of Tables

List of Artefact Exhibits

Chapter 1 - Introduction

1.1 Introduction

Taylor (2002) observes that traditional methods of learning require only the instructor, the textbook, and whatever resource material the instructor is able to gather. With the introduction of computers and Internet-based learning all this has changed. Online learning represents a major paradigm shift and has caused fundamental changes in education. Westra (1999) describes three factors that are driving the learning innovation: the convergence of classroom teaching and open learning, the increasing popularity of technology-enhanced collaborative learning, and fundamental changes in the relationship between students and teachers.

The University of Pretoria has offered the course *Use of the Internet in Education and Training (RBO 880)* since 1997. The outcomes of this course, according to De Villiers (2001), are to improve Internet literacy, to improve one's knowledge of the Internet and web education through work on the Internet, to learn how to work collaboratively with other learners over a distance, to learn how to construct learning environments that are connected to the Internet and the web, and to acquire the kind of theoretical and practical knowledge that one needs to use computer-mediated communication from the Internet as a tool for managing and facilitating resource-based learning.

This module has been presented continuously since 1997. This study documents and analyses data and visual artefacts from the course in order to explore what has been learned in the years during which RBO 880 has been presented at the University of Pretoria. The study aims to describe the achievements and successes of the course, the lessons that have been learned, and a selection of

artefacts that have been preserved for future study. The study will conclude with recommendations.

1.2 Background

RBO 880 was initially offered in 1993 as a self-study literature module with no Internet connectivity. But because of annual increases in (1) the volume of e-mail that the course necessitated, (2) the amount of time that students were spending accessing the web for course-related purposes, and (3) the amount of time being spent on face-to-face contact for teaching purposes, the presenters ultimately decided to redesign and present the course as an Internet-based module. The reconceptualisation of the course gave its designers an opportunity to implement a number of reversals in the course itself. Instead of the students having to come to the campus to explore the Internet, they were encouraged to stay at home and treat the campus as just one among a number of sites where they might perform tasks, complete assignments and engage in a variety of course activities. It is necessary to describe how the module changed from being a self-study literature module to its current format as an Internet-based module.

The following description of the target population of the course, how exactly it is presented and operates as an online course, and the kind of tasks that students need to perform if they wish to complete the course successfully, provide a necessary context for the research question.

The Internet has enabled distance education to change from being a traditional paper-based conventional kind of education to being an interactive web-based experience that is dependent on electronic and communications technology and the Internet as a medium of communication, exploration and production (Harper, Chen & Yen, 2004: 586). The present course has been constructed in a modular way. Early in the second year, students used to take a course about the uses of

the Internet in Education and Training. After technology had improved to a point where the whole course could be presented online, this module was converted into a distance learning module.

De Villiers (2001) describes the results of changing the course from a conventional paper-based course to a distance learning module in the following way:

- It facilitated delivery of material (that included graphics and tables) across great distances.
- It accommodated the needs of distance learners who could not organise the requisite number of trips to Pretoria.
- It gave students opportunities to undertake long-term projects unconstrained by limitations of time and space and unhampered by the necessity to comply with course requirements about contact session attendance.
- It gave learners a number of locations (platforms) on which to display their projects, artefacts, assignments and achievements.
- It enabled students through the connectivity provided by the Internet to participate in course activities from any place in which a stable Internet connection could be maintained.

One of the most interesting observations that can be made about this course is that it is both apt and appropriate that a course about the uses of the Internet in education and training should be presented by means of the Internet itself.

Lieb (1991) and Stroot et al. (1998) assert that adults have special learning needs and requirements that are different from those of children. All the learners who undertake the RBO 880 module are adult learners.

Table 1.1   General descriptions of the learners on the RBO 880 course

Work environment and employment status	Students come from extremely diverse situations. Some are in part-time employment; others are full-time employees. A few of the students take the course on a full-time basis.
Gender/cultural backgrounds	Students are both male and female, and come from diverse cultural backgrounds.
Age range	The ages of enrolled students range from the early twenties to the mid-fifties.
Degrees of computer literacy and Internet experience	These vary enormously from those who have an extensive background in and knowledge of computers and Internet-related matters to those who never used a computer before they enrolled for this module.
Location of learners	Students come from all areas of South Africa. There are also some students from Mozambique, various African countries, and even from the Sudan.

Table 1.1 shows how extremely diverse students are in terms of work experience, gender, ethnic and cultural background, age, computer and Internet experience, and physical location. Students from every imaginable kind of situation and condition have in fact completed this module during the course of its existence. During the years the course facilitator has gone out of his way to collaborate with different universities and institutions both local and international in the presentation of the course. He has also invited guest students and observers to take part in the module. While this has sometimes been a great success, it has other times not quite achieved the desired effect. The students

come from different work environments both in the public sector (these are mostly teachers) and the private sector.

The levels of computer literacy and Internet competence demonstrated by students range from extensive experience to virtually no experience at all. Students come from all provinces of South Africa and a few even come from other African countries. The facilitator has even visited and presented this module to students in Sudan. The module has been presented over a period of six years (1997-2004).
.

Most of the South African students are able to speak and write both English and Afrikaans (the main so-called "European" languages of South Africa). Black students are, in addition, skilled in their own home language and often one or more other African languages as well. And even though English is used as the language medium for teaching and communication in the RBO 880 module, some students from African countries have little proficiency in English.

A digital classroom is one that has been created on the worldwide web (www) and that occupies virtual space for course components such as bulletin and notice boards, e-mails, chat rooms, resources, assignments, model answers, and even a "desk" or learning space for each student. In a digital classroom of this kind, even the instructor has his own desk and resource "cupboard". There are, in addition, poster walls, live-chat facilities and spaces where tasks and challenges are listed and their outcomes noted. The metaphor of "classroom" is used deliberately so that the use of virtual space for teaching and learning may be more readily comprehensible to students.

The RBO 880 digital classroom is therefore the actual means that students use when they engage in active learning by means of the Internet and, experience

both the advantages and limitations of teaching, learning and collaborating through this medium (Clarke, 1998).

This particular module is part of a course whose goal is to prepare students to come professional e-learning specialists. Many of the students who have completed this course have changed their careers after graduating with the M Ed (CIE) degree. A description of some of the elements of the RBO 880 module offers some sense of how the module is structured and presented. The designer and facilitator of the course has noted that some of the module outcomes and activities were suggested by the immediate needs of learners over the years as they grappled in hands-on situations with various problems, challenges and difficulties.

1.3 Theoretical underpinning

The module (RBO 880) under scrutiny in the study is theoretically underpinned by a constructivist theory of learning. The module facilitator used Merrill's (1991) six guidelines of instructional design as the pedagogical point of departure when he designed the RBO 880 module. Merrill's (2005) confirms his understanding of the constructivist theory of learning is that learning is best promoted when a learner:

- observes a demonstration of some skill, activity or solution to a previously defined problem (the demonstration principle)
- applies the new knowledge thus gained (the application principle)
- undertakes real-world tasks in pursuit of knowledge (the task-centred principle)
- activates existing or prior knowledge to solve problems and reach a new understanding (the activation principle)
- integrates the new knowledge into his or her world (the integration principle)

Chapter 1: Introduction
Using the Internet in Higher Education and Training: A development research study

The RBO 880 module was also designed in accordance with Brooks and Brook's (1993) five principles of constructivism that assert that problems that are selected need to be relevant to students, that the curriculum should be founded on primary concepts, that teachers should seek to understand and value their students' points of view (and adapt the curriculum to take such points of view into account), and that authentic assessment should serve rather to assist the learner than merely to determine a grade.

Other authors who guided the facilitator's thinking include Hannafin and Peck (1988), who believe that "learning may be more efficient when the instruction is adapted to the needs and profiles of individual learners". Cronje (2006) suggests that the practical and administrative problems that have to be taken into account when designing and presenting a module such as this are the unavoidable differences in the academic schedules of both students and instructor, group sizes, assessment criteria and the various challenges and opportunities presented by cultural and linguistic barriers.

1.4 Purpose of the research

The purpose of this research is to explore and document various features and elements of the kind of learning that took place over a specific period in the RBO 880 module that forms part of the M Ed (CIE) (Master of Education in Computer-Assisted Education) at the University of Pretoria.

In light of this objective, the research undertaken here:

- documents the history of the RBO 880 module and the learning to which it has given rise
- explores the various learning theories that have been applied in the design and implementation of the RBO 880 module
- arrives at an understanding of the intricacies of the RBO 880 "virtual community" through an analysis of a selection of the cyber artefacts that it has generated

1.5 Literature review

The first element that I will examine in the literature review is the concept of e-learning. Many different terms have been used for e-learning. Hall (2004) discusses these different terms and defines *e-learning* as teaching instruction that is delivered electronically whether it be by means of the Internet, an intranet or any other platform such as, for example, a CD-ROM. Henry (2001: 249) defines e-learning as "the appropriate application of the Internet to support the delivery of learning, skills and knowledge". The Allen Academy (2005) defines e-learning as different learning methods that are aided by or delivered by means of technology.

Van Ryneveld (2005) argues that if educational practitioners wish to ensure that education will be intrinsically engaging and satisfying, they need to think carefully

about the learning process. Why do adults engage in learning? Are there a sufficient number of motivators to ensure that people will *want* to learn in depth? How should opportunities for interaction be designed so that they will support learning goals? If designers of e-learning wish to ensure a robust learning process, the way in which they implement learning theories are critical to the form and appearance of the end product. I shall review and discuss constructivist as well as cooperative, collaborative and active learning theories in order to be in a better position to further the aim of this research.

I shall also review and discuss a number of the theoretical foundations of motivation and adult learning because of their importance and relevance to an understanding and interpretation of the events and interactions that took place in the RBO 880 module over the years that are delimited by this research. Knowles (1959, 1984) argues that andragogy is predicated on crucial assumptions about the characteristics of adult learners that are different from the assumptions about child learners. He defines such assumptions in terms of:

- *Experience*. As people mature, they accumulate a growing reservoir of experience that becomes an increasingly powerful resource for learning.
- *Motivation to learn*. As people mature, their motivation to learn becomes "internal" or inner-directed (Knowles 1984).

Jones (1997) argues that a "virtual settlement" has certain characteristics which he defines as follows:

- A minimum level of interactivity exists on the site.
- A variety of communicators take part in transactions.
- There is always a common public space in which a significant proportion of a community's interactive group-computer mediated communication occurs.

- A minimum level of sustained membership is necessary if the project is to survive and flourish.

I shall collate and review the different understandings of "virtual community" in the literature review.

Reigeluth (1999) states that an instructional design theory is a theory that offers explicit guidance on how best to help people to learn and to develop themselves. Merrill (2001) expands on these guidelines, and Cronje (2006) describes them in more detail as the various kinds of learning that include cognitive, emotional, social physical and spiritual learning. The literature review will describe the different instructional design models and theories that are applicable in the online environment.

1.6 Research methodology

The literature review serves as the entry point for this. I selected a qualitative research approach in order to pursue this research. Greenhalgh and Taylor (1997) argue that research is *qualitative* if the aim of the research is to study events in their natural setting in an attempt to interpret phenomena in terms of the meanings that people bring to them.

Denzin and Lincoln (1995) assert that all qualitative research is interpretative because it is guided by a set of beliefs about the world and how it should be understood and studied. This research is *interpretative* by nature because it explores and documents the interactions of students and facilitator, artefacts and communication created by a "virtual community" in the period selected for the study.

Jones (1997) created a theory that distinguishes between a virtual community and a virtual settlement. He describes a virtual settlement as the cyber place within which a community resides or the cyber place that they inhabit. He further argues that because the study of virtual communities may be compared in its methods to the aims, purposes, methods and techniques of archaeology, it is necessary to study the artefacts of the virtual settlement. Studies of this kind are referred to as *cyber archaeology*. Jones also states that archaeologists do not research communities and cultures directly, but that they reconstruct the life, culture and history of the community through deductions and inferences made during the course of a careful examination of the remains and relicts of a human habitation. I shall attempt to replicate this activity in my examination of the remains left behind by the virtual communities who were RBO 880 module students and instructors.

Most of the artefacts of the RBO 880 module are still available in cyberspace. The data analysis will emerge from a structured analysis conducted in accordance with the methods of cyber archaeology, and an examination of all relevant written information and artefacts will be undertaken in the evaluation chapter. The structure of the virtual classroom will guide the analytical process. Analytical scrutiny of the documents and artefacts and a summary of the data in a separate document will provide a basis for a thorough analysis. My analysis of each part of the virtual classroom will give me the opportunity to explore each of the parts jointly and separately.

By juxtaposing similar artefacts from similar parts in the different "virtual settlements", I shall be able to use a structured process to compare different artefacts and explore the different material components which, as Jones (1997) writes, are "of direct relevance to computer meditated communication (CMC)". Jones (1997) adds that "researchers, archaeologists have also shown that the

material components of settlements play a substantial and essential role in many large-scale transformations of human community life". The transformations of the virtual settlements will be documented on the basis of an analysis of their material components.

Reeves et al. (2005) state:

> Design research has grown in importance since it was first conceptualized in the early 90s, but it has not been adopted for research in instructional technology in higher education to any great extent.

Design research (Bannan-Ritland, 2003; Design-Based Research Collective, 2003; Kelly, 2003), which Van den Akker (1999) calls *development research* (not *developmental research*), has the following characteristics:

- It focuses on broad-based, complex problems that are critical to higher education and the integration of known and hypothetical design principles with technological affordances to provide acceptable solutions to complex problems.
- It requires rigorous and reflective inquiry to test and refine innovative learning environments as well as to reveal new design principles.
- It necessitates long-term engagement and reiterations that produce continual refinements of protocols and questions.
- It requires intensive collaboration among researchers and practitioners.
- It necessitates a commitment to theory construction and explanation while solving real-world problems.

The research methodology implemented in the study consists of a documentation and analysis of the artefacts, communication and interactions that took place between students and a facilitator in the RBO 880 module over the period of six years defined by this study.

1.7 Research question

This research focuses only on the following research question: **What can be learnt from the continuous presentation of the module Use of the Internet in Education and Training (RBO 880)?**

The people who will benefit from this research are:

- course facilitators
- students past and future
- the system itself
- future researchers

1.8 Outline of the report

This report consists of five chapters. Chapter 1 outlines the main points of the study and provides a general overview. Chapter 2 reviews a selection of available literature about various features of e-learning, learning theories, instructional design approaches or principles, virtual communities, and the characteristics of adult learners and what motivates them. Chapter 3 describes the qualitative research methodology that the researcher utilises to analyse the cyber artefacts and documentation from the years defined by the research. Chapter 4 reports on the findings and depicts the cyber artefacts that the researcher selected from the RBO 880 module as being of particular interest and relevance. Chapter 5 concludes the study by considering the significance of the literature and the findings, and by making recommendations about possible future practical applications and potential topics for future research suggested by

a critical analysis of the learning that took place in the RBO 880 module during the years delimited by this study.

1.9 Summary

This research explores the learning that took place over a six-year period in the module *Use of Internet in Education and Training (RBO 880)* which is offered by the University of Pretoria. The research documents and analyses the activities, learning artefacts, documentation, interactions and challenges that formed part of this module. The conclusions reached in this research might prove useful in future research into training and learning that takes place through the medium of the Internet.

Chapter 2 - Literature Review

2.1 Introduction

This chapter comprises a literature review. During the course of the chapter, selected authoritative sources from the literature on to the study will be reviewed under headings that describe learning, theories of learning, virtual communities, cyber archaeology, e-learning, online pedagogy, adult learning, adult motivation to learn, and the kind of instructional design principles that is necessary for adults who learn online. It is necessary to review these sources as a preparation for the practical part of the research because each of the topics that is investigated here has some kind of relevance to the research questions. It is also essential to undertake a literature review of this kind so that relevant, meaningful and nuanced answers can later be given to the main research question.

The relationship among the topics that will be investigated in the literature, and how they all ultimately affect online learning, is depicted in Figure 2.1 below. Figure 2.1 below graphically depicts how the themes from the literature mentioned in this paragraph and reviewed in this chapter relate to one another.

Figure 2.1 Schematic depiction of topics reviewed from the literature in chapter 2
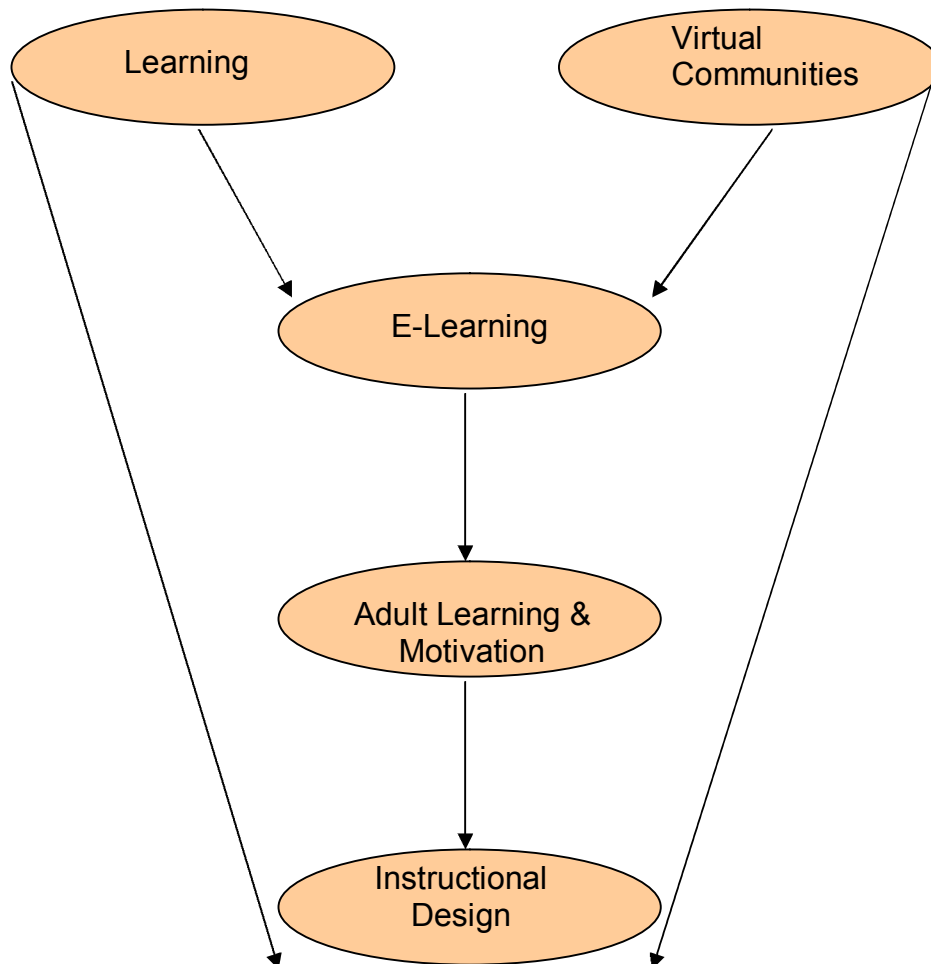
The review begins with a brief overview of the concept of learning and learning theories from various sources. The characteristics of virtual communities and the scope and nature of cyber archaeology are then reviewed in the work of Jones (1997). This will be followed by an in-depth examination of elearning and various aspects of elearning relevant to this research. This will lead naturally to a review of what various researchers and theorists have had to say about the characteristics of adult learning and why adult motivation to learn is unique and

is different from what motivates young people to learn. The chapter will conclude with a summary of Merrill's (2001, 2005) instructional design principles. This chapter reviews and unpacks aspects of the literature that are relevant to the themes and topic of this research, and, in so doing, it contributes to the answering of the research question and provides sound theoretical support for the conclusions reached in chapter 5.

2.2 Learning and Learning Theories

Element (2003) argues that a learning process for an individual can be divided into five phases:

- The first phase is *initial learning*. It is in this phase that new concepts and skills are introduced to a learner.

- This is followed by *continued learning*, a phase during which the learner builds on the foundation of knowledge on a subject that he or she obtained in the previous phase.

- After this *remedial learning* takes place. In this phase a learner refreshes and updates what he or she has already learned.

- In the subsequent phase of *upgraded learning,* a learner may improve his or her competence in the subject and so take it to a higher level.

- The last phase of learning, *transferred learning,* occurs when a learner who is familiar with concepts in one subject area is able to transfer what he or she has learned to new subject areas, understand what is common to both of them, and perceive how they are different.
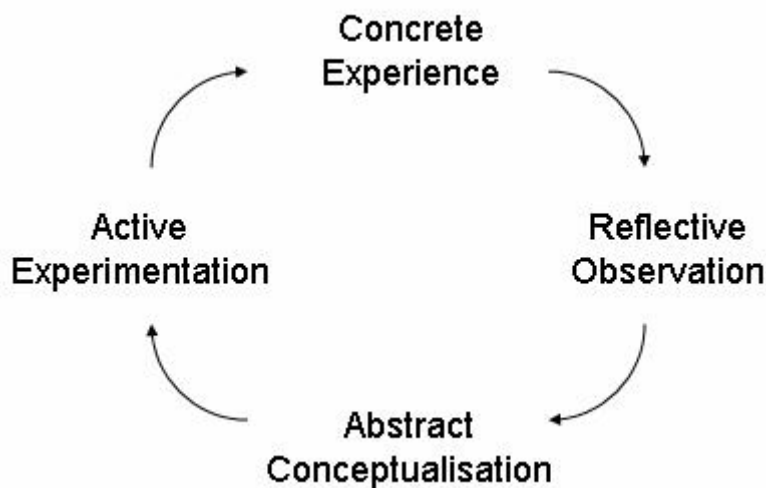
Figure 2.2: Four Mode Learning Cycle

Another view of the learning process is suggested by Kolb's Four Mode Learning Cycle (Watson & Hardaker, 2005: 60), which is graphically represented in Figure 2.2. The first mode learning, according to Kolb, is the phase of *concrete experience*, during which the learner collects information or concrete facts. During the next phase, *reflective observation,* a learner reflects on what he or she has understood and experienced. This leads naturally on to the following phase, called *abstract conceptualisation,* during which the learner will acquire an understanding of the facts in theory. In this phase of abstract conceptualisation, the learner reflects on how the construction of the facts that he or she has already acquired, relates logically and in practice to other theoretical units of knowledge that the learner already understands). The last part of the cycle of learning, according to Kolb, is the phase of *active experimentation* in which the learner applies or practices in the real world what he or she has already learnt about in theory by means of reflection.

The cycle repeats itself in a new iteration whenever a learner is faced with new concrete facts during the last practice mode of active experimentation (Watson &

Hardaker, 2005: 62). In the next section about learning, the researcher will review different learning theories.

2.2.1 Active Learning

Bonwell and Eison (1991) argue that: *"to be actively involved, students must engage in such higher-order thinking tasks as analysis, synthesis, and evaluation".* It is proposed within the context of this study that strategies that promote active learning be defined as instructional activities that require students themselves to perform tasks and to think about what they are doing while they perform them so that they may acquire understanding through active engagement. Ward (1995) writes: "When we think critically we become active learners". She elaborates on this by arguing that "instructional products must challenge learners to be active participants in the knowledge construction process, rather than passive recipients of 'prepackaged' knowledge".

Praxis is the Greek word that means *action with reflection*. (Praxis = Experience + Reflection = Action.) Individuals learn most and benefit most from what they learn when they engage actively in their learning processes. *Active* implies a hands-on attitude to learning in which the mind and all the faculties are engaged and contributing directly towards a learning outcome. Although learners received information through their five senses, they learn best by actually trying to *do* (arrange, construct, perform, organise, execute, erect, systematise, recapitulate and assemble) whatever it is that they are learning about (in whatever mode of doing is appropriate to their learning).

The first step in learning is effected when learners orientate and position themselves towards the task that lies ahead. Before they attempt to perform the task themselves, they need to observe and listen to others who are ready experts in the field, gather and categorise useful and pertinent data, and

scrutinise existing examples (models) of what it is that they wish to learn about. Once they have observed, listened to and interacted with others who are experts in the field, they should attempt to perform a task themselves under the observation of a teacher or instructor. Active engagement provokes interest and enthusiasm, and personal involvement inspires learners to undertake a task for themselves until they also become proficient in performance. This is the basic meaning of self-discovery (when applied to learning).

