An Exploratory Study of a Virtual Partnership for Building Capacity in a Tertiary Education