Ference and Vockell (1994:25) define an *active student* (referred to in Cronje 1997) as learners who bring a wide variety of prior learning and life experience to the learning in hand. Active students understand themselves to be experts in a variety of skills, techniques, methodologies, fields of knowledge and disciplines, and they extrapolate from their existing experience, knowledge and expertise to solve whatever new problems and challenges they might encounter. It is in this way that they make their past knowledge, experience and skill relevant to learning new things. Such students invariably prefer to obtain hands-on experience in any new branch of endeavour. They are task-centred individuals who focus on dealing with ─ and actively seeking solutions to ─ real-life problems by means of intelligent and active engagement. Because they are value-driven, they need to understand *why* they ought to learn something *before* they set about learning it. Active students are always keen to acquire new skills, and have a fundamental need to be directly involved in the planning, directing and executing of their own learning activities.

Doshier (2000) argues that a learning environment should be shaped in such a way that it promotes and rewards active learning and so becomes an environment which is set up and designed to give learners a variety of opportunities to practise and develop necessary skills and knowledge.

Kolb's learning cycle has been tested in a number of empirical studies in the face-to-face environment of classrooms and has been found to be a powerful theoretical basis of the study of the learning process. While Watson and Hardaker (2005) do not refer to online learning and do not apply Kolb's cycle in their specific context, Ward (1995) refers to instructional products that should challenge learners in the process of knowledge construction. In the context of that research, learners were challenged to become active participants in a "virtual settlement" environment.

This research explores how learners approach tasks by active learning, and how this led them to utilise their previous knowledge and experience to accomplish their tasks and find specific solutions in an online setting, by actively participate in the design and development of the RBO 880 module, therefore the importance of the application of action learning in this particular context

2.2.2 Cooperative learning
Johnson and Johnson (1989) are of opinion that individual interactions in an online setting are affected by the way in which social interdependence among learners is arranged, and that such arrangements in turn affect the outcomes of such interactions.

Deutsch (1962) agrees with these premises when he characterises cooperative learning as a method of instruction by means of which small groups of students are enabled to work harmoniously together to improve their own and one another's learning. Johnson and Johnson (1991) asserted most of the prerequisites for successful cooperative learning that Van der Horst and

McDonald (2001), and more recently, Gravette and Geyser (2004), cited in their own research. They state that the prerequisites for successful cooperative learning are:

- *having a mutual goal*
- *working towards a state of positive interdependence among all learners in the group*
- *the willingness of individuals in the learning group to accept individual accountability*
- *working interpersonally*
- *understanding small-group skills and applying them in action*
- *applying techniques of group processing to the group*

Johnson and Johnson (1991) regarded effective cooperative group learning to be what happens when members of a group work together to assure the common success of the group of which they are a part. In contrast to this, Robert Slavin (1995) considered successful cooperative group learning to occur when groups become successful enough as a group to compete with other groups.

Cooperative learning principles were applied by the designer and facilitator of the RBO 880 module throughout the module. He accepted that all the prerequisites of cooperative learning as guidelines when he designed the group and individual tasks. The online environment evokes new dimensions in cooperative learning and how it may be applied in a "virtual settlement". While this research accepts the relevance of Slavin's (1995) view that groups work together and in so doing learn to compete with the other groups, Slavin (1995) has not refer in the study to how competition applies in the online environment and how it affected those who over the years have enrolled for the RBO 880 module. This research explores the interaction between learners working cooperatively towards a mutual goal.

Meyer (2005) paraphrased the benefits of cooperative learning as understood by Johnson and Johnson (1989) and Smith (1992) as being:

- increases in cognitive achievement and ability
- a graduation from lower to higher-level thinking skills
- improved self-esteem and satisfaction that come from helping others
- the development and fine-tuning of the kind of social skills (especially skills of negotiation and conflict resolution) that are needed for effective group work

Meyer (2005) further argues that, in a cooperative learning environment, interaction among learners is characterized by positive goal interdependence and the acceptance of individual responsibility. Cooperative effort causes learners to work for one another's mutual benefit. This means that all the learners in a group understand that that the knowledge they obtain and the success they achieve will be a result of the effort of the whole group working together for one another's mutual benefit. The most important point here is that learners need to realize that since *all* the members of the group share a common goal, they will either all achieve their outcome together — or else they do not achieve it together.

Martin (2000) adduces the following disadvantages of cooperative learning (paraphrased by the researcher):

- Cooperative learning may not appeal to some students because some learners:
  - dislike working in groups
  - resist group work
  - prefer a teacher–centred approach to learning

- o are personally competitive and so prefer to work individually
- For cooperative learning to be optimally successful, heterogeneous groups are required (and this is not always possible).
- Individual learners can only be as successful as the group is successful as a whole.
- It is not always easy for lecturers to evaluate individual learners working in groups.
- Some instructors are uncertain about the roles that to fulfil as facilitators of group learning.

Simply placing learners together to work in the group will not produce cooperative learning. Cooperative learning groups have to be carefully structured and monitored at all stages by their instructor. Successful cooperative learning in a team setting requires the efforts of each individual to be sustained by the efforts of all other team members because each member of a cooperative learning team contributes to the common effort from his or her own reserves of acquired knowledge, skill and resources. Meyer (2005) states that for the best possible results, team members have to work cooperatively and pool their resources and expertise because no single team member has *all* the knowledge, information, skills and resources necessary to achieve the best possible outcome.

Although the RBO 880 module is designed to support group (cooperative) work as well as the development of social skills, improved conflict resolution and the increased satisfaction that comes from helping others the gap exists that these benefits have not been experienced and explored against the disadvantages cited in Martin (2000) in a typical online environment, like the RBO 880 module This research explores the benefits and disadvantages of cooperative learning in an online setting.

2.2.3 Collaborative learning

Panitz (1996) explains the distinction between collaborative and cooperative learning in the following way. *Collaborative* learning is a philosophy of learning and more than just a classroom technique. It is an ethos that respects each group member's individual abilities and contributions. Authority and responsibilities are shared within a team, and the underlying goal in the group is always consensus building. Collaborative learning, on the other hand, is a product of the social constructivist movement, and its practitioners tend to apply this approach in classrooms, at meetings, in the community, and in their homes. Their emphasis is on the active participation of all learners, and on interaction between learners and instructors. The building blocks of collaborative learning may be said to be cooperative learning.

Cooperative learning according to Panitz (1996) is defined as a set of processes whereby people work together to accomplish a specific goal or to develop a content-specific product. It is more a directive than a collaborative system, and is usually "controlled" (facilitated) by an instructor or teacher, i.e. it still remains essentially teacher-centric whereas collaborative learning is completely learner-centric. Collaborative learning empowers students to perform tasks that are frequently open-ended whereas, in cooperative learning, an instructor retains ownership of the task which usually involves a closed problem with a correct answer or predictable solution.

Collaborative learning made define a broad area of approaches with wide inconsistencies in the amount of personal contact time, group work, activities, classroom discussions, online discussions, short lectures, and study in research teams that might be contacted to one another for a whole term or a year.

Collaborative learning is defined by Hiltz (1995) as a process that focuses on cooperative attempts between instructor and students that emphasises active involvement and dealings between instructors and students and among students themselves. While knowledge is regarded as a social construct in the context of collaborative learning, education takes place through the agency of social interactions in an environment that in group interaction, assessment and collaboration.

While the literature dwells on the distinct differences between cooperative and collaborative learning, the main one seems to be that collaborative learning focuses on learner-centric tasks while cooperative learning focuses on facilitator-centric tasks and activities. Not a lot has been written to explain how these two learning theories may be applied in specific online environments such as those of the RBO 880 module. This research will therefore explore how the two learning theories were applied in an online setting through an examination of the sites, procedures, products and artefacts produced during the select number of years which this research has undertaken to investigate.

De Villiers (2001) offers a summary of the findings with regard to collaborative learning of Clarke (1998), Cronje (1997), Hiltz (1995), Johnson and Johnson (1999), Jonassen and Reeves (1996), Tam (2000), Kafai and Resnick (1996) and Watson and Rossett (1999), in Table 2.1 below.

Table 2.1 Features of Collaborative Learning

Role	Description of the role
Role of the leaders	• Assess, sequence and derive meaning from information • Construct and generate their own knowledge • Collaborate with other learners • Act as planners, managers, guides, facilitators and participants
Role of the instructor	• Acts as mentor and guide • Encourages learners to work together to build a common body of knowledge while accomplishing shared goals • Structures learning opportunities (acts as planner, manager, guide, facilitator and participant) • Serves as a resource • Creates and maintains a collaborative problem solving environment • Undertakes assessment
Characteristics of the learning process	• Encourages and accepts learner autonomy and initiatives • Uses a wide variety of materials (including raw data, primary sources and interactive materials) and encourage learners to use them • Inquires about learners' understanding of concepts before sharing his/her own understanding of those concepts • Encourages learners to engage in dialogue with other learners and with the instructors • Engages learners in experiences that reveal contradictions and then encourages discussion • Provides time for learners to construct relationships and create metaphors • Assesses learners' understanding through the application and performance of open-structured tasks

2.2.4 Constructivism

Bruner (1966) states that a theory of instruction should address four major elements that is indispensable for learning:

- the predisposition towards learning
- the ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner
- the most effective sequences in which to present material

- the nature and pacing of rewards and punishments as incentives for learning

One of the important points made by Bruner in his theoretical framework is that learning is an *active* process in which learners build new ideas or concepts upon the basis of their current and past knowledge, experience and skill. The learner selection and processes information, constructs hypotheses, and makes decisions about cognitive structure. The meaning that learners give to experience and the organization that they impose on experience are provided by cognitive structures (i.e. schemas and mental models) that allow learners to move from the mere possession of information to a synthesised understanding of what it is that they know and what they have achieved in their learning.

In work that extended the limits of his initial theory, Bruner (1986, 1990, 1996) expanded his theoretical framework to include various social and cultural aspects of learning Researchers such as Cunningham (1991), Jonassen (1991), supported by Siegel and Kirkly (1997), and, recently, Chien Sing (1999), describe the key characteristics of constructivism as entailing:

- active participation by learner in their own learning
- a recognition of complexity
- the use of multiple perspectives
- the utilisation of real-world contexts

Constructivist theory states that learning is most effective when learners actively engage in learning and are not merely expected to react to stimuli (as is suggested by *behaviourism*). This theory states that learners have a natural propensity to grasp and make sense of disparate phenomena by actively engaging in structured learning tasks that have been especially devised for them by a teacher who is familiar with the larger goals of learning to which the group

aspires. Constructivism emphasises that learners are not simply passive receptacles for information who are able, under certain circumstances, to regurgitate that information and under examination — thereby demonstrating little more than an ability to obtain good results in a conventional examination format (which guarantees nothing about learning or understanding and which may demonstrate certain and narrowly defined competencies).

Learners in fact construct their own tentative *a priori* interpretations of the kind of knowledge that they are expected to absorb, and they then go about testing such informal *a priori* hypotheses during the course of their learning and arriving at their own conclusions. When learners are allowed to learn in constructivist pedagogical settings, they naturally reiteratively construct cognitive hypotheses by means of which they elaborate on the knowledge that they already possess and so extend the limits of their knowledge and understanding through active engagement in a predetermined task until they are able to demonstrate certain learning outcomes that indicate true proficiency and understanding.

Conner (1999) states that constructivist instructors should model the tasks that they set for learners in such a way that learners are given the means to discover essential principles for themselves. It is the task of the constructivist instructor (a task for which teaching professionals have been carefully trained) to translate what the learner needs to learn into an appropriate learning task which, if actively pursued, will extend the competence and knowledge of the learner so that he or she is able to demonstrate specific predetermined learning outcomes. The curriculum also needs to be constructed in a spiral manner so that students are continually building upon what they have already learned and understood. Good methods for structuring knowledge in a constructivist learning situation should promote the synthesis of complex ideas into higher-order knowledge, the generation of new propositions and explanatory hypotheses, and the

increasingly sophisticated manipulation of information to produce new holisms of knowledge.

According to Khan et al. (1997), the worldwide web has proved itself as a medium for direct instruction although its effectiveness is still unknown. Reeves (2000) find that learners are quite capable of constructing knowledge on the basis of previous information and experience. Constructivist does not merely simplify and deliver the kind of direct instruction that conventional (behaviouristic) teachers offer their students. Instead, they create tasks that provide learning opportunities and that allow students to accomplish their learning goals by solving their problems through active engagement with learning tasks in a way that is personally relevant to themselves. It is such an approach that transforms the worldwide web into a "cognitive tool" or medium that online students can use to conduct their own investigations, solve their own problems, and constitute their own knowledge.

2.3 Virtual Communities

There is no consensus on the relevant research about the definition and classification of virtual communities (which are also referred to as *online communities* or *virtual public spaces*). Virtual communities do however give people a medium for engaging in common activities, sharing feelings, discussing ideas, and exchanging opinions with other people online in a defined space (Lee, et al., 2002). Virtual communities are not therefore merely a forum for the exchange of electronic messages in an orderly way. They also a sociological phenomenon in their own right (Jones, 1997). They are also a matter of central importance to this research study, and the research question, in that it provides us with a framework of how the learners operated/survived and therefore accumulated data will have to be understood in the context of research that has already been undertaken in the field of virtual communities.

Carver (1999: 114) defines a community as "*a set of ongoing social relations bound together by a common interest or shared circumstances", and he notes that "people are drawn to virtual communities because they provide an engaging environment in which to connect with other people".*

Virtual communities may also be defined as "*social relationships forged in cyberspace through repeated contact within a specified boundary or place"* (Jones & Rafaeli, 2000) — or *"social aggregations of people carrying out public discussion long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace"* (Chan, 2004).

Lee, et al (2002) attempt to create a general working definition for virtual communities by combining existing definitions from literature. The combined definition that they produced by this means is that a virtual community is "a technology-supported cyberspace, centered upon communication and interaction of participants, resulting in a relationship being built-up". The similarities extracted from the definitions emphasise the following qualities or aspects of a virtual community. A virtual community is a virtual place:

- in which virtual communities exist and interact in cyberspace
- in which technology is used to support the activities in the virtual community concerned
- in which the participants of the virtual community determine what topics will be discussed, how they will be dealt with, and how they will be disposed of
- in which the existence of a virtual community relationship is ordered, sustained and prolonged only because of the common consent and cooperation of its members

A virtual community may be regarded as successful in those cases where there is a high level of participation (extent of membership) or when the number of messages posted in the community is very large. Research shows that some conditions that operate to the advantage of virtual communities include trust, anonymity and sense of community (Chan, 2004). Pascal, Sidiras & Kremar (2004), who identify 32 different indicators for the success of virtual communities, differentiate between member-orientated and operator-orientated conditions for success. These indicators of success in virtual communities have been tabulated in table 2.2 below.

Table 2.2 Indicators of success in virtual communities

Reaching a high number of members within a short period of time
Building trust among members
Evolution of the community according to the ideas of its members
Offering up-to-date content
Offering high-quality content
Appreciation of contributions of members by the operator
Assistance for new members by experienced members
Establishing codes of behaviour (netiquette/guidelines) to contain potential conflict
Supporting the community by regular real-world meetings
Handling member data sensitively
Arranging regular events
Intuitive user guidance
Personalised page design of the community site according to the preferences of its members

Establishing supporting subgroups within the community
Integration of the members into the administration of the community
Fast reaction time of the website
Stability of the website
Price efficiency of offered products and services
Encouraging interaction between members
Offering privileges or bonus programs to members
Special treatment of loyal members
Personalised product and service offers for members
Focusing on one target group
Continuous community-controlling with regard to the frequency of visits
Continuous community-controlling with regard to member growth
Continuous community-controlling with regard to member satisfaction
Defining sources of revenue as a starting condition for building a virtual community
Constant extension of offerings
Building a strong trademark
Existence of an off-line customer club as a starting advantage
Increase of market transparency for community members
Sustaining neutrality when presenting and selecting offers to community members

The table above contains a list of indicators of the success of a virtual community.

A sense of community is one of the success factors of a virtual community. Blanchard and Markus (2002) mention the following four dimensions of sense of community:

- *Feelings of membership.* Members feel that they belong to the community and identify with it.
- *Feelings of influence.* Members feel that they have influence on the community and are being influenced by it.
- *Integration and fulfilment of needs.* Members feel that others in the community support them and that they can provide support in return.
- *Shared emotional connection.* Members feel a shared history and enjoy both relationships and community.

Lee et al. (2002) identified different ways for classifying virtual communities and came to the conclusion that each of these different classifications is valid in its own way. The different classifications that they mention depend upon the basic needs of human beings, use, social structure, technological base, and motivation. Carver (1999: 114) classifies virtual communities in terms of interests, relationships, entertainment and commerce.

Although virtual communities can add a human touch and enrich the learning experience, there are those who warn that addictive attachment to virtual communities can be a source of danger to members (learners) because the fascination that they exert can be dangerous. Addictive obsession with online activity can isolate people from their families and from the community at large as more and more time is spent online. As more and more time is spent on the Internet, learners can become more and more lonely, isolated and depressed (Carver, 1999: 115).

On the positive side, there are many benefits that may be enjoyed by members of a virtual community who take part in the activities of a learning environment or an online simulation. According to (Carver (1999: 115), such benefits may include:

- increased learner motivation generated from a common sense of humanity and from active participation in the virtual community
- a learning experience enriched by the socialization that takes place online as learners engage with the tasks required of them to obtain a degree, certificate or other qualification
- an expanded network of human resources generated through contacts made in the virtual community and with other people engaged in similar pursuits
- the kind of social and emotional support that community members naturally offer to one another in a virtual community.

Jones (1997) created a theory to distinguish between a virtual community and a *virtual settlement* which is the cyber place where the community resides or the cyber realm that they inhabit. He further argues that the study of virtual communities may be compared to archaeological investigation, and that such a study therefore requires a researcher to scrutinise the artefacts that the virtual community produces in its virtual settlement. This study is known as cyber archaeology. The first step of the cyber archaeologist is to define and characterize the virtual settlement that has been selected for study. The steps involved in investigating and chronicling a virtual settlement and its virtual community are graphically displayed in Figure 2.4 below.

The conditions that Jones (1997) sets out to define a virtual settlement are:

- a minimum level of interactivity among members
- a variety of communicators
- a minimum level of sustained membership

- a virtual common public space in which a significant portion of community interactions occur

Efimova and Hendrick (2005), however, argue that the conditions that Jones devised for the study of virtual settlements do not define a settlement's boundaries. Their study investigated the boundaries of weblog communities which *ipso facto* extend their boundaries in a way that a virtual community of the kind that is being investigated here do not. Figure 2.3 below tabulates the steps that Efimova and Hendrick (2005) use to study virtual communities.
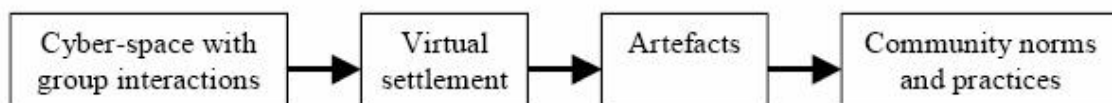
Figure 2.3 Studying virtual communities (Efimova & Hendrick, 2005)

Jones's theory does, however, assist researchers to make a useful distinction between a virtual community and the cumulative content of its electronic messages.

Virtual communities in education give learners from different parts of the world (or separated by obstacles of space and circumstance) opportunities to get come together and thus to rise above the limitations of their personal identities, their individual situations, and their finances. The members of a virtual community work together to construct knowledge and extend understanding, and this knowledge remains in the form of artefacts within the virtual settlement where it can be accessed and studied (Turvey, 2006: 310). Virtual communities give students an effective means of exchanging knowledge and information over and

above normal opportunities to engage in social and friendly exchanges (Wagner, et al., 2005).

Online message boards, mailing list servers, video conferencing, Internet relay chat, and group and private chat rooms are some of the technology-based facilities that virtual communities offer their members. Some of these provide asynchronous communication while others offer synchronous communication. (Demiris, 2006: 179). The user population of a virtual community is responsible for the extent and quality of the communication that they offer one another. But not all members made equal contributions. Corresponding members may be divided into "lurkers" and contributors. Lurkers (as their name implies) are members of the community who remain silent and out of sight, and who do never or rarely contribute to the public discourse on the site. Contributors are members who actively engage in public discourse (Jones & Rafaeli, 2000).

"Virtual communities can also be divided into those that are moderated and those that are not moderated. On a moderated list, someone is responsible for reviewing and filtering messages that are somehow inappropriate in terms of the conditions laid down for participation. Communities that are not moderated rely on the existence of shared social norms and understandings to guide individual members to behave appropriately" (Demiris, 2006: 179).

Jones and Rafaeli (2000), who conducted extensive investigations into cyber archaeology, affirm that the remains (artefacts) of a virtual community can tell researchers a great deal about the members of community and what occurred on different levels of the community at various times of its existence. If archaeology is the study of past generations by means of an analysis of their material remains, cyber archaeology is the study and analysis of the remains of

virtual communities for the same purpose. Jones and Rafaeli (2000) make use of Fletcher's methodology in their investigation of virtual communities.

In the section above, the researcher have explored some aspects of the format, content, methods and intentions of virtual communities, and explained how a cyber archaeologist could make use of the relicts and artefacts of a virtual community to reach conclusions about the performance, prospects, intentions and achievements of the community in the period under scrutiny. This research explores to what extend the RBO 880 module adheres to the requirements of a virtual settlement, according to Jones (1997), remains (artefacts) are analysed to gather data on how the learners 'lived' in these settlements. By analysing the communities, the researcher explores, possible community norms and practices in this particular context (RBO 880 module). In the section below, an explanation on the uses and purposes of elearning as a distinctive mode of learning will follow.

2.4 eLearning

Thomas Toth (2003) describes *elearning* as a comprehensive term generally used to refer to computer learning, although it is often extended to include the use of mobile technologies such as PDAs and MP3 players. Elearning would include the use of web-based teaching materials and hypermedia in general, multimedia CD-ROMs, web sites, discussion boards, collaborative software, e-mail, blogs, wikis, computer-aided assessment, educational animation, simulations, games, learning management software, electronic voting systems, and various combinations of these methods.

Along with the terms *learning technology* and *educational technology,* the term *elearning* is generally used to refer to use technology in learning in a much broader sense than it does for computer-based training or the computer aided

instruction of the 1980s. It is also broader in scope than the terms *online learning* or *online education* which generally refer to purely web-based learning. In cases where mobile technologies are used, the term *mlearning* has become more common. While elearning is naturally suited to distance learning and flexible learning, it can also be used in conjunction with face-to-face teaching, in which case the term *blended learning* is commonly used.

Table 2.3 shows Romiszowski's (2004) definition of elearning.

Table2.3 Romiszowski's structured definition of elearning

	(A) INDIVIDUAL SELF-STUDY Computer-Based Instruction/ Learning/Training (CBI/L/T)	(B) GROUP COLLABORATIVE Computer-Mediated Communication (CMC)
(1) ONLINE STUDY Synchronous Communication ("REAL-TIME")	Surfing the Internet, accessing websites to obtain information or to learn (knowledge or skill) (Following up a Web Quest)	Chat rooms with(out) video (IRC; Electronic Whiteboards) Audio/Videoconferencing (CUSeeMe; NetMeeting)
(2) OFFLINE STUDY Asynchronous Communication ("FLEXI-TIME")	Using stand-alone courseware/ Downloading materials from the Internet for later local study (LOD-learning object download)	Asynchronous communication by e-mail, discussion lists or a Learning Management System (WebCT, Blackboard, etc.)

These definitions show that elearning may be either an individual activity or a collaborative group activity. They also suggest that both synchronous (real-time) and asynchronous (flexi-time) communication modes may be employed. Romiszowski's definitions are quite broad when compared to others from the literature.

Hall (2004) discusses the different terms used for elearning and defines *elearning* as instructions that are delivered electronically whether through the Internet, an intranet or other platforms such as, for example, a CD-ROM. Henry (2001:249, in Van Romburgh, 2005) defines elearning as *"the appropriate application of the Internet to support the delivery of learning, skills and knowledge".*

Van Romburgh (2005) argues that there is a perception that some technology-based learning has failed. While each of these technologies has limitations of its own that affect educational delivery in various ways, there can be no doubt that this kind of learning, when applied correctly, can be of tremendous benefit to the organisations, individuals and institutions that use it. If they are effectively used, learning technologies can enhance the learning experience, improve efficiency and reduce costs. Research has shown some of the reasons why technology-based learning that is similar to individual tutoring can be more effective than classroom learning. One may, for example, produce the following evidence:

- The speed at which different learners process content varies enormously. Online technologies are particularly suited to accommodate the variable pace at which learners work their way through the material.
- While learners in a classroom setting ask an average of 0.1 questions per hour, learners with individual tutoring delivered by means of online electronic technology may ask (or answer) up to 120 questions per hour.
- Students who receive individual tutoring can perform with as much as two standard deviations better than equivalent learners in a classroom (ADL, 2004: 9).

Technology-based learning enables students to learn at any time in any place. Some educators, however, feel that this form of learning isolates learners

because it is impersonal and not interactive enough. The obvious counter-argument would be that in a large classroom with only one lecturer, learning is inevitably also impersonal. Current technology is now able to facilitate the whole range of interactions that include, for example, video or audio conferencing and instant messaging. Because these modes of interaction are at least to some extent comparable with face-to-face learning, they make it less likely that learners will be isolated when they learn by means of online technologies (MacDonald et al., 2001).

Raab et al. (2002, 222) further argue that another benefit of web-based learning is that learners can access courses at times that they find convenient, and not only during the periods in which traditional learning is scheduled. Learners and instructors online do not therefore have to meet one another at any specific time. In addition to this, technology-based learning makes education and learning opportunities available to non-traditional students. It also makes the resources associated with education available to traditional students, while passing on the advantages of cost efficiency and efficient training options to those who make online computer-assisted education available.

Bob Jensen (2001) states that while many researchers have cautiously applauded the opportunities offered by elearning, other commentators are critical of elearning as a substitute for conventional classroom-based education because online learning dispenses with the face-to-face human interaction between teacher and learner that is characteristic of real-time classroom education. They argue it for that one can no longer defined this process as "educational" in the highest philosophical sense such as that defined by, for example, RS Peters. But elearning does not absolutely exclude human interactions which may still take place through the agency of audio or video-based web-conferencing programs.

While the sense of isolation experienced by some distance-learning students is also often cited as part of the general criticism of elearning, discussion forums and other computer-based communication can ameliorate any feelings of isolation that an elearning student might experience. Apart from this, elearning students are encouraged, wherever possible, to meet one another face-to-face and even to form self-help groups for the purpose of mutual assistance.

The cost-effectiveness of elearning has also been the subject of much debate because of the large initial investments that can only be recouped through subsequent economies of scale. Web and software development in particular may be expensive, as are systems that are specifically geared to elearning. The development of adaptive materials is also much more time-consuming than the development of non-adaptive ones.

David Merrill encouraged Badrul H. Khan in 1997 to develop an e-learning framework that would include all the most important dynamic components of elearning. Figure 2.4 (below) depicts Khan's (1997) graphic representation of the dynamic components of elearning.

Fig 2.4 The Elearning Framework of Badrul Khan
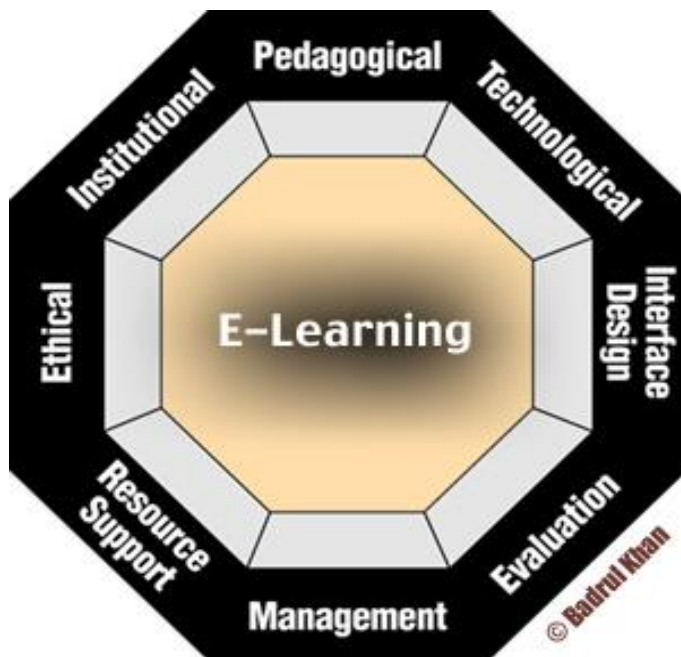
According to Khan (1997), this figure contains a comprehensive and dynamic list of the eight dimensions and sub-dimensions of elearning. The researcher will now unpack the constituent components of Khan's dimensions and sub-dimensions of elearning (above) in Table 2.4 (below).

Table 2.4 Constituent components of Khan's (1997) dimensions and sub-dimensions of elearning

Dimension and Sub-Dimensions
Pedagogical
Content Analysis, Audience Analysis, Goal Analysis, Medium Analysis, Design Approach, Organization, Methods and Strategies, Presentation, Exhibits, Demonstration, Drill and Practice, Tutorials, Games, Story Telling, Simulations, Role-playing, Discussion, Interaction, Modelling, Facilitation, Collaboration, Debate, Field Trips, Apprenticeship, Case Studies, Generative Development, Motivation
Technological
Infrastructure Planning (Technology Plan, Standards, Metadata, Learning Objects), Hardware, Software (LMS, LCMS), Enterprise Application
Interface Design
Page and Site Design, Content Design, Navigation, Accessibility, Usability Testing
Evaluation
Assessment of Learners, Evaluation of Instruction and Learning Environment
Management
Maintenance of Learning Environment, Distribution of Information
Resource Support
Online Support, Instructional/Counselling Support, Technical Support, Career Counselling Services, Other Online Support Services, Resources, Online Resources, Offline Resources
Ethical
Social and Political Influence, Cultural Diversity, Bias, Geographical Diversity, Learner Diversity, Digital Divide, Etiquette, Legal Issues, Privacy, Plagiarism, Copyright
Institutional
Needs Assessment Readiness Assessment (Financial, Infrastructure, Cultural and Content Readiness), Organization and Change (Diffusion, Adoption and Implementation of Innovation), Budgeting and Return on Investment, Partnerships with Other Institutions, Programme and Course Information Catalogue (Academic Calendar and Services, Orientation, Faculty and Staff directories, Advising, Counselling, Learning Skills Development, Services for Students with Disabilities, Library Support, Bookstore, Tutorial Services, Mediation and Conflict Resolution, Social Support Network, Students Newsletter, Internship and Employment Services, Alumni Affairs Recruitment, Admission, Financial Aid, Registration and Payment, Information Technology Services, Instructional Design and Media Services, Graduation Transcripts and Grades, Academic Affairs, Accreditation, Policy, Instructional Quality, Faculty and Staff Support, Class Size, Workload and Compensation and Intellectual Property Rights, Student Services, Pre-enrolment, Course Schedule, Tuition, Fees, and Graduation), Marketing

This table unpacked the constituent components of Khan's dimensions and sub-dimensions of elearning. Khan's model postulates a holistic view on the concept of elearning, which in turn will enable the researcher to explore the RBO 880 module in a broader sense and establish what, can be learn about learning in an online environment and how it is applied in this specific context (RBO 880) by the learners and the facilitator. Khan's model further, guides the researcher to be alert and identify and unpack different aspects of elearning, specifically in this context In the section that follows the researcher will explore the unique characteristics of adult learners as suggested by a number of prominent researchers.

2.5 Adult Learning

Knowles (1973, 9), often regarded as a pioneer of adult education, commented on the central opportunity of adult education (to become "the laboratory of democracy, the place where people may have the experience of learning to live cooperatively ") in the following words:

> *The major problems of our age deal with human relations; the solutions can be found only in education. Skill in human relations is a skill that must be learned; it is learned in the home, in the school, in the church, on the job, and wherever people gather together in small groups. This fact makes the task of every leader of adult groups real, specific, and clear: Every adult group, of whatever nature, must become a laboratory of democracy, a place where people may have the experience of learning to live cooperatively. Attitudes and opinions are formed primarily in the study groups, work groups, and play groups with which adults affiliate voluntarily (Knowles, 1973).*

Knowles's quotation touches on the centrality of human relations in adult education, and the importance of accommodating adult learners with rich life experience, characteristic problems, and skills that have been learned in the adult world of everyday experience. Van Ryneveld (2005) summarises the major characteristics adult learners described by the most important researchers on the subject. While I respect the comprehensiveness of Van Ryneveld's summary, I would like to add the principles of K.P. Cross (1981) to her table. What follows below in Table 2.5 is Van Ryneveld's tabular summary of the clusters of attributes that various researchers attributed to adult learners (with the addition of information by K.P. Cross).

Table 2.5 Characteristics of Adult Learners

Characteristics of adult learning	Author
Adult learners • are autonomous and self-directed • have a foundation of life experience and knowledge • are goal oriented • are relevancy-oriented • are practical • need to be shown respect	Lieb (1991)
Adult learners have • a self-concept that tends towards self-direction • a growing reservoir of experience • a developmental readiness to learn • a problem-centred and present-reality orientation to learning	Knowles (1984)
Key factors in adult learning are that • adults need to know why they need to learn something • need to learn experientially • approach learning as problem-solving • learn best when the topic is of immediate value	Knowles (1984)
Adult learning is based on • voluntary participation and mutual respect among participants • collaborative facilitation • a praxis approach to teaching and learning • the necessity of critical reflection on life as a whole • the pro-active and self-directed empowerment of participants	Brookfield (1986)

Characteristics of adult learning	Author
Adults prefer learning situations that • show respect for the individual learner • capitalize on their experience and are practical and problem-centred • promote their positive self-esteem • integrate new ideas with existing knowledge • allow choice and self-direction	Goodlad (1984)
Adult learners • possess a wealth of prior knowledge and experience • appreciate clear goals and objectives • do not want to be surprised or embarrassed in front of their peers • need good feedback • require material that is relevant • need to take an active part in their own education	Decker (2002)
Some principles of adult learning include the fact that • new knowledge has to be integrated with previous knowledge and that this process requires active learner participation • collaborative modes of teaching and learning enhance the self-concepts of those involved and should result in more meaningful and effective learning • adult learning is facilitated when teaching activities promote the asking and answering of questions, problem finding, and problem solving • adult skill learning is facilitated when individual learners can assess their own skills and strategies in order to discover their own inadequacies or limitations for themselves	Dewar (1996)
Key assumptions about adult learners are that • adults are motivated to learn as their needs are progressively satisfied by learning • their orientation to learning is life-centred • adults rely on experience as a rich resource • adults have a profound need to be self-directing • they enjoy processes of cooperative and democratic inquiry rather than being made to conform to quasi-authoritative canons of received 'wisdom' • adults are all individuals and adult education should therefore make provision for differences in style, time, place, and pace of learning	Lindeman (1926)
Adult Learners respond to • situational characteristics such as part-time versus full-time	K.P. Cross (1981)

Characteristics of adult learning	Author
learning, and voluntary versus compulsory learning. The administration of learning (i.e. schedules, locations, procedures) is strongly affected by the first variable; the second pertains to the self-directed, problem-centred nature of most adult learning. • Personal characteristics include: aging, life phases, and developmental stages. Aging results in the deterioration of certain sensory-motor abilities (e.g., eyesight, hearing, reaction time) while intelligence abilities (e.g. decision-making skills, reasoning, and vocabulary) tend to improve. Life phases and developmental stages (e.g. marriage, job changes, and retirement) involve a series of plateaus which may or may not be directly related to age.	

Table 2.5 (above) shows Van Ryneveld's summary of the attributes that various researchers attribute to adult learners (with the addition of a summary of the opinions of Cross (1981)).

While adult learners have different characteristics and respond different in learning environments, Smith (2000) states: "As we grow in our understanding about what it takes to teach adults effectively, we are seeing distinct patterns in how adults tend to learn".

These distinct patterns should be taken in account when presenting and designing learning. Adult learners sometimes tend to expect learning in an online environment to be similar in atmosphere method to the teaching many experienced in traditional teacher-instructor-led classrooms. Adults tend to want to solve problems immediately, and, in searching for immediate solutions, they might devote less time to an in-depth exploration of the subject in hand. Such learners will often rely on the opinions and advice of their colleagues and peers without exploring their own preferences, likes and dislikes. Adults thrive in

learning environments in which they feel that they too have a significant contribution to make to the group as a whole.

In this section, the researcher looked briefly at the unique characteristics of adult learners as they are described by researchers such as Knowles and other researchers prominent in this field. However most of the researchers focus on a face to face environment, this research explores adult learning and adult learning characteristics as described by the different authors in a particular context,. This enables the researcher to explore the artefacts, tasks, group tasks, conduct and document research about adult learners in a specific online environment. the section that follows, I shall describe what researchers have to say about learning motivation.

2.5.1 Motivation

Huitt (2001) quotes Kleinginna and Kleinginna (1981a) as saying that a consensus exists amongst researchers that motivation is an:

- internal state or condition that activates behaviour and gives it direction
- desire or want that energizes and directs goal-oriented behaviour
- influence of needs and desires on the intensity and direction of behaviour

Franken (1994) provides an additional component in his definition, namely that motivation is *"the arousal, direction, and persistence of behaviour".*

Conner M. (1999) suggest that adults engage in education for various reasons of their own. Motivation can give learners the intensity and direction they need to invest educational goals with the requisite amount of work to succeed. Houle (1966), a pioneer in the field of what motivates adult learners, identified three subsidiary kinds of ways in which adult learners are motivated.

- Goal-oriented learners use their *need* for education as an objective to reach clear-cut goals.

- Activity-oriented learners take part mainly because of the *social contact*. "Their selection of any activity was essentially based on the amount and kind of human relationships it would yield" Houle (1966).

- *Learning-oriented learners seek knowledge for its own sake. "For the most part, they are avid readers and have been since childhood… And they choose jobs and make other decisions in life in terms of the potential for growth which they offer."*

Maslow (1954) posited a hierarchy of human needs based on two aspects of in his model: deficiency needs and development needs. Huitt (2001) describes Maslow's hierarchy in terms of these two groupings. Each deficiency need must be met before person can move to the next highest level. Once each of these needs has been satisfied, an individual will act to compensate for the deficiency if at some future time a deficiency is detected. According to Maslow, an individual will only generally be prepared to fulfil growth needs if and only if the deficiency needs indicated by the first five levels have been satisfied. These first five levels are:

- Physiological: the most basic needs of hunger, thirst, sleep, and bodily security (integrity)

- Safety/security: the need to be out of danger: free from the menace of attack, violence, personal violation and provocation

- Belonging and love: the need to affiliate oneself with others and to be accepted and valued by significant others

- Esteem: to need to be admired because of one's competence and achievements; the need for approval and recognition

- Self-actualization: to need to actualise self-fulfilment and realize one's own potential

Maslow later differentiated two growth needs that are logically and experientially prior to self-actualization. He labelled these two lower-level growth needs that precede self-actualization as:

- Cognitive needs: the need to know, understand, and explore
- Aesthetic needs: the need for symmetry, order, and beauty
- (Maslow & Lowery, 1998)

Maslow describes individuals on the level of self-actualisation as people who are vital and dynamic and have an intense appreciation of life. Learners who fall into this category are concerned about their personal growth and education, and they have an ability to focus on problems, gather information and do whatever they need to do to solve the what which they are confronted. In the right environment and under certain conditions, such learners will experience what Maslow called "peak" experiences.

Huitt (2001) notes that, in general, explanations about the source(s) of motivation may be categorized as either *extrinsic* (outside the person) or *intrinsic* (internal to the person). In Table 2.6 below, I outline the actions that one needs to perform to increase motivation on the intrinsic and extrinsic levels.

Table 2.6 Actions needed to increase motivation on intrinsic and extrinsic levels (Huitt, 2001)

Actions needed to increase intrinsic motivation	Actions needed to increase extrinsic motivation
Explain or show why learning a particular content or skill is important.	Provide clear expectations.
Create and/or maintain curiosity.	Give corrective feedback.
Provide a variety of activities and sensory stimulations.	Provide valuable rewards.
Provide games and simulations.	Make rewards available.
Set goals for learning.	
Relate learning to student needs.	
Develop plan of action.	

In Table 2.6 (above), I outlined the actions that required increasing motivation on the intrinsic and extrinsic levels.

Research into the motivational factors as they relate to online learning and the theory of gaming has in the past two decades largely been based on Malone and Lepper's (1987) theory of motivation. Van Ryneveld (2005) notes that Malone and Lepper (1987) defined intrinsic motivation in terms of *"what people will do without external inducement".*

Intrinsically motivating activities are those in which people will engage for the sake of interest and enjoyment (no element of compulsion motivates what they do). Malone and Lepper (1987) have integrated a large amount of research on motivational theory into a synthesis of ways to design environments that are intrinsically motivating. They argue (1987a) that intrinsic motivation is stimulated by the following four qualities: *challenge*, *curiosity*, *control*, and *fantasy*.

Challenge

Van Ryneveld (2005) writes: "Learners pursue tasks that they perceive as challenging, and learners are challenged when they direct their activities toward personally meaningful goals in situations in which the accomplishment of their goals is uncertain". Setting goals, the level of certainty, performance feedback and self-esteem are all contributing factors when one is designing challenges that will evoke motivation.

Curiosity

Curiosity influences individual motivation because it is stimulated when something in the physical environment attracts attention, or when there is an optimal level of discrepancy between current skills and how these might be improved if the learner worked to engage in some kind of learning activity. Novelty and interest are factors that express the motivation that can be engendered by curiosity. The two kinds of curiosity that can stimulate intrinsic motivation are sensory curiosity and cognitive curiosity.

Control

Another factor that influences intrinsic motivation is control. This acknowledges our basic human need to control our environment to whatever extent is possible without harm or disruption to ourselves. Learners all need to exert some control over what happens to them in the learning environment. The three elements that influence the contribution of control to intrinsic motivation are cause and effect relationships, powerful effects, and free choice. The facilitator, in the RBO 880 module follows a constructivist approach to the design of the module, resulting in that learners should construct their own meaning, the research explores how control is exercised in the specific context, if any.

Fantasy

Garris et al. (2002) state that motivation can be generated by providing optimal levels of informational complexity, and by including "imaginary or fantasy context, themes, or characters". One way in which learning can be made more appealing and motivating is by presenting learning material to learners in *an imaginary context* which is nevertheless interesting, stimulating and familiar (Malone & Lepper 1987). No study that touches on motivation and the use of technology in education would be complete without mention of Keller's ARCS model for motivation (1983). The researcher will now describe the four components of motivation that Keller postulates. The RBO 880 module uses fantasy like a game (SurFviver) to enable learning using the Internet. This research explores the relevance of a game/fantasy in a adult online learning environment

John Keller synthesized existing research on psychological motivation before creating the ARCS model (Keller et al, 1987). ARCS are an acronym that stands for **A**ttention, **R**elevance, **C**onfidence, and **S**atisfaction. Although this model was not devised as a theoretical underpinning for instructional design, it can nevertheless be usefully incorporated into different models of instruction.

The first and single most important imperative suggested by the ARCS model is that it is necessary to gain and keep the learner's **attention**. This is similar to the first step in Gagne's model (quoted by Kruse & Keil, 1999). According to Keller and Suzuki (1988:412), attention increases perceptual arousal if it is stimulated by the appearance of novel, surprising, out-of-the-ordinary and uncertain events. Keller's suggested strategies include thought-provoking questions and variability (variety in exercises and use of media).

Attention and motivation cannot, however, be maintained unless the learner believes that the material with which he or she is confronted is **relevant**. Kruse (1999) agrees with this, and argues that the training program should answer the critical question, 'What's in it for me?' ". It is important to state benefits clearly. An increase in the degree of relevance derived, for example, from the use of concrete language and familiar concepts will undoubtedly increase motivation. Teachers are encouraged to use examples and concepts that are related to learners' previous experiences and values. They should also present learners with clear outcomes and choose learning content that will remain relevant in the future.

If learners are enabled to succeed, they develop **confidence.** Csikszentmihalyi (1990) states that the level of perceived challenge should balance the perceived level of skill before an optimal state of flow can be acquired. Confidence presents a degree of challenge that allows for meaningful success in conditions of both learning and performance. Confidence generates positive expectations. In technology-based training programmes, students should be given estimates of the time required to complete lessons or a measure of their progress through the programme.

Finally, learners need to be able to obtain some kind of **satisfaction** or reward from the learning experience. They may receive such satisfactions or rewards in the form of entertainment or as a sense of achievement. A self-assessment game, for example, might end with an animation sequence acknowledging the player's high score. A passing grade on a post-test might be rewarded with a completion certificate. Other forms of external rewards might include praise from a supervisor, a raise in salary, or a promotion. Ultimately, though, the best kind of learner satisfaction occurs when they find their new skills immediately useful and beneficial to their occupations. This research explores how Keller's model,

developed in 1987, can be applied in an online environment specifically in the RBO 880 module and if this model can be applied in the same way as in a face to face environment

These and other motivational models and theories show that there are various factors, such as recognition and cognitive interest that may encourage adult learners when they undertake learning activities. In this section, the researcher described what various authors in the field have said about learning motivation. This research explores if the motivation techniques, for adult learners implemented by the facilitator are effective in the specific context (RBO 880). In the section that follows, instructional design will be discussed.

2.6 Instructional Design

Reigeluth (1999: 5) describes instructional design theory as "*a theory that gives explicit guidance on how to better help people learn and develop*". Instructional design principles are central to this study, in that it provides a framework, that enables the researcher to explore the instructional design principles applied by the facilitator of the RBO 880 module, in order to create an optimal online learning environment for learners'

Gagne, Briggs and Wagener (1992), however, describe Gagne's nine instructional events as "the basis for designing instruction and selecting appropriate media". These nine events recommend that one should:

- **Gain attention.** Gagne et al. (1992) argue that one should present a problem or a new situation by "using an 'interest device' that grabs the learner's attention". They use the example of the short segments shown in a television show right before the opening credits, that is designed to keep viewers watching and listening.

- **Inform the learner of the objective**. This allows learners to organize and cluster their thoughts around what they are about to see, hear, and/or do.

- **Stimulate recall of prior knowledge**. Learners should have prior knowledge relevant to the current lesson recapitulated for them before the lesson starts. Learners should also be provided with a framework that facilitates learning and remembering.

- **Present the material.** The information presented to learners should be "chunked" or broken into easily recognisable and remembered units so as to avoid memory being overwhelmed by information overload. An instructor should arrange information to optimise recall.

- **Provide guidance for learning**. This point does refer to the presentation of content, but to *instructions on how best to learn*. This is normally presented in a different way from subject matter or content. It uses a different channel or medium so it can be separated from subject matter. If learners put the guidance that they are given about improving their learning methods into practice, they are likely to experience all kinds of benefits. Their rate of learning, for example, is likely to increase because they will be less likely to waste time and become frustrated as a result of approaching their work in a haphazard, unscientific and random way.

- **Elicit performance**. Let learners actually practise doing something with their newly acquired behaviour, skills and knowledge.

- **Provide feedback**. Give learners well-designed feedback that is based on an analysis of their performance. This can be best delivered in the form of a test, a quiz, or by means of verbal comments. Good feedback is always specific and personalised.

- **Assess performance**. Test to determine whether or not a lesson has been learned.

- **Enhance retention and transfer**. Inform learners about similar problems and situations and provide learners with additional practice that will facilitate their ability to transfer knowledge and skills.

Merrill et al. (2001) postulates instructional design as a technology for the development of learning experiences and environments which promotes and facilitates the acquisition of specific knowledge and skills by students. They further describe instructional design as a technology that incorporates known and verified learning strategies into instructional experiences so that the acquisition of knowledge and skills become more effective and appealing. Instructional design *"involves directing students to appropriate learning activities; guiding students to appropriate knowledge; helping students rehearse, encode, and process information; monitoring student performance; and providing feedback as to the appropriateness of the student's learning activities and practice performance"* Merrill et al. (2001: 2).

Many current instructional models suggest that the most effective learning environments are those that are problem-based and that take the student through four distinct phases of learning. These four distinct phases of learning are: (1) activation of prior experience, (2) demonstration of skills, (3) application of skills, and (4) integration or these skills into real-world activities. Figure 2.7 (below) illustrates these five ideas. Merrill et al. (2001) argue that instructional practitioners concentrate primarily on phase 2 and ignore the other phases in this cycle of learning

Figure 2.5 Phases of Learning
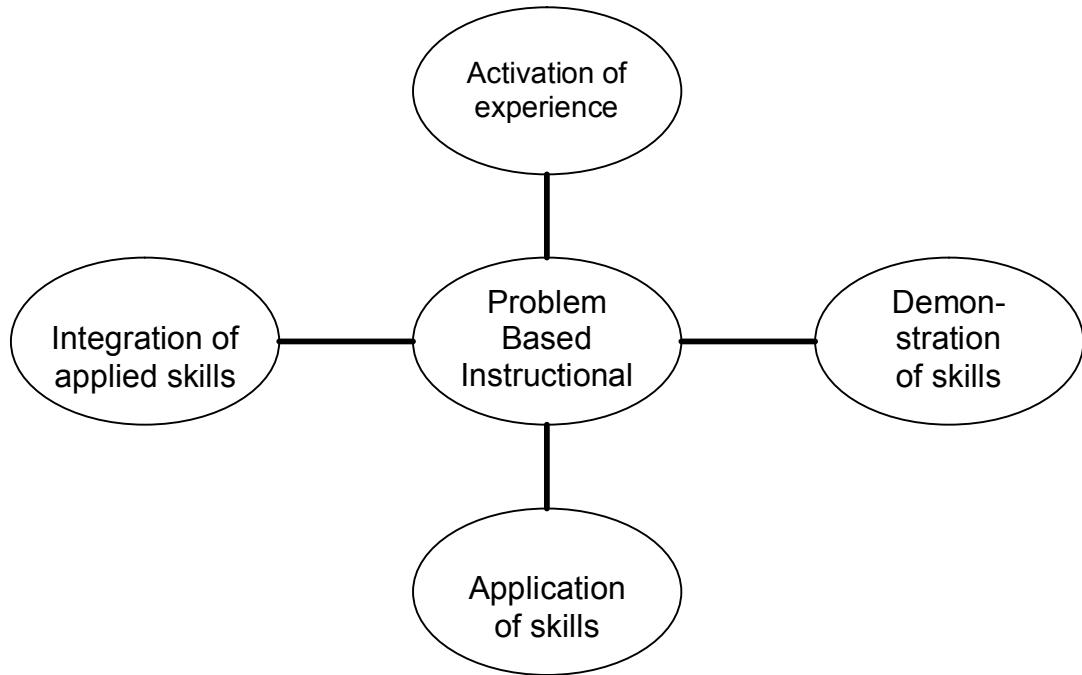
Figure 2.5 (above) illustrates the four distinct phases of learning suggested by Merrill et al. (2001)

In recent years we have seen an explosion of instructional design theories and models (Merrill et al., 2001). According to Merrill et al. (2001), learning is facilitated when *"the learner is engaged in real world problems, when new knowledge and skills are build on the learners existing knowledge, when new knowledge is demonstrated to the learner, when new knowledge is applied by the learner, and when new knowledge is integrated into the learners world".*

Merrill et al. (2005) confirm their research of the constructivist theory of learning when they write that learning is best promoted when a learner:

- observes a demonstration of some skill, activity or solution to a previously defined problem (the demonstration principle)

- applies the new knowledge thus gained (the application principle)

- undertakes real-world tasks in pursuit of knowledge (the task-centred principle)

- activates existing or prior knowledge to solve problems and reach a new understanding (the activation principle)

- integrates the new knowledge into his or her world (the integration principle)

The facilitator in the RBO 880 module uses Merrill's guidelines on instructional design, it is therefore important to explore these guidelines, but also analyse the effectiveness of the particular guidelines in the specific research and context. By exploring, these principles the researcher might find principles that are more effective than others. In the section, the researcher summarised various theories of instructional design.

2.7 Summary

In this chapter, a literature review was undertaken. This literature review comprised an exploration into five different aspects of web-based learning under different headings. In the chapter that follows (chapter 3), the activities and interactions of learners and facilitators will continue to be explored, analysed and investigated. Chapter 3 will also contain a description of the research design and the methodology that will be followed during a properly development research approach of the RBO 880 module.

Chapter 3 – Research Design and Methodology

3.1 Introduction

This research reports only on one main research question: **What can be learnt from the continuous presentation of the module Use of the Internet in Education and Training (RBO 880)?**

The purpose of this chapter is to present and discuss the research design and methodology that will form part of this research study, in order to address the research question. An outline and justification of the research methods utilised in designing, presenting and researching the RBO 880 module, over a period of six years is provided in the remainder of the chapter.

The University of Pretoria presents a module **Use of the Internet in Education and Training** (RBO 880), as part of the M Ed in Computer Integrated Education (CIE) and was initially offered in 1993 as a self-study literature module with no Internet connectivity. The increasing use of e-mail and Web access with each succeeding year, plus some face-to-face contact time changed the course to an Internet Based Module.

3.2 Research methodology

The research methodology in this research is a development research analysis of artifacts, communication, documents and interaction between learners' and facilitator in the RBO 880 module. Virtual communities can be defined as *"social relationships forged in cyberspace through repeated contact within a specified boundary or place"* (Jones & Rafaeli, 2000) or *"social aggregations of people carrying out public discussion long enough, with sufficient human feeling, to form webs of personal relationships in cyberspace"* (Chan, 2004).

Chapter 3: Research Design and Methodology
Using the Internet in Higher Education and Training: A development research study

61

Jones (1997) created a theory to distinguish between a virtual community and a virtual settlement, which is the cyber place where the community resides or the cyber place they inhabit. He further argues that the study of virtual communities compares to archaeology and therefore it is necessary to study the artifacts of the virtual settlement. This is called cyber archeology. Jones states further that archaeologists don't research communities and cultures directly; rather they examine the remains of human habitation. The researcher will examine the remains of the virtual communities in the RBO 880 module, in order to explore what could be learnt from these remains, after the facilitator and learners' 'deserted' the settlement

The artifacts of the RBO 880 module are all available in cyberspace, although some artifacts has 'disintegrated' like artifacts do, the remains might give the researcher a 'story' of activities that were performed in the particular context. All written information and artifacts will be examined and integrated into the evaluation chapter. The researcher uses cyber archeology to do the data analysis. A structured analysis process is followed. The researcher uses the structure of the virtual classroom to guide the analytical process. Screening the documents and artifacts and summarising the data in a separate document, will give the researcher an opportunity to do a thorough analysis. By analyzing each part of the virtual classroom the researcher has the opportunity to explore each part as a whole and each piece of artifact separately.

By juxtaposing similar artifacts, from similar parts in the different virtual settlements, the researcher uses a structured process of comparing the different artifacts and exploring the different material components, which as Jones (1997) states is "*of direct relevance to computer meditated communication (CMC) researchers, archaeologists have also shown that the material components of settlements play a substantial and essential role in many large-scale*

Chapter 3: Research Design and Methodology
Using the Internet in Higher Education and Training: A development research study

62

transformations of human community life. In analyzing the material components the researcher will be able to document the transformations of the virtual settlements.

Jones & Rafaeli (2000) investigate cyber archaeology further and state that the remains of a virtual community can tell researchers about phenomena at many levels of a particular virtual community. Where archaeology is the study of past generations through analyzing the material remains, cyber archaeology can study and analyze the remains of virtual communities. The researcher will use the remains of the virtual settlements to establish interaction levels, memberships through listserv's, tasks and challenges and describe the journey of the RBO module over a six year period. This method will enable the researcher to conduct a thorough analysis of the remains and document the journey of the RBO 880 module.

The Literature Review serves as the entry point for this research study. A qualitative research approach is followed. Greenhalgh and Taylor (1997) argues that it is a qualitative research approach if the aim of the research is to study events in their natural setting in an attempt to interpret phenomena in terms of the meaning people bring to them. The qualitative approach was followed in order to explore and describe what could be learnt by the students in the RBO 880 module the six year period.

Creswell (1998) offers another definition of qualitative research when he said: *"Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or human problem. The researcher builds a complex, holistic picture, analyzes words, reports detailed views of informants, and conducts the study in a natural setting. Research design combines the 'engineering' of a particular form of learning or a particular*

Chapter 3: Research Design and Methodology
Using the Internet in Higher Education and Training: A development research study

63

design with a systematic approach to the study of this form of learning within a particular context"

Merriam (1988) argues that the strength of qualitative research lies in rich and thick description of data.

Denzin and Lincoln (1995) describe all qualitative research as interpretative, because it is guided by a set of beliefs about the world and how it should be understood and studied

This research falls within the interpretative arena because it explores and documents the interactions of students and facilitator, artifacts and communication created by a "virtual community" in an online environment over a period in a specified context (RBO 880).

3.3 Research Design

The design of the RBO 880 module is based on development research as described by van den Akker (1999) as:

- *A focus on broad-based, complex problems critical to higher education, the integration of known and hypothetical design principles with technological affordances to render plausible solutions to these complex problems;*
- *Rigorous and reflective inquiry to test and refine innovative learning environments as well as to reveal new design principles;*
- *Long-term engagement involving continual refinement of protocols and questions;*
- *Intensive collaboration among researchers and practitioners;*

Chapter 3: Research Design and Methodology
Using the Internet in Higher Education and Training: A development research study

64

- *A commitment to theory construction and explanation while solving real-world problems*

According to Brown (1997) this type of research is usually carried out in complex and 'messy situations of actual learning environments, such as classrooms' and in this report research will be conducted within virtual, 'messy 'classroom environment as cited in de Villiers (2001) Cronje states: "I don't want the physical design to be pretty. I want my site to look like real people have made it. I don't want my classroom to look like designer-built programs like WebCT and Egroups. Remember, I do classrooms. There must be dirt on the floor, there must be old posters on the wall that are falling off, and the teacher keeps them because they are so remarkably good and they are the best that they can find. Think real school. The good things just stay there because they are there. It must look like a classroom. Schools are not about aesthetics - that's not good teaching."

Van Ryneveld (2005) argues that design research combines the 'engineering' of a particular form of learning or a particular design with a systematic approach to the study of this form of learning within a particular context.

Reeves etal (2005) argues: *"design research has grown in importance since it was first conceptualized in the early 90s, but it has not been adopted for research in instructional technology in higher education to any great extent".*

Colb et al. (2003) as seen in van Ryneveld (2005) also identify five very similar features that they feel should apply to design research:

- The goal of design research is to develop a class of theories about the process of learning and the design that supports the learning.

Chapter 3: Research Design and Methodology
Using the Internet in Higher Education and Training: A development research study

65

- Design research is highly interventionist by nature.

- Design research creates the conditions for developing theories by hypothesising prospectively about the learning process and by fostering the emergence of other potential pathways for learning as the design unfolds. It furthermore also has a reflective side. This means that the assumptions on which the initial design was based are studied by analysis. If the assumptions are refuted, alternatives can be generated and tested.

- As new theories are generated or refuted, the result becomes an iterative design process featuring cycles of invention and revision.

- The theories developed in the process of design research should be accountable to the activity of design and should provide detailed guidance for organising instruction.

3.4 Research Strategy

The methods and designs described in chapter 3 will be applied in the following chapter. The rich and thick data collected over a number of years in the RBO 880 module will be analysed and scrutinized in order to report and document on the learning that took place. In chapter 4 the evidence collected will support the research question. E-mail and text messages, artifacts, the literature, text and visual documents online and offline will be analysed and documented.

To ensure trustworthiness and authenticity the following measures were put into place:

- Crystallisation according to Richardson (1994) recognises the many possible facets of any given approach to the social world. She explains the triangle of triangulation by using the metaphor of a crystal, and states that the crystal combines symmetry and substance with an infinite variety

Chapter 3: Research Design and Methodology
Using the Internet in Higher Education and Training: A development research study

66

of shapes, substances, transmutations, multidimensionality's, and angles of approach. Van Ryneveld (2005)

- In this research, triangulation is considered to be a process that uses multiple perceptions, from the facilitator Prof Cronje, members/learners' from RBO 880, artefacts and the documented data to clarify meanings and to verify the repeatability of an observation or interpretation. Triangulation served the purpose of reducing the likelihood of misinterpretations and of clarifying the meaning – even though it is acknowledged that no single truth or unquestionable certainty may be found.

3.5 Summary

Chapter 3 contains a description and discussion of the research design and the methodology that will be followed during a properly development research approach which is functional in this particular context (RBO 880) and to address the research question, that falls within the scope of this research study. The researcher explores multiple perceptions, to ensure trustworthiness of data and analyses of the module RBO 880. In chapter 4 the data and artefacts of the RBO 880 module will be analysed, studied scrutinized for information and described. Findings will be based on what the researcher has seen, read and interpreted through the different virtual settlements and lastly recommendations documented during the research study will be presented.

Chapter 3: Research Design and Methodology
Using the Internet in Higher Education and Training: A development research study

67

Chapter 5 – Conclusions and Recommendations

5.1 Introduction

This chapter concludes this development research study with a summary of the research question and rationale of the research, the literature review, and the research design. This chapter will also include a reflective section, namely, a substantive reflection. The substantive reflection combines the findings in chapter 4 with the literature review that is presented in chapter 2. The researcher attempts to construct a balance by providing some critique against the presentation of the RBO 880 module as part of the conclusions. Lastly, the chapter will close with some recommendations for practice, recommendations for further research, and recommendations for further development work.

This research focuses only on the following research question: **What can be learnt from the continuous presentation of the module Use of the Internet in Education and Training (RBO 880)?**

The people who will benefit from this research are:

- course facilitators
- students past and future
- the system itself
- future researchers
- Organisational Design specialists

The rationale for this study is to explore the learning aspects in presenting an online course where adult learners have the opportunity to participate in various activities pertaining to, but is not limited to the discovery of constructivist, collaborative and cooperative initiatives and tasks, focussing the learners to build and be members of virtual communities in an online environment. Through this module that is presented online learners' expands their reality by going from the

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

109

unknown to the known, by applying own skills and skills gained, interacting with fellow members and the instructor during the time the module is presented.

The research study documents, explore and attempts to understand the learning theories, instructional design principles, elearning elements and virtual community principles applied in the RBO 880 module presented at the University of Pretoria over a period of six years. The instructor concurred with Merrill (2001) guidelines of Instructional design principles and these will be discussed in the chapter.

5.2 Substantive Reflection/Conclusions

5.2.1 Conclusion 1 - The Concept of E-Learning

The RBO 880 is presented online and used the online environment to expose the learners manoeuvring and gain vital life skills in a possible new way of learning. Brandon Hall (2004) defines *e-learning* as instructions that are delivered electronically whether through the Internet, an intranet or other platforms, for example CD-ROM. Henry (2001:249) in (van Romburgh, 2005) defines e-learning as "*the appropriate application of the Internet to support the delivery of learning, skills and knowledge*". Kozma (1987:22) as seen in (Cronje 1997) goes further and says that "*to be effective, a tool for learning must be parallel to the learning process; and the computer, as an information processor, could hardly be better suited for this*".

Through the exploration of the cyber-artefacts it was found that the RBO 880 module changed in structure, in 1997 to mirror changes in the virtual realities of the particular time. As such it moved from a lecturer centred environment, through stages of simplicity and an esthetical composition towards a fully interactive environment where students were not only in control of their learning,

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

110

but also co-responsible for guiding the learning experience of the rest of the group. In this way Cronje, the facilitator succeeds in giving students exposure not only to basic web teaching issues, but also to vital life skills surrounding team work and interdependence between colleagues in an online environment. It is also evident from Exhibit 4.1 in chapter 4 from the facilitators welcome note that all instructions happens online.

This leads to the conclusion that the RBO 880 module exposed learners to a true online environment and stays true to the importance of e-learning and learning environments in cyberspace. However Knapper (1988) as cited in de Villiers (2001) argues that adult learners are likely to have more insecurity about learning as a result of financial, work barriers and friends and family's lack of support. These pressures can result in high drop-out rates. With regard to family and work-related barriers, some of the students got voted off or dropped-out from the course, due to the demands of a total online learning environment and factors described above.

5.2.2 Conclusion 2 – Virtual Communities

Jones (1997) created a theory to describe the difference between a virtual community and the virtual settlement, which is the cyber place where the community resides or the cyber place they inhabit. He further argues that the study of virtual communities compares to archaeology and therefore it is necessary to study the artefacts of the virtual settlement. This is called cyber archaeology according to Jones. The first step of the cyber archaeology is to define and characterize the virtual settlement.

The RBO 880 module subscribed to most of the conditions and definitions of virtual communities set out by Jones (1997) and, Lee et a 2002. The RBO 880 learners belongs to the Yahoo and e-groups as seen as an example in exhibit

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

111

4.3 in chapter 4, this constitutes a place where learners are members of a specific group (community) and interact with one another on a regular basis, supporting the condition of Jones that virtual communities have to have a minimum level of interaction and variety of communications. The facilitator and learners' construct a site where they can have a virtual common-public-space where a significant part of community interactions can occur. The virtual classroom, in the RBO 880 module is the common-public space where members can meet and interact.

The RBO 880 module has sustained membership in that the module is presented online and that the learners have to be a member of the community in order to participate and contribute in discussions, receives tasks and submits deliverables; this is another requirement from Jones (1997). Lee et al (2002) attempts to create a general working definition for virtual communities by combining existing definitions from literature. The combined definition is "a technology-supported cyberspace, centred upon communication and interaction of participants, resulting in a relationship being built-up". The learners of the RBO 880 module compel the topics and have the opportunity to influence the facilitator on how the direction of different topics/challenges should proceed

Cyber Artefacts from the continuous presenting of the RBO 880 module conclude the fact that virtual communities and relationships exists during the presentation of the module and that technology, membership groups learning spaces and work area's are used to support the virtual communities. The learners had no choice to be part of the virtual community or not. The learners' were forced to participate in a specific space and become a member of a team that they not necessarily wanted. Learners' were forced to have a minimum level of interactivity, as clearly indicated by Exhibit 4.4 in chapter 4

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

5.2.3 Conclusion 3 – Learning Theories

The framework of the learning space, in the RBO 880 module is constructed by the instructor and learners'. The students have to expand within this realm and "construct" their own personal space and thus create an environment which would reflect their newly acquired insights. Cunningham, Jonassen (1991) supported by Siegel and Kirkly (1997) and recently Chien Sing (1999) describes the key characteristics of constructivism as:

- active participation by learner

- recognition of complexity

- multiple perspectives

- real-world context

Constructivist theory states that learners are active, this ties in with Bonwell and Eison (1991) that argues that: "… to be actively involved, students must engage in such higher-order thinking tasks as analysis, synthesis and evaluation". Within this context, it is proposed that strategies promoting active learning be defined as instructional activities involving students in doing things and thinking about what they are doing. Ward (1995) states further that: When we think critically we become active learners". She elaborates and argues that "Instructional products must challenge learners to be active participants in the knowledge construction process, rather than passive recipients of 'pre-packaged knowledge'. The learning context in the RBO 880 did not stagnate, but grow continuously over time. The reflective nature of the facilitator did not exclude going back to previous approaches should that prove to be better. In this way the role of reflective practitioner is modelled to students. Cronje (2000), as cited in de Villiers (2003) the instructor emphasised that:

"My classroom is a messy lot of stuff. It is like squatter camps on the information highway. Everything and anything goes."

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

113

I don't want the physical design to be pretty. I want my site to look like real people have made it. I don't want my classroom to look like designer-built programs like WebCT and Egroups. Remember, I do classrooms. There must be dirt on the floor, there must be old posters on the wall that are falling off, and the teacher keeps them because they are so remarkably good and they the best that they can find. Think real school. The good things just stay there because they are there. It must look like a classroom. Schools are not about aesthetics - that's not good teaching. (Cronje cited in De Villiers 2003)

Learners engage, naturally grasp, and seek to make sense of things. Constructivism is defined when learners do more than absorb and store information. Learners construct tentative interpretations of prior knowledge and go on to elaborate and test what they determine. Learners cognitive structures are constructed elaborate and tested until they establish a satisfactory configuration. Metaphors, like the "phantom of the opera" in the RBO 880 module are exploited to help students reflect and construct meaning from the development of their environments and reach a satisfactory configuration (Ward 1995)

The tasks in Table 4.1, as described in chapter 4 depicts that the RBO 880 module consisted of individual and group tasks for which marks of equal weighting were allocated. "Class participation" through the e-groups played a huge role in grading. The individual assignments for example was for each student to create their own learning space (desk), group tasks like building the "Phantom of the Internet" encouraged collaboration among the students. Learners play an active role in the direction and or change in group or individual tasks. In the 2002 *Cybersirver* game learners were divided into tribes and had to use cooperative and collaborative learning to "survive"

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

114

Collaborative learning are defined by Hiltz (1995) as a process that focuses on co-operative attempts among instructor and students, and highlights active involvement and dealings of instructors and students. Knowledge is seen as a social construct, although the education procedures are assisted by social interaction in an environment that assists in group interaction, assessment and collaboration. The *CyberSurfiver* game in 2002 is a prime example of collaborative and cooperative learning during the presentation of the RBO 880 module Johnson and Johnson (1991) recognize prerequisites for successful cooperative learning. Ten years later Van der Horst and McDonald (2001) and more recently Gravette and Geyser (2004) cited the following prerequisites:

- a mutual goal

- positive interdependence

- Individual accountability.

- Interpersonal and Small group skills

- Group Processing

All these prerequisites can be identified in the RBO 880 module and mutual goal and individual accountability are discussed as examples. Learners have a mutual goal, for example the tribal challenge and immunity challenge in the 2002 *CyberSurfiver* game. Learners get voted off in the same game if they did not take individual responsibility and finish challenges on time. The RBO 880 module takes constructive, cooperative, collaborative and active learning theories into account when the instructor designed and developed the activities and challenges. This enabled the learners to explore and expand their knowledge of learning theories applied this in practice and expand their current realities. Literature suggests that web-based classrooms have the potential to be extremely effective, especially in the way they can be used to support collaboration.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

115

It is, however, necessary to test whether the benefits are indeed what literature claims them to be. (Reeves 2000)

5.2.4 Conclusion 4 - Adult Learning and Motivation

Cronje (2001) states that adult learners, recognises various metaphors of which the RBO 880 modules were composed. Learners consciously engaged in the role-play that was necessitated by the metaphors without being told overtly to do so. The instructor nevertheless they remained adult learners in their response to their virtual environment by actively challenging its constraints. Therefore concurs with Brookfield (1986) that Adult learner's necessity of critical reflection on life as a whole and in this case the virtual classroom and it's activities. On the other hand, they found the emailed lectures, and tasks on the virtual classroom site which had no underlying metaphor unsatisfactory and boring. They responded more positively to the tasks that had a metaphoric underpin. The instructor identified key issues of learning and focused students learning in that direction.

Learner time and effort was not wasted on peripherals, concurring with Goodlad (1984) that challenges should be practical and problem centered. Individual tasks are designed so that learners could build on what they have learned in the individual tasks and apply it in the group work; this promotes positive self-esteem, in that adult learners experience that they contributing value to the group (Brookfield 1986). Group work includes collaboration amongst the learners and the instructor

.

It would seem, Cronje (2001) further argues: "*that placing learning materials for adult learners in a pre-packaged instructivist learning shell such as those that are currently winning popularity may create an impoverished learning*

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

116

environment, for Adult learners in which the creativity and imagination remains unchallenged".

The main contribution of the strong use of familiar metaphors, like the virtual classroom and *CyberSurfiver*, based on the popular TV series Survivor are also to allow choice and self-direction. People could vote, change rules and influence the direction. This according to Goodlad (1984) promotes positive adult learning situations.

The instructor kept the design of the environment flexible and creative to maintain motivation. He, Cronje made the design principles functional and practical to eliminate the risk of focus deviation. This is evident in the artefacts where learners have no guidelines on how their desks should look like or that they cannot challenge tasks set by the instructor

Intrinsically motivating activities are those in which people will engage for the sake of interest and enjoyment. Malone and Lepper (1987) integrated a large amount of research on motivational theory into a synthesis of ways to design environments that are intrinsically motivating. They argue (1987) that intrinsic motivation is stimulated by four qualities, namely challenge, curiosity, control, and fantasy. The RBO 880 module challenged learners' ability to function in an online environment. The instructor stimulates the learner's curiosity by setting challenges and created more metaphoric environments. In 2002 the instructor took the RBO 880 module to a next level by creating a game based on the popular TV series Survivor. Through this change/challenge the instructor created a fantasy and learners wanted to know more and experience the controlled environment, they were motivated to experience something different and influence the direction of the game. Metaphors also grab the attention of the

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

117

learners, and the game *Cybersurvifer* for instance let the learners have voting rights, tribal councils and the like.

The virtual classroom which reflected a real learning space made it relevant for students to understand that the virtual classroom is a place where they could work and learn. Exploring and expanding their realities regarding online learning gave the learners the opportunity to gain confidence in an environment that is not familiar to them. RBO 880 gives learners the opportunity to experience learning in a different environment, learners receives marks that was added to their total credit score for their Masters in CIE degree, this is part of the module contributed to the satisfaction need learners have. Attention, relevance confidence and satisfaction are all aspects of Keller's (1987) ARCS motivation model.

Learners from the RBO 880 model experienced adult learning principles designed into all the activities and challenges the instructor used different motivation models to challenge the learners and keep them motivated to wrap up the RBO 880 module as part of their Masters degree. However the classroom metaphor might not be the best environment for adult learners. Learners' were graded and marks were allocated, not necessarily the best way to assess if adult learners, are acquiring the skills for their 'real life' environments. Intrinsic motivation happens if people are interested and if they enjoy the activities (Malone &Lepper, 1987), some learners were board and if they are not confident in the learning processes they get de-motivated (Keller and Kopp, 1987) as cited in de Villiers (2001)

5.2.5 Conclusion 5 – Instructional Design Principles

Many current instructional models suggest that the most effective learning environments are those that are problem-based and involve the student in four distinct phases of learning: (1) activation of prior experience, (2) demonstration

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

118

of skills, (3) application of skills, and (4) integration or these skills into real world activities. Merrill (2001) further argues that instructional practitioners concentrates primarily on phase 2 and ignores the other phases in this cycle of learning. Cronje (2006) describes Merrill's six guidelines for instructional design, the researcher elaborates as follows:

- *Learning is constructed from the experience of the learner*. That was the reason why the instructor in the RBO 880 uses familiar metaphors like a virtual classrooms, games and simulations, to keep the learners motivated and expand their realities regarding new learning spaces.

- *Interpretation is personal*. Based on their own knowledge and experience individual learners make different interpretations of the same material. The instructor was flexible regarding the guidelines on how a learner should construct their own learning spaces (Learner desks)

- *Learning is an active process whereby experience is converted into knowledge and skills, instead of being "taught".* The instructor in the RBO 880 gave each learner the opportunity to contribute and add value to the process, the statement "don't switch off the lights" in his welcome note gives the students the chance to carry on in the working space without the instructor's 'supervision'.

- *Learners should be given learning tasks that they can only complete by acquiring the prerequisite knowledge and skills.* Knowledge is situated in real life and that is where learning should take place. By using "real life" metaphors learners' gains knowledge and skills that they will be able to apply in their own working environments. However further research needs to be done in order to determine in what way learners' who acquired the skills in the RBO 880 are applying it in their current working/life environments.

- *Learning is collaborative and enhanced by multiple perspectives and Testing should be integrated with the task*. Mutual dependence was built

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

119

into the design. The module consisted of individual and group tasks for which marks of equally weighting were allocated. "Class participation" through the e-groups played a huge role in grading. The individual assignments for example was for each student to create their own learning space (desk), group tasks like "building" the "Phantom of the Internet" encouraged collaboration among the students. Learners play an active role in the direction and or change in group or individual tasks. In the 2002 *CyberSurfiver* game learners were divided into tribes and had to use cooperative learning amongst tribe member to survive.

The instructor of the RBO 880 module followed the six Instructional Design guidelines from Merrill and made the RBO 880 module a true learning experience for all the learners. However there is not a process in place to indicate if learners are applying the skills they acquired in the RBO 880 module in 'real life', which is one of the distinct phases of learning (Merrill 2001). Some learners got demoralised to work in a group either because learners' did not pull their weight or bickered endlessly. According to Keller and Knopp (1987) as seen in de Villiers (2001) adult learners will loose motivation if they not sure about the instructional design principles.

5.3 Recommendations

5.3.1 Recommendations for further practical application

- Learners should be aware of the technology requirements to participate in a module that is presented online.
- A short technical skills course (HTML, FTP etc) might be useful to assist the learners in gaining experience in different languages and applications and it might serve as a refresher for learners that have experience in these applications and technical skills.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

120

- Adult learners appreciate clear guidelines of what are expected of them. Time should be allocated in an online course for thorough face to face interaction before the start of the online module.

- 'Lessons learned' document might be created. This can't form part of the outcomes of the module. The document should be updated throughout the module and can serve as part of the designing process in creating the next presentation of the RBO 880 module.

- Dynamics in a team are very important, teams should be well formed and expectations of team members managed. Team members should receive clear guidelines on how the team structure will work as well as rules in the team and the instructor should make time for social interaction between learners' and instructor.

5.3.2 Recommendations for further development

- The Metaphor of a virtual classroom should be further developed and assessed if this environment is conducive for adult learning and motivation

- The internet is powerful tool, the instructor and learners should develop the RBO 880 module and test its application in the commercial environment , the question of this online course and its relevance in the market will be answered

- Further development is necessary to design the learning space, group and individual tasks/challenges. Input from external, possible objective users, the instructor and learners' participating in the online course should all form part of the designing and development team.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

121

5.3.3 Recommendations for further research

- Future Researchers may want to investigate the different learning strategies and theories and explore the importance and implications of each in an online environment.

- Further investigation is needed to explore the social structures, within theses virtual communities and how it applies in 'real life'.

- The metaphor of a virtual classroom should be explored and establish if this environment is conducive for adult learning.

- Equal weighting was given to group and individual tasks; further studies might establish a better way of grading learners' in terms of group work and individual assignments.

- Future research may show what happened with each learner that participated in the RBO 880 module and assess the skills gained in this particular online environment and establish how they apply it in their current realities.

5.4 Summary

Chapter 5 concludes the development research study, for the RBO 880 module, in this chapter the findings and analysis in chapter 4, combined with the literature review in chapter 2 formed the conclusions reached through the analysis process and lastly recommendations are proposed for future researchers, learners, facilitators organisational design specialists, online content and curriculum designers.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

122

Chapter 4 - Findings

4.1 Introduction

In chapter 4, the researcher analyses selected aspects of the design, development and implementation of the RBO 880 module from an exploration of a selection of its artefacts. As a prelude to each facet of this analysis, the researcher will present and explore a cyber artefact (which, in terms of the central metaphor of this research, is an electronic document) retrieved from the cyber archives. In this archive is stored a great variety of electronic source documents representative of the six years during which the module RBO 880 has been presented as a required component part of the master's degree in Computer Integrated Education (CIE) at the University of Pretoria.

The original designer, implementer and presenter of the RBO 880 module, Professor Johannes Cronjé (hereinafter referred to as "the facilitator", "the instructor", "the presenter" or "the course presenter"), currently holds the post of professor of education at the University of Pretoria where, amid a variety of other responsibilities, is also supervisor of the course that is investigated in this research, the master's degree in Computer-Assisted Instruction (of which further details are available at http://hagar.up.ac.za/catts/abccv.htm).

The archives of the course contain a great variety of documents that reflect transactions between the course presenter (the facilitator) and the learners', and between the learners' themselves. These documents reflect a variety of different activities, intentions and modes of writing, as well as the phases through which each of the learners' passed as the course developed from inception to termination in each of the years of its presentation.

The findings include critique from the researcher and other sources, and an exploration of what was achieved and learned during the presentation of the RBO 880 module by learners and instructor alike.

Since 1997 this course has been offered as a web-based course, and it holds the distinction of being the first entirely web-based course offered by the University of Pretoria in South Africa. Because it was the very first web-based course offered by the university, the presenter designed it so that it would develop through various experimental and constructional stages or iterations.

Each of the stages would be subjected to intense analytical scrutiny during and at the end of each of the years of course's presentation. Because most of the essential components of the course were experimental and therefore subject to constant scrutiny and critique by the participants themselves, all information flowing through the course would inevitably circle back through the system in one way or another and be subjected to analysis, reflection and redesign. Whatever the presenter learned from the successes and weaknesses revealed during each year of presentation would influence the representation of the course in the subsequent academic year to a new group of learners'.

It is important therefore to reflect on the successes and difficulties of these early years in the context of the experimental intention of the course designer. One of the presenter's core ideas was that the learners' themselves would be responsible, through their projects, assignments and interactions with one another, for constructing a great deal of the locations on the common site on which the educational transactions took place between presenter and learners' and among the learners' themselves. Another one of the presenter's core ideas was that the learners' should *learn by doing* – an approach that compelled

learners' to interact with one another not only to learn basic computer and Internet techniques (most of which were out of the ambit of casual computer users), but also to complete tasks and assignments under enormous pressure. The pressure under which learners' worked (and still work in the course) is an intentional feature of the course design. It creates an atmosphere in which (unless one was already extremely skilled in the techniques and methods required by the course) one would either sink or swim. Although the urgent necessity to cooperate with other learners' in the course is still immense, the pressure on the first learners' who enrolled for this course was legendary. The impossibility of working alone to complete what needs to be done in order to graduate is an intentional design feature.

Some of the most important tasks and assignments in each year are deliberately designed to *compel* learners' to cooperate and work closely together to achieve their common goal and to supplement one another's knowledge and understanding. This working together in order to achieve a common aim and assist one another to attain the goal was also not an accidental feature, but is one of the foundational pillars of constructivist pedagogy, on which the course is based. I shall return to these points later in this chapter.

According to De Villiers (2001), the general learner outcomes for the RBO 880 module are to enhance Internet literacy, to become familiar with all the techniques, methodologies and processes necessary to pursue tertiary level education on the web, and to construct and maintain appropriate learning environments by using resources obtained and downloaded from the Internet. The ultimate intention of the course is that the successful student will end up knowing how to use the most essential forms of communication and computer technology to teach and learn and to construct and maintain web-based facilities for the pedagogical support of text-based learning or for the learning presented

completely through the medium of the Internet. All this is intended to be achieved by learners who are often physically remote from one another and have been compelled by the pressures of the course to work collaboratively with one another as they build constructive learning environments through the Internet and acquire the theoretical and practical knowledge that they need to master computer-mediated communication as a tool for managing and facilitating resourced-based learning.

Kozma (1987:22), quoted by Cronje (1997), says that *"to be effective, a tool for learning must closely parallel the learning process; and the computer, as an information processor, could hardly be better suited for this"*. Cronje (1997) argues that "when, one wants to design a learning task where the objective is the linking of knowledge and navigating through information, the Internet becomes the ideal (virtual) learning environment".

Since 1997, the central feature of the module has been a virtual online classroom which is the convergence point for all the activities of the course. De Villiers (2001) summarise some of the features of this virtual classroom.

- While web-based course material was provided, very little or no face-to-face contact took place.
- Student communication and discussion took place through the medium of a dedicated list server (an e-mail list) and personal e-mail exchanges between learners'. In later years some learners' took the initiative to create Yahoo! groups as a forum in which to exchange views among themselves and between themselves and the facilitator. Access to these groups was effected through links in the virtual classroom.
- Student "handed in" their e-projects on websites and pages that they themselves had created and that were linked to the virtual classroom.

Chapter 4: Findings
Using the Internet in Higher Education and Training: A development research study

- The virtual classroom also contain information about longer-term collaborative and cooperative projects that learners' were expected to complete in addition to whatever individual work they were doing.

Cronje (1997) notes that the architectural features common to most institutions include a main entrance, an administration block, lecture halls, a library, sites and buildings for ancillary services and for recreation. The virtual classroom that is the centrepiece of the module being described here contains metaphorical or virtual equivalents of most of these features.

The conclusions drawn from the analysis undertaken in chapter 4, as well as recommendations drawn from the research, will be presented in chapter 5.

4.2 Tools and Technology

4.2.1 The blackboard, the instructor's desk, the resource cupboard and other features of the virtual classroom

The main component of the virtual classroom was a website that corresponds to the physical part of a real classroom. Because this website contained all the virtual equivalents of the physical accessories of a course such as basic course information, orientational information, resources and instructions, there was no need for learners' to travel to the university to be present in actual physical locations for the purposes of study. The classroom website, located at http://hagar.up.ac.za/rbo/classrm.html. , was initially stored on an experimental Unix-based computer server located at the University of Pretoria. In later developments of the course, the Unix operating system was replaced by Windows NT (de Villiers 2001)

The virtual blackboard was an image file on which there was a minimum of text at the beginning of each year. Learners were invited to access this file and change it in whatever way they wished. This facility simulated the graffiti to which learners' are attached and which may be found inscribed on desks and in other places in real classrooms. Since it is a convention to inscribe homework instructions on a blackboard in a traditional classroom, the virtual blackboard contained whatever assignment instructions learners' needed. By clicking on a link, they could also open an online study guide. The blackboard also contained information about the course. This is examined in the next section.

4.2.2 Course information

The course was introduced to the learners' by the instructor in a short description of what they might expect from the RBO 880 module. Learners' could only

receive this information via http://hagar.up.ac.za/rbo/***specific year***/welcome.html because, in the early days of the course, there were no face-to-face interactions between the instructor and the learners'. Exhibit 4.1, the first of our virtual artefacts from this virtual classroom, shows one of the instructor's welcome messages to learners'. It contains a welcome note and an explanation of what learners' might expect to find on the site. From 2000 onwards, welcoming notes from the instructor were no longer necessary because preliminary orientation to the course took place in a one-off face-to-face session at the university.

There was a strong emphasis on the welcome note on the fact that the course was under construction and that the construction process depended on the learners' themselves. A link on the welcome page led the learners' to the virtual classroom, to which all of the learners' possessed " keys" and which they could therefore enter at any time. As a specific place in the virtual classroom, there was information about the syllabus, due dates, and the individual and cooperative tasks that learners' were expected to perform as part of the course requirements. The instructor himself, as well as each student, possessed a virtual desk which was designed to be a place in which each participant and instructor himself could store personal information in electronic form. There was also a resource cupboard in which participants could find interesting, stimulating and informative resources relevant to the course.

Cyber Artefact Exhibit 4.1 A cyber artefact: an early welcome note from the instructor

---

Welcome

To the module of Computer-Assisted Communication and Management. . As you know the whole course will be presented on line.

To this end a Virtual Classroom has been created.

All of you have keys to the classroom and may visit whenever you wish.

You will notice that the classroom is under construction. This is because YOU will be helping to construct it. In the process you will also be helping to construct the learning of your fellow learners'.

In this way you will be seeing the virtual classroom expand before your own very eyes.

You may, for instance wish to write on the board, by altering the file "hagar.up.ac.za/catts/ole/rbo1998/board1.jpg"

Directly above the board you will find links to the syllabus, individual and cooperative tasks, as well as the deadlines.

You may approach the instructor's desk and send email to him from there.

Your learning tasks involve filling your own desk with specific information, linking your Cooperative project to the portfolio box and doing a one month project.

You will also find various interesting resources about Web-based learning in the Resources cupboard.

SOME CAUTIONS

Please remember that, like in any real classroom, none of your possessions are <u>absolutely safe</u>, so *keep backups at home!!!*

You all have keys to the classroom, so you can go in there and put up your own posters, or work at your desks or on your portfolios. Please do this responsibly and without damaging other learners' property.

DONT turn off the lights when you leave

4.2.3 Meeting time and location

Our following artefact is an example of how the instructor scheduled asynchronous and synchronous times at which learners' could meet and interact. Cyber Artefact Exhibit 4.2 shows how instructor scheduled a particular meeting. The time of the meeting ("Whenever it suits you") illustrates one of the characteristic advantages of online environments. This feature is crucial for learners' who are studying part-time and who are also involved in other commitments and obligations such as full-time day jobs, child-rearing and minding responsibilities, and responsibility for the care and maintenance of other people.

Cyber Artefact Exhibit 4.2   Asynchronous and synchronous meetings and interactions

Meeting and Location
Day: Saturday 5 February 2000.
Time: Whenever suits you
Place: http://hagar.up.ac.za/rbo/2000/welcome.html

De Villiers (2001) notes that information from the Internet tends to flow in one direction unless learners take control over the informational paths through which they navigate. The two-way movement of information was effected in this course by means of a dedicated e-mail list for all members of the class, and later by means of Yahoo group lists initiated by learners'. Cyber Artefact Exhibit 4.3 (below) illustrates the e-mail interface at which the learners' and instructor communicated with one another. The list was also the place in which learners' could not only communicate and interact, but also the place where they could exchange information, assist one another, expressed personal feelings and reactions, and get feedback from one another and from the instructor to augment

their learning experience. The unique features of the e-mail list provided a didactic forum based on constructivist principles and encouraged learning methods (such as group cooperation to achieve learning goals) that conformed to the constructivist paradigm.

Finding 1 Tools and Technology – negative experiences by learners

Although RBO 880 module was the first entirely web-based course of the university, the instructor and university did not take into account the level of student demand that the course would create, or the tools and technology that would be necessary to facilitate participation in an online module.

A professor who enrolled for a web-based course but who dropped out because of his busy schedule, made the following observation:

> *"The things that made me a dropout are the same things that make the Web so compelling. The beauty of "anywhere, anytime, wherever you want," too readily turns into not now, maybe later, and often not at all. Lacking a dynamic instructor, powerful incentives, links to the job and fixed schedules, web learning is at a dramatic disadvantage in capturing and holding attention"* (Rossett 2000, quoted by De Villiers 2001).

Cyber Artefact Exhibit 4.3   Example of the interface of an early e-mail list
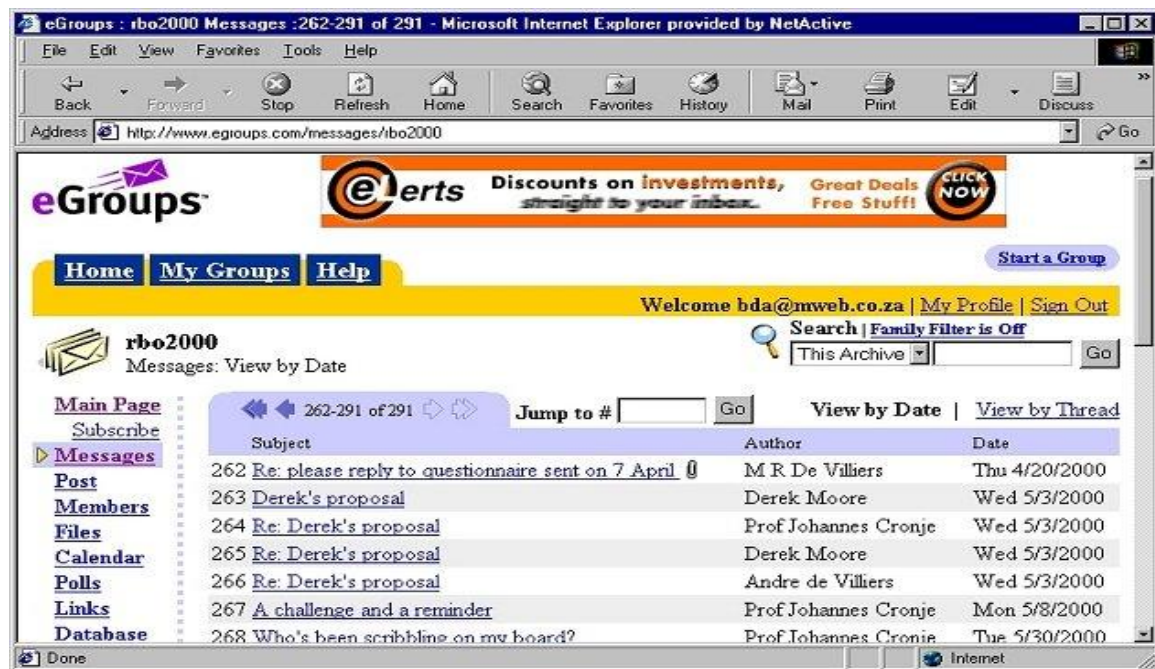
This artefact shows that the learners' very quickly took control of their own learning environment by proposing courses of action, questioning one another, and assisting one another because they soon realised that that was the only way in which they would achieve the goals of the course. This is an example of what happens when learners' are compelled to cooperate to achieve a common goal.

The RBO 880 module was first offered by the University of Pretoria in 1993 as a face-to-face course. Since its appearance is an online course in 1997, the instructor and learners' began to communicate by means of the Internet, dedicated e-mail lists and e-groups on Yahoo. All the instructions that learners' needed were available at the meeting place: http://hagar.up.ac.za/rbo/2000/welcome.html. Artefacts from this time show that specific groups met regularly at specific places on the web either asynchronously or synchronically.

Some early learners revealed that they neither enjoyed nor benefited from these discussion lists to which all members of the online community subscribed. The reasons for this are open to speculation. Cyber Artefact Exhibit 4.4 contains quotations from De Villiers (2001) that bear this out.

Cyber Artefact Exhibit 4.4   Quotations from learners (De Villiers 2001)

> *"I did not really benefit from the listserv. It seemed to be more of a waste of time than anything. I suppose it would work better with different people conversing. Participants only seemed to respond to things that either got them really angry or if they were interested enough to respond (formal learner)."*
>
> *"There was irrelevant bickering and chat on the listserv."*

Finding 2 Technology - Online without face to face interaction
The RBO 880 module changed its structure to mirror changes driven by technological progress in the virtual realities of that particular time. It moved from being a lecturer-centred environment through various stages of simplification and minimal aesthetic adjustments towards becoming a fully interactive environment in which the most successful learners' not only took control of their learning, but also took responsibility for helping and guiding other members of the class. In this way Cronje succeeded in inculcating in learners' not only basic web teaching and learning skills, but also those crucial personal and communication skills that

are essential for successful teamwork and that depend on a functional interdependence and symbiosis between colleagues in an online environment. Exhibit 4.1 shows the course was presented online and that face-to-face interaction was kept to a bare minimum.

4.2.4 Assignments/tasks and examinations

The first task that faced the presenter and learners of the RBO 880 course was the construction of a site that would be a virtual learning environment. Cyber Artefact Exhibit 4.5 shows the site under construction. There is a didactic purpose in the *construction* aspect of the site because it was the intention of the designer right from the beginning to get learners' to use their *own* productions and artefacts to populate certain areas of the site. The site would therefore become more and more "constructed" as learners' posted more and more of their own materials, achievements, assignments and documents to the site. This is exactly how the site has developed.

Cyber Artefact Exhibit 4.5   Site under construction

The Virtual Construction Site

Warning: Hard Hat Area: Enter at your own risk

The striking graphic depicted in Cyber Artefact Exhibit 4.5 illustrates the intense effort that the learners' need to put into their projects and their mutual assistance in order to achieve their goals. The graphic in this artefact is an apt illustrative

metaphor of constructivist learning which is more like a construction site on which many people are employed rather than a solitary desk at which the student works alone or the ivory tower in which the academic broods and works without interruption. The metaphor works both on and unconscious and a conscious level. The conscious level invites learners' to become co-workers with other learners' — construction workers creating their own meanings and destiny.

The indication of meeting times being whenever a student may be available criticises, by implication, the temporal, spatial and constructional limitations of real-world classrooms which, however commodious and well endowed, are always limited by their physical features and by the limitations of a single instructor attempting to fulfil the educational needs of a large class of people.

The principle of moving from the known to the unknown is exemplified here. The learners' begin with a metaphorical classroom depicted as a construction site. This immediately alerts the user to the fact that this kind of education is democratic rather than elitist, and that it will only succeed through cooperation rather than the one-way imposition of information from teacher to learner. It is in this way that the learners' in this course are encouraged to move beyond the typical constraints of face-to-face educational settings to exploit the almost limitless opportunities afforded by the new medium.

Finding 3 – Constructivist approach

The framework of the learning space is constructed and semantically framed by the instructor by the use of a deliberate metaphor that evokes the communal effort of skilled people to achieve the final goal and destination of the site (the completed building — which, metaphorically speaking, represents completion, finality, closure, and, most important of all, success in achieving the goals of the

---

Chapter 4: Findings
Using the Internet in Higher Education and Training: A development research study

course). Learners' are asked to share their activities within this realm and "construct" their own personal learning spaces, thus helping to create linked environments that reflect their newly acquired insights, achievements and skills. The central metaphor here (the construction site) imprints upon learners' the necessity for working skilfully together in a deliberate and considered framework to develop the environment and achieve their aims.

Learners' were given various tasks and these tasks were designed by the facilitator to ensure that, once they had been completed, learners' would undoubtedly possess the skills they required to accomplish their required outcomes. The course was divided into three units, each of which had its own tasks and assignments that the learner would have to master before he or she could demonstrate the learning outcomes. Retrieved artefacts containing examples of content from 1999 and 2000 are given for each unit in Cyber Artefact Table 4.2 (De Villiers 2001).

The outcomes for these same learning tasks are presented in Cyber Artefact Table 4.3 below. Tasks were divided into individual and group tasks respectively. The design also devised intermittent collaborative tasks that learners' had to complete at specific times throughout the module. These tasks were all aligned to relevant unit standards and they all addressed the different critical outcome requirements.

Cyber Artefact Table 4.1 Tasks retrieved from selected pages of 1999 and 2000 instructions (De Villiers 2001)

	1999	2000
Tentative reading assignments	▪ Find out what is meant by *constructivism*. ▪ Work through last year's Virtual Classroom on Online Learning. ▪ Work through Kathy Murrell's Interactive Instructional Material Research and Resources. ▪ Familiarise yourself with Hypertext Markup Language (HTML) by working through Cathy Murrell's Guide to HTML.	

Unit One	*Individual tasks:*
	▪ Build your own "Virtual Desk" and fill it with the following:
	  ▪ Your ears (Mailto: ...).
	  ▪ Your utility bag (Links to handy stuff such as HTML editors, Search Engines, Clipart Libraries, etc.) .
	  ▪ Your textbooks (Links to useful sites).
	  ▪ Your work (Interesting stuff you have done in other MEd modules).
	  ▪ Your hobbies (Links to sites of special interest to you).
	  ▪ Your class work (Your answers to all the objectives of the course).
	  ▪ Your portfolio (A link to the portfolio of your examination project).	

	Individual tasks: ▪ Download Macromedia Dreamweaver from the WWW and install the 30 day trail version on your computer. You can use that to make all of what you need to make for this course. You may, of course use any other HTML editors or even tag it by hand. Make a clickable concept map of the concept "The Internet in Teaching and Learning". The hot spots on your concept map should lead to various useful links on the WWW where a visitor may obtain further information. ▪ Write your own poem using as many Internet terms and acronyms as possible, and place it on the bulletin board.	*Individual tasks:* ▪ Subscribe to ITForum. Deadline Monday 7 Feb at 20:00. You will receive postings from ITforum and the instructor may well give you a test on the content. ▪ Attend a "Live" chat session in the *eGroups* "Chat" facility on Thursday 17 Feb at 07:30 AM. ▪ Make your own webspace at one of these (or another) free webspace providers. Link your site to your desk under the heading "Extramural Activities". ▪ Make a clickable image to serve as the main menu to your desk. See this example by Selwyn Marx. *Collaborative task:* ▪ Produce a Web-based Virtual Opera, called "The Phantom of the Internet.
Unit Two	Individual tasks: ▪ *Design and build a float for the virtual*	*Individual tasks:* ▪ Consider the following article: Powell, G. (2000)

	rag. ## Collaborative tasks: ▪ Build a virtual museum for the MEd (CIE). ▪ Build a site exploring the possibilities and constraints of Distance Education on the Internet. ▪ Build a virtual exploratorium for Science and Biology at various levels. Concentrate on high-tech sites, such as those employing Java, Shockwave, etc. ▪ Build the mother of all resource sites for "The Internet in Schools". It must be the sort of site that contains all the information needed for a Headmaster who wants to implement the Internet in his school to best effect. ▪ Build a virtual auditorium, that discusses the role of sound for learning on the Internet.	Are You Ready for WBT? http://itech1.coe.uga.edu/itforum/paper39/paper39.html. Design a spreadsheet-based instrument that will measure the extent to which an organisation is ready for WBT, based on Powell's article. Analyse any organisation of your choice using your instrument and put your results in your desk in the form of an 2000 word research paper. Collaborative task: Report on the activities of the Web-based learning initiative specified below. You need to ascertain aspects such as their aim, the way they mean to achieve their aim, and how successful they seem to be. In order to do this, you may have to determine criteria for success from the literature. Your report should also contain recommendations as to the direction the initiative may follow in future. The following Web-based learning initiatives will be assigned to different groups: Schoolnet South Africa, Learning Channel Campus, Mschool and Brainline.

Cyber Artefact Table 4.1 (continued) (De Villiers 2001)

	1999	2000
Unit Three	Develop and run an Internet-based course. Learners can decide between two options, as given below: Option One (Research) Identify a specific context where the Internet could be used to facilitate learning. Design a sustainable project which will ensure that the Internet is used for at least six weeks on a weekly basis. Post your proposal to the discussion list for comment from the rest of the group. After incorporating any valid comments/suggestions from the group, run this project and publish a collection of web pages on your results. This publication should be in the form of a portfolio which contains the following sections: ▪ Rationale for your project ▪ Literature review ▪ Description of project and execution ▪ Findings (data) ▪ Conclusions and recommendations Option Two (Development) Identify a specific area where an Internet application could be useful in facilitating learning or the administration of learning. Build the utility and post it on your Web site. Invite comments from your classmates and from members of the Internet community (via discussion lists etc). Publish a collection of web pages on your results. This publication should be in the form of a portfolio which contains the following sections: ▪ Rationale for your project ▪ Literature review ▪ Description of project and execution ▪ Findings (data) ▪ Conclusions and recommendations	

Finding 4 Collaborative and Cooperative approach

Mutual interdependence was built into the design and it would have been impossible for any student, no matter how talented, to complete the course alone or without cooperation from other participants. The module consisted of individual and group tasks for which marks of equal weighting were allocated. "Class participation" in e-groups was given major consideration in grading. Learners' were expected to create their own individual learning spaces (their virtual "desks"), and to participate in group assignments such as the building of the "Phantom of the Internet". The group assignments, deliberately constructed in such to create constructivist learning conditions, compelled learners' to negotiate tasks and collaborate on their execution. Input from learners also played a major part in assessment of the direction that the course should take and in changes in the groups themselves. In the 2002 class, the major group project of the year was based on *Cybersurfviver* (an analogue of the popular television reality show, *Survivor*). For the purposes of this game, learners were divided into tribes, and, as in the television original, learners had to use negotiation, cooperative learning and concerted collaborative action in order to survive.

Cyber Artefact Table 4.2   Learning outcomes of the tasks set in 1999 and 2000 (De Villiers 2001)

	1999	2000
Unit 1	1. Send and receive electronic mail. 2. Subscribe to an electronic mailing list (discussion list). 3. Write elementary Hypertext Markup Language (HTML). 4. Use File Transfer Protocol (FTP) to transfer files to the class host computer (Hagar). 5. Make clickable .gif pictures. 6. Use an HTML editor.	
		Additional tasks for 2000: *Individual tasks:* 1. Use "live" chat groups. 2. Use shared whiteboards and application Sharing. 3. Set up your own electronic mailing list. 4. Find your own free web space. *Collaborative tasks:* 1. Work together as a team. 2. Produce Web pages in a frames environment. 3. Obtain and produce suitable graphics and animated graphics in gif or jpg format and use them to enhance your web page. 4. Edit MIDI files and insert them as background objects in web pages. 5. Present at least twenty terms with their definitions in a de-contextualised format. 6. Use an HTML editor.

Unit Two	*Individual tasks:*	
	1. Determine the conditions under which distance education/training would be the most suitable option.	
	2. List the possibilities and constraints of the Internet in facilitating distance education/training.	
	3. Show the relationship between hypertext and constructivist learning/cognitive scaffolding and problem-based learning.	
	4. List the characteristics of virtual learning environments.	
	5. Specify design criteria for appropriate and effective distance education on the Internet.	
	6. Specify conditions and criteria for co-operative learning events on the Internet.	
	7. Formulate evaluation criteria for Internet-Based teaching and learning.	
	Collaborative tasks:	*Collaborative tasks:*
	1. Work together as a team.	1. Investigate ways in which the Internet is currently used in educational applications.
	2. Repackage information, that is, surf the WWW for relevant information, analyse, synthesise and evaluate it, and then build something with it.	2. Conduct interviews by e-mail.
	3. Create a site that has a good balance of information generated or gleaned by the learners themselves, with links to relevant other sites.	3. Write a critical analysis of an Internet-based initiative using the skills you acquired during the EEL880 module – Evaluation of programs and their effect on learning.
	4. Create a site that is a model of relevant, good, and educational sound design.	
Unit Three	*Individual tasks:*	
	1. Determine the assumptions underlying the learning event.	
	2. Mention the specific problems one is likely to encounter with Internet-based learning and suggest ways of overcoming them.	
	3. List criteria according to which Internet management tools may be evaluated for selection.	
	4. Design and build Web pages.	
	5. Make and manipulate Internet graphic files.	
	6. Lead discussions in electronic forums.	
	7. Evaluate learners learning.	

One of the constant features of this module is that learners were encouraged to scrutinise one another's work and offer assistance to other learners' who needed it. Another feature of this course is that learners' came to recognise the value of reciprocal altruism, and they manifested this by sharing information and expertise and by appealing to other learners' for help when they needed it. Cyber Artefact Table 4.3 shows a discussion that took place (in Afrikaans) between the facilitator, Dolf Jordaan, and the learners. (Although no translation of this interchange has been attempted, suffice it to say that this interaction provides ample evidence of facilitator and peer support.)

Cyber Artefact Table 4.3 An interchange between the learners' and the facilitator (De Villiers 2001)

Name of Student	Reply/Comments from Facilitator
Dolf Jordaan (facilitator)	Ek dink dus lewensvatbaar om so projek te loods. Ek dink jy moet die program goed bekend stel dmv E-mail, omsendbriewe en die skoolkoerant. Daar moet ook n databasis van alle oud sudente gehou word wat toegang het tot die projek en wat moontlik toegang het. Jy kan subscribe by bv. Loods 'n kompetisie vir die leerlinge vir die beste webbladsy. Stel 'n projek span saam wat die ontwikkeling en instandhouding sal behartig asook info inwin. Sien: RSA Schools http://www.learnthenet.com/english/index.html
Debbie Adendorff	Net 'n klip in die bos. Wat is die moontlikheid van 'n on-line demo (tutorial), 'n chat program (al hou baie mense nie daarvan nie). Frequently asked questions(FAQ) het nogal baie vir my beteken, dit kan ook vir ander "iets" beteken. Dit klink baie interessant, sterkte met jou projek. Sien Standard Bank
Linda van Ryneveld	Gaan kyk na Industriee en maatskappye nie net na opv. instellings nie.

	Jy't eintlik baie dinge waarna jy kyk - sterkte Hier's 'n paar links vir jou. http://www.doit.co.za/ http://www.cyberserv.co.za/cyber/search.htm http://www.learnthenet.com/english/index.html
Sylvia Morgan	Why don't you visits chat rooms? It is very interesting stuff. Subscribe to IRC or Parachat http://agoralang.com/audioforum/whatsnew.html http://www.emich.edu/~linguist/issues/6/6-736.html http://www.pitt.edu/~cjp/Lang/langind.html
Pieter de Lille	Very interesting. See this: http://www.learn.net/cbt_ent.html http://www.eos.ncsu.edu/eos/info/eng112vc/ http://biz.yahoo.com/prnews/97/09/09/dec_uolp_1.html http://www.lucent.com/netsys/systimax/virt_campus.html

Finding 5 A - Collaborative and Cooperative approach

Cyber archaeological evidence such as that contained in Cyber Artefact Table 4.2 (above), gives clear evidence of how cooperative online learning can work to the advantage of all concerned. It also demonstrates the uniquely efficient capacity of online programs to enable discussion and mutual assistance. This artefact substantiates the historical existence of both a formal and informal community of learners who demonstrated the advantages that each member of the team gets from cooperation and collaboration among themselves and between facilitator and learners'. What is most evident is that each individual participant is empowered by the information, knowledge and advice that he or

she receives from other members of the team. The cyber artefact also shows that constructive network building and cooperation to place between select groups of learners' enrolled for the course in 1999 and 2000. Those who enrolled soon realised that there was little hope of survival — let alone achievement — unless they co-operated closely with one another and shared their expertise and information. The learners in the cyber archaeological evidence went out of their way to interact with one another, share their knowledge, resources and assets, and to work cooperatively to achieve their goals. The Yahoo and e-groups from Exhibit 4.3 are an example of a dedicated Internet place in which members of a particular group could encounter one another, the facilitator, external facilitators and designated helpers on a continuous basis with all the advantages of online communication supported by the Internet.

4.2.5 Grading system

The grading system is explained in the outcomes of the course. Grades were given for both individual and group tasks. Learners' were also required to sit for an examination that normally contributed 50% to their year mark.

4.2.6 Attendance policy

In this context the principle of attendance was used to enforce participation. Contribution to the class discussion list and regular updating of learners' desks is regarded as attendance. This could be tracked on the e-mail list and progress made by learners' on their virtual desks. In 1997 links were provided (next to the blackboard) to a roster and deadlines and to the tasks for the course. Below the blackboard the instructor's desk linked to his home page and curriculum vitae.

4.2.7 Instructor

The course designer, presenter and instructor, Professor Cronjé, had his own website which was an essential resource from which learners' could obtain not only information, but other features as well. Professor Cronjé updates the website every year, and, since the inception of the course, has added features such as the Museum, (model) Essays from Learners', transcripts of talks, and add-on courses. It is not difficult therefore to see why this site is a critical resource for learners' enrolled for the MEd (CIE) course. The instructor launches his interaction and instructions from this site.

Cyber Artefact Exhibit 4.6 Artefact: The instructor's desk (and website)

Next to the instructor's desk is a link that opens a resource cupboard which contains further links to useful and interesting subject matter and to website construction software.

The facilitator is constantly updating, expanding, adding to and subtracting from this resource. Cyber Artefact Exhibit 4.6 therefore illustrates how the facilitator

makes references available to learners'. The guide (facilitator's website) includes references to websites and articles in journals and books. The facilitator has divided references into essential reading, additional reading, and tentative reading.

 This enables learners' to make a distinction between what is essential for this course and what is nice-to-have. It also gives learners' opportunities to explore and undertake their own research into topics that deal with the Internet, online courses, site construction and maintenance, assessment of online learning, information and computer technology, and a host of other relevant topics.

What is unique however on the facilitator's website is the way in which the typical circumstances of the average subscriber to this course are catered for. As one might expect, postgraduate learners' are all enmeshed to a greater or lesser extent in a whole network of personal and community obligations before they ever enrol for this course. The average postgraduate student is usually married or in a full-time relationship. They nearly always also support themselves and others, either directly or indirectly. They are involved with members of a family either through marriage or relationship, and have obligations of maintenance and support towards significant others including children, the elderly and members of the community who need their help. Here the classificatory system that gives learners' the degree of control over their motivation that is appropriate to themselves (Keller 1987). It also enables them to decide exactly how much time, energy and space they can afford to devote to the exploration of particular topics.

Cyber Artefact Exhibit 4.7 shows how the facilitator made useful links available to learners' during these years. Each of these links is concerned with a specific

skill that each participant in the course needs to perform basic tasks that are required to complete assignments and both personal and cooperative projects.

Cyber Artefact Exhibit 4.7 Helpful linked references for RBO 880 learners'

Cyber Artefact Exhibit 4.8 illustrates the blackboard, the instructor's desk, and links to resources, tasks and the timetable (roster). Although the tasks and roster were depicted separately in the following years, this information formed part of the blackboard in 1999.

In 1998, blackboard links to resources were provided, and a means to mail the instructor was also added (see Cyber Artefact Exhibit 4.8). The blackboard section and resource cupboard were combined in the same year.

Cyber Artefact Exhibit 4.8 A view of the blackboard from 1997

In 1999 a link next to the blackboard to a bulletin board in addition to links to the tasks and roster were added. Clicking on the blackboard still took the user to an online study guide. The instructor's desk was placed back in the digital classroom and a resource cupboard was placed alongside it. The layout of the virtual classroom in 1999 therefore became similar once again to the way it had looked in 1997 (see Cyber Artefact Exhibit 4.10).

Cyber Artefact Exhibit 4.9   Blackboard and resource cupboard in 1998

Resources   Admin and Syllabus   Mail to instructor

Cyber Artefact Exhibit 4.10   The blackboard in 1999
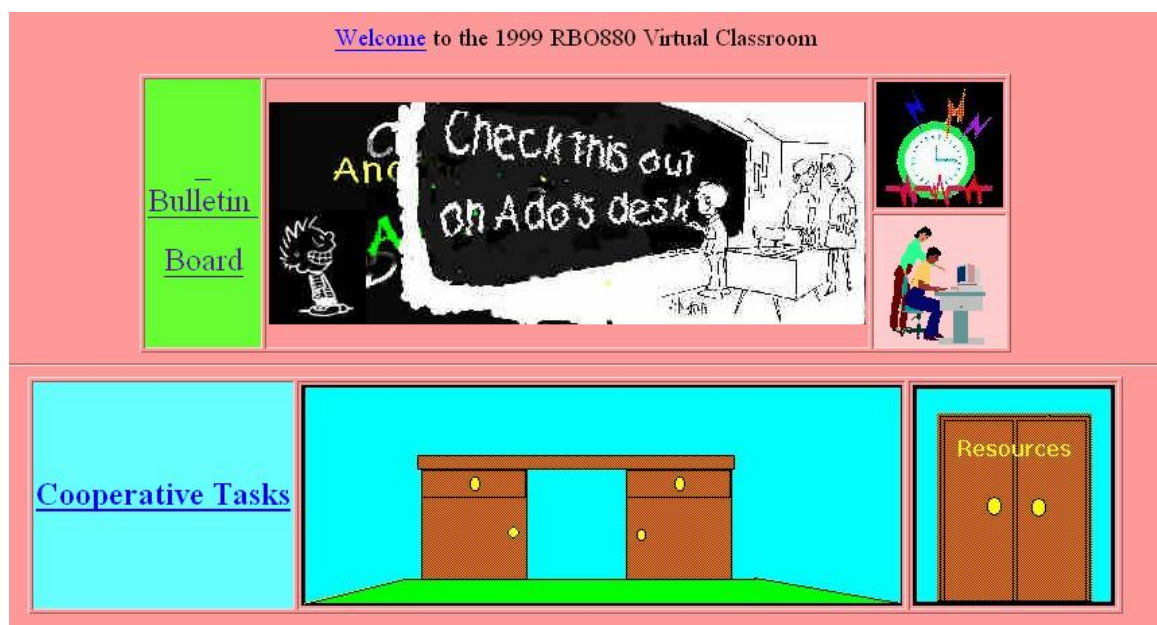
The digital classroom of 2000 was divided in a similar way although the images were replaced by wooden buttons on which learners could click to navigate each section. The instructor/designer made certain modifications in 2000 on the basis of the deficiencies of the 1997-1999 digital classrooms. The design specifications were based on the need that learners had for material that was

both cognitively comprehensible and affectively acceptable. The instructor therefore focused on the functionality and aspects that inspires creativity of the virtual classrooms and not on the sites themselves as examples of top-quality web design, as the following quotations in Cyber Artefact Exhibit 4.11 indicate.

Cyber Artefact Exhibit 4.11 Quotations from the designer of the website (De Villiers 2001)

My classroom has a messy lot of stuff. It is like squatter camps on the information highway. Everything and anything goes.

(Cronjé, quoted by De Villiers 2001)

I don't want the physical design to be pretty. I want my site to look like real people have made it. I don't want my classroom to look like designer-built programs like WebCT and e-groups. Remember, I do classrooms. There must be dirt on the floor, there must be old posters on the wall that are falling off, and the teacher keeps them because they are so remarkably good and they are the best that they can find. Think real school. The good things just stay there because they are there. It must look like a classroom. Schools are not about aesthetics ─ that's not good teaching.

(Cronjé, quoted by De Villiers 2001)

Finding 5 B - Motivating factors

The designer of RBO 880 identified key issues of learning and constructed the website so that student attention would be moved in the right direction. One of the purposes in constructing the website in the way in which he did was to prevent learners' from wasting their time and effort on secondary matters or peripheral matters.

Although the design of the digital classrooms was functional enough for its purposes between 1997 and 1999, its design was not altogether cognitively comprehensible (i.e. consistent and predictable). One of the changes that the instructor made between 2000 and 2004 was to improve the design of the material itself. The changes and the reasons for these changes are summarized by De Villiers (2001) in Table 4.3

Finding 6 – Adult Learning and Motivation

The instructor kept the design of the environment flexible and challenging so that he might stimulate student motivation, initiative and creativity. He constructed the site in accordance with accepted constructivist functional design principles with the intention of keeping the learners' focused on the task in hand and preventing them from becoming lost in a welter of detail and distraction. A close examination of the cyber archaeological sites suggests that this objective was admirably achieved. One of the ways in which the designer achieved this may be deduced from the fact that there are no exact instructions or guidelines about the appearance of learners'' desks or other details or about the way in which they

should accomplish specific tasks and assignments. It is interesting to see that although learners' are given the *means* for discovering for themselves (in various online places) how they might master the various techniques, methods and skills that they need for accomplishing tasks, these details are not available in the cyber classroom itself. The pedagogical purpose expressed in the quotations from Cronjé (in **Cyber Artefact Exhibit 4.11** above) is exemplified in the design, construction and maintenance of the course's operative website.

Table 4.4 Design specifications for the RBO digital classroom between 2000 and 2004 (De Villiers 2001)

Design principles and features	Rationale
Interface was made consistent.	• A simple navigation system was created, using wooden buttons, to gain the attention of learners, and provide them with a sense of context, and orientation. • Learners relate to familiarity. • The different pages within the site were created to be consistent and coherent with one another.
Desks were reduced in size.	• The home page of the classroom, was fitted onto one screen/page, to simulate the design of a real classroom, which one sees in its totality. The screen was therefore made non-scrollable. • To increase the speed with which site downloads and appears on the learners monitor.
Blackboard was made writable.	• Create challenge between learners.
The poster wall was a collage. Clicking on it produced the entire poster wall showing various posters constructed by learners over the years.	• To foster intrinsic motivation. • To support orientation and recall of prior knowledge.

"Alternate" messages ("alt" tags in HTML) were present on all graphics.	• To allow learners without graphic capabilities, to understand the function of graphics on pages.
Colours in the site were designed to complement each other.	• To make the site visually appealing.
Links were made predictable.	• To enable users to predict the outcome of their action, e.g. clicking on the navigation buttons would make them go darker in colour. • To confirm the learners' whereabouts and options.
On-line help	• The lifeline page was designed to ease anxious learners, and to provide support.

As table 4.4 tabulates the facilitator and learners' critiqued the previous virtual settlements and were flexible enough to make changes to the appearance and structure of the virtual classroom, this enabled learners and facilitator to accept, ideas and critique , assess the relevance and therefore 'improve' on previous virtual settlements

Cyber Artefact Exhibit 4.12   The structure of the digital classroom in 2000
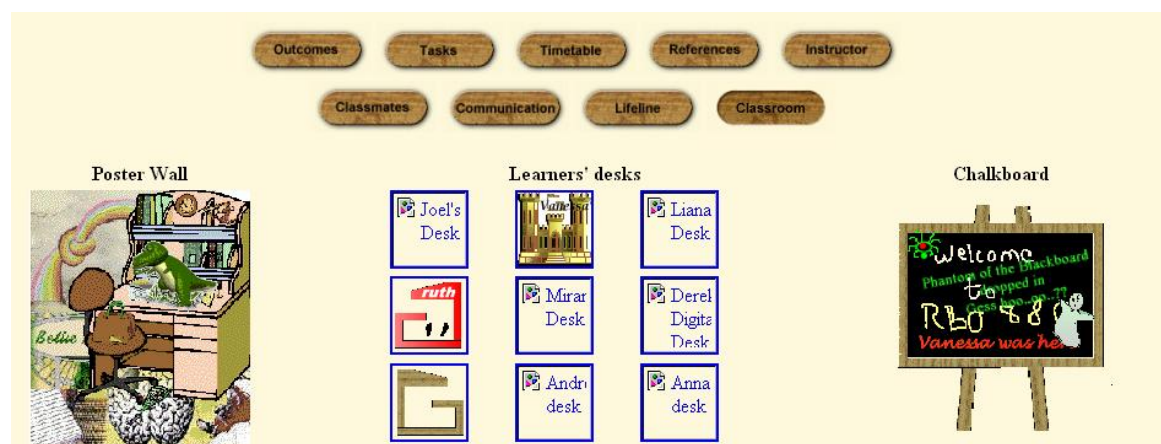
What is also evident in exhibit 4.12 is the fact that some of the cyber artefacts disintegrate, as seen in the learners' desks , just as artefacts on an archaeology site 'disintegrate', some artefacts in a cyber archaeology site 'disintegrates'.

4. 2. 8 Learners' desk and poster wall

Cyber Artefact Exhibit 4.12 (The structure of the digital classroom in 2000) shows how the poster wall of the virtual classroom offered links to projects that learners from previous years had completed as well as some projects that learners were creating in that year. Each learner, in addition, was provided with his or her own "desk" clearly marked with his or her name. Each desk linked to a place on the web in which a learner could create a personalized page. In this way all the learners were rendered virtually present in the cyber classroom.

In 1997 the poster wall had been placed *above* the learners' desks, and both these elements took up a large amount of space in the digital classroom page (see Cyber Artefact Exhibit 4.13). In 1998 the learners' desks had been placed above the poster wall (see Cyber Artefact Exhibit 4.9). In 1999 the learners' desks remained above the poster wall although the remainder of the digital classroom was rearranged in the way that it had been in 1997. In 2000 the links to learners' desks were miniaturised, and the whole layout of the digital classroom in consequence took up less space on the screen than they had in previous years (see Cyber Artefact Exhibit 4.13).

Cyber Artefact Exhibit 4.13   Learners' desks and poster wall in 1997 (left), and equivalent page in 1998 (right)
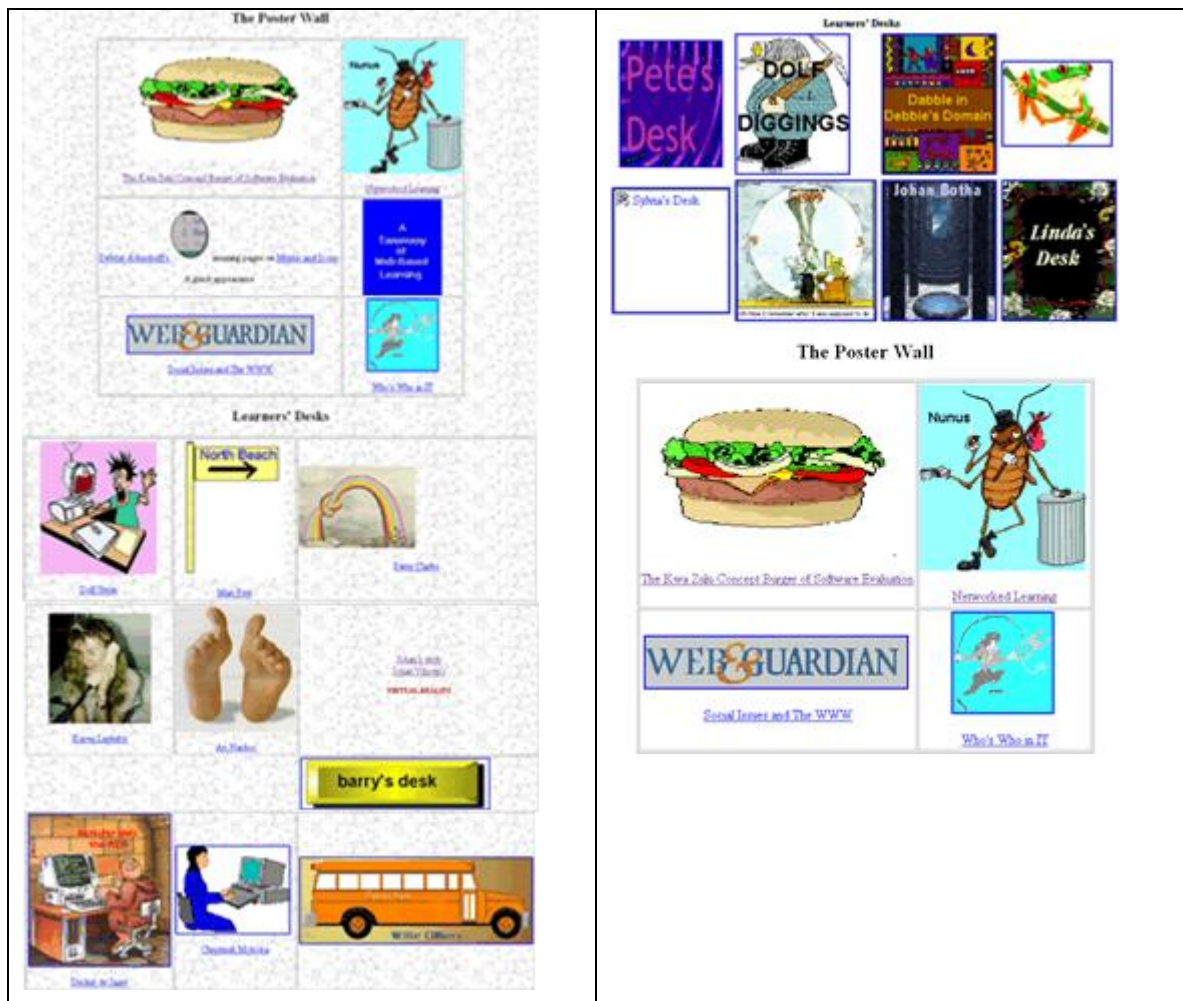
4.3 RBO 880 in 2002 and 2004

In 2002 the facilitator together with three master's learners' largely redesigned the module RBO 880. They structured the module in the form of a game to which they gave the name *"CyberSurFiver"*. The theme, well known and widely popular because of the television series *Survivors*, also entailed overcoming all kinds of obstacles and challenges to survive on the Cyber Island. The group work of the learners' from the previous year created an opera and a rag procession in

addition to the digital desks. The survivor metaphor was extended so that each learner would have a shelter (called a participant's shelter). Next to the shelters, a single image called The Treasure Chest, linked learners' to sites that the poster wall had done in previous years. All other links was presented as *menu items* above these images (see Cyber Artefact Exhibit 4.13).

Finding 7 – Adult Learning and Motivation

The research undertaken here provides evidence for the fact that the learning context constructed for learners' never remained static. The course presenter subjected course interfaces to continuous critical scrutiny and modified them in various ways on the basis of assessment of information about how effective they had been in previous years. Changes made to the website were thus never arbitrary. They were always made in accordance with what worked best and the didactic needs of the course itself. It is interesting to note that the facilitator did not hesitate to reinstitute earlier designs from previous years in those cases where subsequent innovations proved that earlier versions had been more effective. In this way the facilitator modelled the role of reflective practitioner to his learners'. The instructor also went out of his way to stimulate learner curiosity by setting challenges and creating further virtual environments. In 2002 the instructor took the RBO 880 module to a next level by co-creating a game based on the popular television series *Survivor*. It was by means of this extremely challenging virtual game that learners were given opportunities to grapple with often arduous challenges by quickly acquiring through cooperative effort all the expertise and knowledge that they needed to meet the challenges and so complete the game.

Cyber Artefact Exhibit 4.14   The appearance of the digital classroom in 2002

As exhibit 4.14 indicates that the 2002 learner group experienced a different virtual settlement, in that the facilitator introduced different challenges in the RBO 880 module.

Because *CyberSurFiver* was presented online, face-to-face interactions were kept to the minimum. For the purposes of the game, learners' were divided into "tribes" an each tribe was issued with individual and group (collaborative) "challenges". The module was presented over a period of six weeks. The individual challenges seen in Cyber Artefact Exhibit 4.15 varied from improving technical skills to other challenges based on educational premises (Van Ryneveld 2005).

Cyber Artefact Exhibit 4.15   Technical and educational "challenges" (Van Ryneveld 2005)

Individual Assignment 4 *(Technical Skill)*

This week you should add the following feature to your personal web site:

- a sound file (approximately 30 seconds should do it) in which you give us your impressions of the first week on the CyberIsland. Include at least one positive and one negative comment.

Individual Assignment 6 *(Educational activity)*

Compile a report (600 words maximum) on ONE of the following topics:

- The role of the online facilitator as contrasted to that of the traditional face-to-face teacher.
- The strengths and weaknesses of the Web in an educational environment.

Mail your report in HTML format to the Webmaster of your tribal site with a request to have it linked from there. This link must be available by 17:30, Wednesday 7 August 2002.

The table above is evident of how tasks were designed to improve the learners' skills, technically and educationally.

Reward and immunity challenges (familiar items from the original television game) were also incorporated into the module. These prompted learners to take cognisance of important issues through short interventions of possible reward value. Tribe members were also given the opportunity to vote, and the ones who were voted off the game were grouped together in a separate tribe. These members still had to complete all individual and group challenges. Exhibit 4.16

depicts the voting station at which tribe members were given the opportunity to vote.

Cyber Artefact Exhibit 4.16   Voting station (Van Ryneveld 2005)
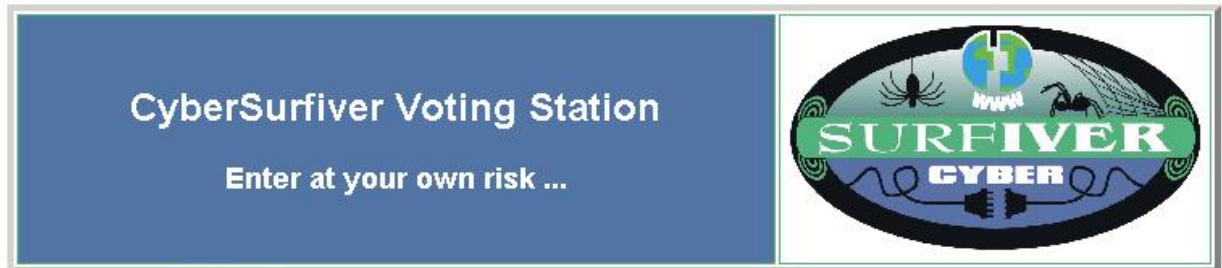
Exhibit 4.16 shows that learner's worked together in tribes but that the competition factor exerted pressure and supports Slavin (1995) notion that when teams participate in a cooperative environment, they soon start to compete amongst themselves and other groups

In 2004 the course designer presented these challenges in a simulation of a World Cup soccer tournament. The digital classroom contained links to discussion tools, the whiteboard, the gym (chat rooms), a clubhouse, and instructions for each unit. Each learner represented one of the non-English speaking countries in the FIFA World Soccer Cup. Weekly discussion topics

were hosted in the "main stadium" and game rules, referees, team building and other concepts was introduced as part of the extended metaphor of a World Cup soccer tournament (Schoeman et al. 2004).

From these two years it is evident that the facilitator and learners' designed the RBO 880 module on a different level by introducing a gaming environment with underlying learning and instructional design principles, the simulations and challenges, increased the motivation levels of the learners.

Finding 8 - Instructional Design Principles

By continuously changing, renewing and updating the environment, the facilitator makes best use of the combined impact of multiple metaphors. Learners' in this course are encouraged to revisit the work of their predecessors, and, in so doing, to expose themselves to the central themes of the course through the medium of a variety of metaphors ─ even though the key elements, purposes and objectives of the course remain relatively consistent and stable. The accumulation of metaphors in the course over a period of years enriches the resources available to all new and future learners'. The metaphor of the virtual classroom does sometimes, however, create an environment in which adult learners are also capable of acting like children (Cronje 2006).

4.4 Summary

Chapter 4 has described selected aspects of the history of the RBO 880 module over a period of six years. In chapter 5, the researcher will collate and present the findings in this chapter on the basis of the literature study conducted in chapter 2. From this juxtaposition, the researcher will offer certain conclusions about possible answers to the research question.

Chapter 5 – Conclusions and Recommendations

5.1 Introduction

This chapter concludes this development research study with a summary of the research question and rationale of the research, the literature review, and the research design. This chapter will also include a reflective section, namely, a substantive reflection. The substantive reflection combines the findings in chapter 4 with the literature review that is presented in chapter 2. The researcher attempts to construct a balance by providing some critique against the presentation of the RBO 880 module as part of the conclusions. Lastly, the chapter will close with some recommendations for practice, recommendations for further research, and recommendations for further development work.

This research focuses only on the following research question: **What can be learnt from the continuous presentation of the module Use of the Internet in Education and Training (RBO 880)?**

The people who will benefit from this research are:

- course facilitators
- students past and future
- the system itself
- future researchers
- Organisational Design specialists

The rationale for this study is to explore the learning aspects in presenting an online course where adult learners have the opportunity to participate in various activities pertaining to, but is not limited to the discovery of constructivist, collaborative and cooperative initiatives and tasks, focussing the learners to build and be members of virtual communities in an online environment. Through this module that is presented online learners' expands their reality by going from the

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

109

unknown to the known, by applying own skills and skills gained, interacting with fellow members and the instructor during the time the module is presented.

The research study documents, explore and attempts to understand the learning theories, instructional design principles, elearning elements and virtual community principles applied in the RBO 880 module presented at the University of Pretoria over a period of six years. The instructor concurred with Merrill (2001) guidelines of Instructional design principles and these will be discussed in the chapter.

5.2 Substantive Reflection/Conclusions

5.2.1 Conclusion 1 - The Concept of E-Learning

The RBO 880 is presented online and used the online environment to expose the learners manoeuvring and gain vital life skills in a possible new way of learning. Brandon Hall (2004) defines *e-learning* as instructions that are delivered electronically whether through the Internet, an intranet or other platforms, for example CD-ROM. Henry (2001:249) in (van Romburgh, 2005) defines e-learning as "*the appropriate application of the Internet to support the delivery of learning, skills and knowledge*". Kozma (1987:22) as seen in (Cronje 1997) goes further and says that "*to be effective, a tool for learning must be parallel to the learning process; and the computer, as an information processor, could hardly be better suited for this*".

Through the exploration of the cyber-artefacts it was found that the RBO 880 module changed in structure, in 1997 to mirror changes in the virtual realities of the particular time. As such it moved from a lecturer centred environment, through stages of simplicity and an esthetical composition towards a fully interactive environment where students were not only in control of their learning,

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

110

but also co-responsible for guiding the learning experience of the rest of the group. In this way Cronje, the facilitator succeeds in giving students exposure not only to basic web teaching issues, but also to vital life skills surrounding team work and interdependence between colleagues in an online environment. It is also evident from Exhibit 4.1 in chapter 4 from the facilitators welcome note that all instructions happens online.

This leads to the conclusion that the RBO 880 module exposed learners to a true online environment and stays true to the importance of e-learning and learning environments in cyberspace. However Knapper (1988) as cited in de Villiers (2001) argues that adult learners are likely to have more insecurity about learning as a result of financial, work barriers and friends and family's lack of support. These pressures can result in high drop-out rates. With regard to family and work-related barriers, some of the students got voted off or dropped-out from the course, due to the demands of a total online learning environment and factors described above.

5.2.2 Conclusion 2 – Virtual Communities

Jones (1997) created a theory to describe the difference between a virtual community and the virtual settlement, which is the cyber place where the community resides or the cyber place they inhabit. He further argues that the study of virtual communities compares to archaeology and therefore it is necessary to study the artefacts of the virtual settlement. This is called cyber archaeology according to Jones. The first step of the cyber archaeology is to define and characterize the virtual settlement.

The RBO 880 module subscribed to most of the conditions and definitions of virtual communities set out by Jones (1997) and, Lee et a 2002. The RBO 880 learners belongs to the Yahoo and e-groups as seen as an example in exhibit

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

111

4.3 in chapter 4, this constitutes a place where learners are members of a specific group (community) and interact with one another on a regular basis, supporting the condition of Jones that virtual communities have to have a minimum level of interaction and variety of communications. The facilitator and learners' construct a site where they can have a virtual common-public-space where a significant part of community interactions can occur. The virtual classroom, in the RBO 880 module is the common-public space where members can meet and interact.

The RBO 880 module has sustained membership in that the module is presented online and that the learners have to be a member of the community in order to participate and contribute in discussions, receives tasks and submits deliverables; this is another requirement from Jones (1997). Lee et al (2002) attempts to create a general working definition for virtual communities by combining existing definitions from literature. The combined definition is "a technology-supported cyberspace, centred upon communication and interaction of participants, resulting in a relationship being built-up". The learners of the RBO 880 module compel the topics and have the opportunity to influence the facilitator on how the direction of different topics/challenges should proceed

Cyber Artefacts from the continuous presenting of the RBO 880 module conclude the fact that virtual communities and relationships exists during the presentation of the module and that technology, membership groups learning spaces and work area's are used to support the virtual communities. The learners had no choice to be part of the virtual community or not. The learners' were forced to participate in a specific space and become a member of a team that they not necessarily wanted. Learners' were forced to have a minimum level of interactivity, as clearly indicated by Exhibit 4.4 in chapter 4

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

112

5.2.3 Conclusion 3 – Learning Theories

The framework of the learning space, in the RBO 880 module is constructed by the instructor and learners'. The students have to expand within this realm and "construct" their own personal space and thus create an environment which would reflect their newly acquired insights. Cunningham, Jonassen (1991) supported by Siegel and Kirkly (1997) and recently Chien Sing (1999) describes the key characteristics of constructivism as:

- active participation by learner
- recognition of complexity
- multiple perspectives
- real-world context

Constructivist theory states that learners are active, this ties in with Bonwell and Eison (1991) that argues that: "… to be actively involved, students must engage in such higher-order thinking tasks as analysis, synthesis and evaluation". Within this context, it is proposed that strategies promoting active learning be defined as instructional activities involving students in doing things and thinking about what they are doing. Ward (1995) states further that: When we think critically we become active learners". She elaborates and argues that "Instructional products must challenge learners to be active participants in the knowledge construction process, rather than passive recipients of 'pre-packaged knowledge'. The learning context in the RBO 880 did not stagnate, but grow continuously over time. The reflective nature of the facilitator did not exclude going back to previous approaches should that prove to be better. In this way the role of reflective practitioner is modelled to students. Cronje (2000), as cited in de Villiers (2003) the instructor emphasised that:

"My classroom is a messy lot of stuff. It is like squatter camps on the information highway. Everything and anything goes."

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

I don't want the physical design to be pretty. I want my site to look like real people have made it. I don't want my classroom to look like designer-built programs like WebCT and Egroups. Remember, I do classrooms. There must be dirt on the floor, there must be old posters on the wall that are falling off, and the teacher keeps them because they are so remarkably good and they the best that they can find. Think real school. The good things just stay there because they are there. It must look like a classroom. Schools are not about aesthetics - that's not good teaching. (Cronje cited in De Villiers 2003)

Learners engage, naturally grasp, and seek to make sense of things. Constructivism is defined when learners do more than absorb and store information. Learners construct tentative interpretations of prior knowledge and go on to elaborate and test what they determine. Learners cognitive structures are constructed elaborate and tested until they establish a satisfactory configuration. Metaphors, like the "phantom of the opera" in the RBO 880 module are exploited to help students reflect and construct meaning from the development of their environments and reach a satisfactory configuration (Ward 1995)

The tasks in Table 4.1, as described in chapter 4 depicts that the RBO 880 module consisted of individual and group tasks for which marks of equal weighting were allocated. "Class participation" through the e-groups played a huge role in grading. The individual assignments for example was for each student to create their own learning space (desk), group tasks like building the "Phantom of the Internet" encouraged collaboration among the students. Learners play an active role in the direction and or change in group or individual tasks. In the 2002 *Cybersirver* game learners were divided into tribes and had to use cooperative and collaborative learning to "survive"

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

114

Collaborative learning are defined by Hiltz (1995) as a process that focuses on co-operative attempts among instructor and students, and highlights active involvement and dealings of instructors and students. Knowledge is seen as a social construct, although the education procedures are assisted by social interaction in an environment that assists in group interaction, assessment and collaboration. The *CyberSurfiver* game in 2002 is a prime example of collaborative and cooperative learning during the presentation of the RBO 880 module Johnson and Johnson (1991) recognize prerequisites for successful cooperative learning. Ten years later Van der Horst and McDonald (2001) and more recently Gravette and Geyser (2004) cited the following prerequisites:

- a mutual goal

- positive interdependence

- Individual accountability.

- Interpersonal and Small group skills

- Group Processing

All these prerequisites can be identified in the RBO 880 module and mutual goal and individual accountability are discussed as examples. Learners have a mutual goal, for example the tribal challenge and immunity challenge in the 2002 *CyberSurfiver* game. Learners get voted off in the same game if they did not take individual responsibility and finish challenges on time. The RBO 880 module takes constructive, cooperative, collaborative and active learning theories into account when the instructor designed and developed the activities and challenges. This enabled the learners to explore and expand their knowledge of learning theories applied this in practice and expand their current realities. Literature suggests that web-based classrooms have the potential to be extremely effective, especially in the way they can be used to support collaboration.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

115

It is, however, necessary to test whether the benefits are indeed what literature claims them to be. (Reeves 2000)

5.2.4 Conclusion 4 - Adult Learning and Motivation

Cronje (2001) states that adult learners, recognises various metaphors of which the RBO 880 modules were composed. Learners consciously engaged in the role-play that was necessitated by the metaphors without being told overtly to do so. The instructor nevertheless they remained adult learners in their response to their virtual environment by actively challenging its constraints. Therefore concurs with Brookfield (1986) that Adult learner's necessity of critical reflection on life as a whole and in this case the virtual classroom and it's activities. On the other hand, they found the emailed lectures, and tasks on the virtual classroom site which had no underlying metaphor unsatisfactory and boring. They responded more positively to the tasks that had a metaphoric underpin. The instructor identified key issues of learning and focused students learning in that direction.

Learner time and effort was not wasted on peripherals, concurring with Goodlad (1984) that challenges should be practical and problem centered. Individual tasks are designed so that learners could build on what they have learned in the individual tasks and apply it in the group work; this promotes positive self-esteem, in that adult learners experience that they contributing value to the group (Brookfield 1986). Group work includes collaboration amongst the learners and the instructor

.

It would seem, Cronje (2001) further argues: "*that placing learning materials for adult learners in a pre-packaged instructivist learning shell such as those that are currently winning popularity may create an impoverished learning*

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

116

environment, for Adult learners in which the creativity and imagination remains unchallenged".

The main contribution of the strong use of familiar metaphors, like the virtual classroom and *CyberSurfiver*, based on the popular TV series Survivor are also to allow choice and self-direction. People could vote, change rules and influence the direction. This according to Goodlad (1984) promotes positive adult learning situations.

The instructor kept the design of the environment flexible and creative to maintain motivation. He, Cronje made the design principles functional and practical to eliminate the risk of focus deviation. This is evident in the artefacts where learners have no guidelines on how their desks should look like or that they cannot challenge tasks set by the instructor

Intrinsically motivating activities are those in which people will engage for the sake of interest and enjoyment. Malone and Lepper (1987) integrated a large amount of research on motivational theory into a synthesis of ways to design environments that are intrinsically motivating. They argue (1987) that intrinsic motivation is stimulated by four qualities, namely challenge, curiosity, control, and fantasy. The RBO 880 module challenged learners' ability to function in an online environment. The instructor stimulates the learner's curiosity by setting challenges and created more metaphoric environments. In 2002 the instructor took the RBO 880 module to a next level by creating a game based on the popular TV series Survivor. Through this change/challenge the instructor created a fantasy and learners wanted to know more and experience the controlled environment, they were motivated to experience something different and influence the direction of the game. Metaphors also grab the attention of the

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

117

learners, and the game *Cybersurvifer* for instance let the learners have voting rights, tribal councils and the like.

The virtual classroom which reflected a real learning space made it relevant for students to understand that the virtual classroom is a place where they could work and learn. Exploring and expanding their realities regarding online learning gave the learners the opportunity to gain confidence in an environment that is not familiar to them. RBO 880 gives learners the opportunity to experience learning in a different environment, learners receives marks that was added to their total credit score for their Masters in CIE degree, this is part of the module contributed to the satisfaction need learners have. Attention, relevance confidence and satisfaction are all aspects of Keller's (1987) ARCS motivation model.

Learners from the RBO 880 model experienced adult learning principles designed into all the activities and challenges the instructor used different motivation models to challenge the learners and keep them motivated to wrap up the RBO 880 module as part of their Masters degree. However the classroom metaphor might not be the best environment for adult learners. Learners' were graded and marks were allocated, not necessarily the best way to assess if adult learners, are acquiring the skills for their 'real life' environments. Intrinsic motivation happens if people are interested and if they enjoy the activities (Malone &Lepper, 1987), some learners were board and if they are not confident in the learning processes they get de-motivated (Keller and Kopp, 1987) as cited in de Villiers (2001)

5.2.5 Conclusion 5 – Instructional Design Principles

Many current instructional models suggest that the most effective learning environments are those that are problem-based and involve the student in four distinct phases of learning: (1) activation of prior experience, (2) demonstration

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

118

of skills, (3) application of skills, and (4) integration or these skills into real world activities. Merrill (2001) further argues that instructional practitioners concentrates primarily on phase 2 and ignores the other phases in this cycle of learning. Cronje (2006) describes Merrill's six guidelines for instructional design, the researcher elaborates as follows:

- *Learning is constructed from the experience of the learner*. That was the reason why the instructor in the RBO 880 uses familiar metaphors like a virtual classrooms, games and simulations, to keep the learners motivated and expand their realities regarding new learning spaces.

- *Interpretation is personal*. Based on their own knowledge and experience individual learners make different interpretations of the same material. The instructor was flexible regarding the guidelines on how a learner should construct their own learning spaces (Learner desks)

- *Learning is an active process whereby experience is converted into knowledge and skills, instead of being "taught".* The instructor in the RBO 880 gave each learner the opportunity to contribute and add value to the process, the statement "don't switch off the lights" in his welcome note gives the students the chance to carry on in the working space without the instructor's 'supervision'.

- *Learners should be given learning tasks that they can only complete by acquiring the prerequisite knowledge and skills.* Knowledge is situated in real life and that is where learning should take place. By using "real life" metaphors learners' gains knowledge and skills that they will be able to apply in their own working environments. However further research needs to be done in order to determine in what way learners' who acquired the skills in the RBO 880 are applying it in their current working/life environments.

- *Learning is collaborative and enhanced by multiple perspectives and Testing should be integrated with the task*. Mutual dependence was built

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

119

into the design. The module consisted of individual and group tasks for which marks of equally weighting were allocated. "Class participation" through the e-groups played a huge role in grading. The individual assignments for example was for each student to create their own learning space (desk), group tasks like "building" the "Phantom of the Internet" encouraged collaboration among the students. Learners play an active role in the direction and or change in group or individual tasks. In the 2002 *CyberSurfiver* game learners were divided into tribes and had to use cooperative learning amongst tribe member to survive.

The instructor of the RBO 880 module followed the six Instructional Design guidelines from Merrill and made the RBO 880 module a true learning experience for all the learners. However there is not a process in place to indicate if learners are applying the skills they acquired in the RBO 880 module in 'real life', which is one of the distinct phases of learning (Merrill 2001). Some learners got demoralised to work in a group either because learners' did not pull their weight or bickered endlessly. According to Keller and Knopp (1987) as seen in de Villiers (2001) adult learners will loose motivation if they not sure about the instructional design principles.

5.3 Recommendations

5.3.1 Recommendations for further practical application

- Learners should be aware of the technology requirements to participate in a module that is presented online.
- A short technical skills course (HTML, FTP etc) might be useful to assist the learners in gaining experience in different languages and applications and it might serve as a refresher for learners that have experience in these applications and technical skills.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

120

- Adult learners appreciate clear guidelines of what are expected of them. Time should be allocated in an online course for thorough face to face interaction before the start of the online module.

- 'Lessons learned' document might be created. This can't form part of the outcomes of the module. The document should be updated throughout the module and can serve as part of the designing process in creating the next presentation of the RBO 880 module.

- Dynamics in a team are very important, teams should be well formed and expectations of team members managed. Team members should receive clear guidelines on how the team structure will work as well as rules in the team and the instructor should make time for social interaction between learners' and instructor.

5.3.2 Recommendations for further development

- The Metaphor of a virtual classroom should be further developed and assessed if this environment is conducive for adult learning and motivation

- The internet is powerful tool, the instructor and learners should develop the RBO 880 module and test its application in the commercial environment , the question of this online course and its relevance in the market will be answered

- Further development is necessary to design the learning space, group and individual tasks/challenges. Input from external, possible objective users, the instructor and learners' participating in the online course should all form part of the designing and development team.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

121

5.3.3 Recommendations for further research

- Future Researchers may want to investigate the different learning strategies and theories and explore the importance and implications of each in an online environment.

- Further investigation is needed to explore the social structures, within theses virtual communities and how it applies in 'real life'.

- The metaphor of a virtual classroom should be explored and establish if this environment is conducive for adult learning.

- Equal weighting was given to group and individual tasks; further studies might establish a better way of grading learners' in terms of group work and individual assignments.

- Future research may show what happened with each learner that participated in the RBO 880 module and assess the skills gained in this particular online environment and establish how they apply it in their current realities.

5.4 Summary

Chapter 5 concludes the development research study, for the RBO 880 module, in this chapter the findings and analysis in chapter 4, combined with the literature review in chapter 2 formed the conclusions reached through the analysis process and lastly recommendations are proposed for future researchers, learners, facilitators organisational design specialists, online content and curriculum designers.

Chapter 5: Conclusions and Recommendations
Using the Internet in Higher Education and Training: A development research study

122

References

.

- **ADL.** 2004. SCORM 2004 2nd Edition Overview. Advanced Distributed Learning. Accessed on: www.adl.net Accessed and available in September 2006

- **Allen Academy**. (2005) Accessed in August 2006 Available at: www.teachermentors.com/RSOD%2

- **Bannan-Ritland, B** (2003). The Role Of Design In Research: The Integrative Learning Design Framework

- **Blanchard, AL & Markus, ML** (2002) Sense of Virtual Community – Maintaining the Experience of Belonging. Proceedings of the 35th Hawaii International Conference on System Sciences.

- **Bonwell, CC & Eison, JA** (1991) Active Learning: Creating Excitement in the Classroom. Washington, DC. George Washington University.

- **Brookfield, SD** (1986) Understanding & Facilitating Adult Learning. Jossey-Bass, San Francisco.

- **Brooks, JG. & Brooks, MG (1993).** The Case for Constructivist Classrooms. Alexandria, VA: Association for Supervision & Curriculum Development

- **Brown, BL** (1997). New Learning Strategies for Generation X. ERIC Document No. 411414. ERIC Clearinghouse on Adult, Career, & Vocational Education, Columbus, Ohio.

- **Bruner, J** (1966) Towards a Theory of Instruction. Cambridge , MA : Harvard University Press

- **Bruner, J** (1986) Actual Minds Possible Worlds. Cambridge MA: Sing LC (1999)

- **Bruner, J** (1990). Acts of Meaning. Cambridge, MA: Harvard University Press

- **Bruner, J** (1996) The culture of education. Cambridge, MA: Harvard University Press.

- **Carver, C** (1999) Building a Virtual Community for a Tele-Learning Environment. IEEE Communications Magazine, March 1999..

- **Chan, JMT & McDonald, R**. (2004) Teachers Guide to Designing Classroom Software. London: Sage Publications

- **Chien Sing.** (1999) Problem-solving in a Constructivist Environment

- **Clarke, PA.** (1998) Telemetric Teaching of Adults via the World Wide Web: A University Case Study. University of Pretoria.

- **Colb P, Confrey J, di Sessa A, Lehrer R & Schauble L**(2003) Design Experiment in Educational Research

- **Conner, ML** (1999) Facilitating Adult Learning: A Guide to Classroom Management and Delivery Skills. PeopleSoft University, February 1999.

- **Creswell, JW** (1998) Qualitative Inquiry and Research Design. Choosing Among Five Traditions. SAGE Publications, California

- **Cronjé, JC** (2001). Metaphors and Models in Internet-Based Learning. Computers & Education (37): 241-256

- **Cronjé, JC** (1997) Interactive Internet: Using The Internet To Facilitate Co-Operative Distance Learning. SA Journal of Higher Education, 11(2):149-156

- **Cronjé, JC** (2006). Pretoria to Khartoum - How We Taught An Internet-Supported Masters' Programme Across National,

Religious, Cultural and Linguistic Barriers. Educational Technology and Society, 9 (1), 276-288.

- **Cross, KP** (1981) Adults as Learners. San Francisco: Jossey-Bass.

- **Csikszentmihalyi, M** (1990). Flow: The Psychology of Optimal Experience. New York: Harper & Row. Educational Technology, Jan.-Feb 2004

- **Cunningham, DJ** (1991) Assessing Constructions and Constructing Assessments: A Dialogue. Educational Technology, 31(5), 13-17

- **De Villiers, GJ** (2001) Asynchronous Web-Based Technologies to Support Learning. Unpublished M.A. Half Dissertation. University of Pretoria.

- **Demirus, G** (2006) The Diffusion of Virtual Communities in Health Care: Concepts & Challenges. Patient Education & Counseling 62: 178 – 188.

- **Design-Based Research Collective**. (2003). Design-based research: An emerging paradigm for educational inquiry. Educational Researcher, 32(1), 5-8.

- **Denzin, NK & Lincoln, YS** (Ed). (1995) Handbook of Qualitative Research. (2nd Edition) London. Sage Publications, Inc

- **Deutsch, M** (1962) Cooperation and Trust: Some Theoretical Notes. In M. R. Jones (Ed.), Nebraska Symposium on Motivation, 275-319. Lincoln, NE: University of Nebraska Press.

- **Dewar, T** (1996) Educational Psychology Interactive. Educational Technology Publications, Englewood Cliffs, New Jersey. Educational Technology, 31(5):45-52

- **Doshier,S.** (2000). Report on Learning: John Dewey and constuctivism in Adilt Learning Availble : http://dana.ucc.nau.edu/~sad24/paper.htm Accessed September 2006

- **Efimova, L & Hendrick, S** (2005) in search for a virtual settlement: An exploration of Weblog Community Boundaries Available at: https://doc.freeband.nl/dscgi/ds.py/Get/File46041/weblog_community_boundaries.pdf#search=%22Efimova%20%26%20Hendrick%20virtual%20communities%22 Accessed November 2006

- **Element K** (2003) Learning Management Systems in the Work Environment: Practical Considerations for the Selection and Implementation Of An E-Learning Platform. Element K White Paper.

- **Ference, PR & Vockell, EL** (1994). Adult Learning Characteristics & Effective Software Instruction. Educational Psychology, 24(7):25-31.

- **Franken, R** (1994) Human Motivation (3rd ed.). Pacific Grove, CA: Brooks/Cole Publishing Co.

- **Gagne, RM, Briggs, LJ & Wagner, WW** (1992). Principles of Instructional Design (4th Edition.). Fort Worth, TX: HBJ College Publishers

- **Garris, R. Ahlers, R. & Driskell, JE** (2002) Games, Motivation & Learning: A Research & Practice Model

- **Goodlad, JI** (1984) Principles of Adult Learning. Available online at http://www.teachermentors.com/RSOD%20Site/StaffDev/adultLrng.HTML Accessed on November 2006.

- **Gravette, S & Geyser, H** (2004) Teaching and Learning in Higher Education. Pretoria: Van Schaik.

- **Greenhalgh, T & Taylor, R** (1997) How to Read a Paper. Papers that go Beyond Number. (qualitative research) BMJ, 315,740-743.
- **Hall, B** (2004) 'FAQs About E-Learning.' Brandon-hall.com. [http://www.brandonhall.com/public/faqs2/index.htm] (2004). Accessed on August 2006
- **Hannafin, MJ & Peck, KL** (1988) The Design, Development, & Evaluation Instructional Software. New York: MacMillan.
- **Harper, KC. Chen, K. & Yen, DC** (2004). Distance Learning, Virtual Classrooms and Teaching Pedagogy in the Current Internet Environment, Technology in Society,
- **Henry, P** (2001). E-learning technology, content and services. Education and Training, 43, 4/5: 249 - 255.
- **Hiltz, R** (1995) Teaching in a Virtual Classroom. ICCAI'95: International Conference on Computer Assisted Instruction
- **Houle, C** (1966) The Inquiring Mind. Madison, WI: University of Wisconsin Press. (Originally Published in 1961)
- **Huitt, W** (2001) Motivation to learn: An overview. Educational Psychology Interactive. Valdosta, GA: Valdosta State University. Retrieved 15 August 2006 from http://chiron.valdosta.edu/whuitt/col/motivation/motivate.html
- **Jensen, B** (2001) Bob Jensen's Bookmarks Retrieved September 2006 from:http://WWW.Trinity.edu/rjensen/bookbob.htm

- **Johnson, DW & Johnson, RT** (1989): Co-operation and Competition: Theory and Research. Edina, MN: Instruction Book Co.
- **Johnson, DW & Johnson, RT** (1991): L*earning together and alone.* New Jersey: Prentice Hall

- **Johnson, DW & Johnson, RT** (1999) Making Co-operative Learning Work. Theory in Practice, 38(2):70-71. New Jersey, Prentice Hall.

- **Jonassen, DH & Reeves, TC** (1996) Learning with technology: Using computers as cognitive tools. In: Jonassen, D. H. (Ed.), Handbook Of Research For Educational Communications & Technology. New York: Macmillan

- **Jonassen, DH** (1991) Evaluating Constructivist Learning. Educational Technology 31(10):28-33

- **Jones ,Q & Rafaeli, S** (2000) What do Virtual "Tells" Tell? Placing Cybersociety Research into a Hierarchy of Social Explanation. Proceedings of the Hawaii International Conference on System Sciences, January 4-7, 2000, Maui, Hawaii.

- **Jones, Q** (1997) Virtual-Communities, Virtual-Settlements and Cyber-Archaeology: A Theoretical Outline. Journal of Computer Supported Cooperative Work, 3(3)

- **Kafai, Y & Resnick, M** (1996). Constructivism in Practice: Designing, Thinking, & Learning in a Digital World. Mahwah, NJ: Lawrence Erlbaum.

- **Keller, JM & Kopp, T** (1987). Applications of the ARCS model of motivational design. In: Reigeluth, C.M. (Ed.), Instructional Theories In Action: Lessons Illustrating Theories & Models. New Jersey: Lawrence Erlbaum.

- **Keller JM, & Suzuki. K** (1988) Use of the ARCS motivation model in courseware design. In DH Jonassen (ED), Instructional Designs for Microcomputer Courseware (pp 401-434)

- **Kelly, AE** (2003) The Role of Design in Educational Research 32(1), 3-4

- **Khan, BH** (Ed) (1997) Web-Based Instruction. Educational Technology Publications, Englewood Cliffs, New Jersey

- **Kleinginna, PR & Kleinginna, AM** (1981) "A Categorized List of Emotion Definitions with Suggestions for a Consensual Definition" Motivation & Emotion.

- **Knapper, C** (1988). Lifelong Learning & Distance Education. American Journal of Distance Education, 2(1): 63-72..

- **Knowles, MS** (1973) Introduction to Group Dynamics. Chicago: Association Press. Revised edition 1972 *published by New York: Cambridge Books

- **Knowles, MS** (1984) Andragogy in Action: Applying Modern Principles Of Adult Education. San Francisco: Jossey-Bass.

- **Kozma, RB** (1987) The Implications Of Cognitive Psychology For Computer-Based Learning Tools. *Educational Technology*. 27 (11):20-25

- **Kruse, K & Keil, J** (1999). Technology-Based Training: The Art and Science of Design, Development, and Delivery. San Francisco, CA: Jossey-Bass Pfeiffer.

- **Lee, FSL. Vogel, D. & Limayem, M** (2002) Virtual Community Informatics: What We Know & What We Need to Know. Proceedings of the 35th Hawaii International Conference on System Sciences.
  http://ieeexplore.ieee.org/xpl/freeabs_all.jsp?arnumber=994248
  Accessed November 2006

- **Lieb, S** (1991) Principles of Adult Learning. Available online at:
  www.hcc.hawaii.edu/intranet/tcommotties/teachtipadults-2htm
  Accessed October 2006

- **Lindeman, EC** (1926) The Meaning of Adult Education. New York: New Republic

- **MacDonald, CJ. Stodel, EJ. Farres, LG. Breithaupt, K. & Gabriel, MA** (2001). The Demand-Driven Learning Model – A Framework For Web-Based Learning. Internet & Higher Education, 4: 9 – 30.

- **Malone, TW & Leppers, MR** (1987) Intrinsic Motivation & Instructional Effectiveness in Computer Based Education

- **Martin, K.** (2000)**.** Alternative Modes of Teaching and Learning [Online]. Available: http://www.csd.uwa.edu.au/altmodes/to_delivery/collab_coop.html (Accessed August 2006)

- **Maslow, A** (1954) Motivation and Personality. New York: Harper

- **Maslow, A & Lowery, R.** (1998). Toward A Psychology Of Being (3rd ed.). New York: Wiley & Sons.

- **Merriam, S** (1988) Patient Education & Counseling 62: 178-188 Placing Cyber Society Research into a Hierarchy of Social Explanation. Proceedings of the Hawaii International Conference on System Sciences

- **Merrill, MD** (1991). Constructivism & Instructional Design. Educational Technology, 31(5):45-52.

- **Merrill, MD** (2001). Components of Instruction: Toward a Theoretical Tool for Instructional Design

- **Merrill, MD** (2005) Hypothesized performance on complex tasks as a function of scaled instructional strategies http://it.coe.uga.edu/itforum/paper84/DrMerrillPDF.pdf Accessed October 2006

- **Meyer, SM** (2005) An Investigation into the Affective Experiences of Students in an Online Learning Environment Unpublished Ph.D. Thesis, University of Pretoria Outcome-Based Education: A Teachers Manual.

- **Panitz, T** (1996) A Definition of Collaborative vs. Cooperative Learning Available online at: http://www.city.londonmet.ac.uk/deliberations/collab.learning/panitz2.html Accessed on September 2006.

- **Pascal Sidiras, JJL. & Kremar, H**. 2004. Success Factors of Virtual Communities from the Perspective of Members & Operators: An Empirical Study. Proceedings of the 37the Hawaii International Conference on System Sciences.
Peer Assistance & Review Guidebook. Columbus OH, Ohio: Department of Education

- **Raab, RT. Ellis, WW. & Abdon, RB** (2002). Multisectoral Partnerships in E-Learning: A Potential Force for Improved Human Capital Development In Asia Pacific. Internet & Higher Education, 4: 217 – 229.

- **Reeves, TC** (2000). Socially Responsible Educational Technology Research. Educational Technology, 40(6):19-28.

- **Reeves, TC. Herrington, J & Oliver, R** (2005). Design Research: A Socially Responsible Approach To Instructional Technology Research In Higher Education. Journal of Computing in Higher Education, 16(2), 97-116.

- **Reigeluth, CM** (1999) Instructional-Design Theories and Models: Volumn II. Lawrence Erlbaum and Associates, Hillsdale, NJ

- **Richardson, L** (1994) A Method of Enquiring. CA: SAGE Publications

- **Romiszowski, JA** (2004) Educational Technology, January-February 2004 Volume 44, Number 1, pp. 5-27 Accessed on 11 August 2006
  http://BooksToRead.com/etp/elearning_failure_study.doc

- **Rossett, A** (2000) Confessions of an e-dropout. Training 37 (8):100.

- **Schoeman, H. Cronjé, JC. Nagel, & L. Blignaut, S** (2004) Virtual Soccer: Using A Game Metaphor To Encourage Adult Learners To Complete An Online Course submitted to Online Education 17 October 2005.

- **Siegel, M. A., & Kirkley, S. (1997).** Moving toward the digital learning environment: The future of Web-based instruction. In B. H. Khan (Ed.), Web-Based Instruction. Englewood Cliffs, NJ: Educational Technology Publications.

- **Slavin, R** (1995) Cooperative learning: Theory, research, and practice. Needham Heights, MA: Simon & Schuster Company.

- **Smith, J**. (2000) Computer Games Research 101 – A Brief Introduction to the Literature Available online: http://www.game-research.com/art_computer_game_research.as Accessed in October 2006.

- **Smith, S** (1992) Communication in Nursing 2nd Edition. St Louis: Mosby.

- **Stroot S, Keil V, Stedman P, Lohr L, Faust R, Schincariol-Randall L,Sullivan A, Czerniak G, Kuchcinski J, Orel N & Richter M** (1998)
  Peer Assistance and Review Guidebook. Colombus OH, Ohio: Department of Education

- **Tam, M** (2000). Constructivism, Instructional Design, & Technology: Implications for Transforming Distance Learning. Educational Technology & Society, 3(2).
- **Taylor, RW** (2002) Pros and cons of online learning – A faculty perspective" Journal of European Industrial Training **26**, 24-37.
- **Toth, T** (2003) Animation – Just Enough, Never Too Much http://www.learningcircuits.org/2003/aug2003/toth.htm Accessed October 2006
- **Turvey, K** (2006) Towards Deeper Learning through Creativity within Online Communities in Primary Education. Computers & Education 46: 309 – 321.
- **Van den Akker, J** (1999) Principles & Methods of Development Research.
- van den Akker, J. (1999). Principles and methods of development research. In J. vanden Akker, N. Nieveen, R. M. Branch, K. L. Gustafson, & T. Plomp, (Eds.), Designmethodology and developmental research in education and training (pp. 1-14). TheNetherlands: Kluwer Academic Publishers
- **Van der Horst, H & McDonald, R** (1997) Outcomes-Based Education: A Teacher's Manual. Pretoria: Kagiso.
- **Van Romburgh, H** (2005) The Relation & Differences Between The Use Of Technology Based Learning In Third World & First World Countries – A Case Study
- **Van Ryneveld**, **L** (2005) Surviving the Game: Interaction in an Adult Online Learning Community. Unpublished Ph.D. Thesis. University of Pretoria.

- **Wagner, C. Cheung, KSK. Rachael, KFI. & Fion, SLL** (2005) Deceptive Communication in Virtual Communities. Proceedings of the 38th Hawaii International Conference on System Sciences.

- **Ward, TB** (1995) What's Old About New Ideas? In: Smith, S.M., Ward, T.B., Finke, R.A. (Eds.), The Creative Cognition Approach. MIT Press, Cambridge, MA, pp. 157–178.

- **Watson, J & Hardaker, G** (2005). Steps Towards Personalised Learner Management System (LMS): SCORM implementation. Campus-Wide Information Systems, 22(2): 56 – 70.

- **Watson, JB & Rossett, A** (1999). Guiding the Independent Learner in Web-Based Training. Educational Technology, 39(3):27-36.

- **Westera, W** (1999) Paradoxes in Open Networked Learning Environment: Towards a Paradigm Shift. Educational Technology Jan- Feb Edition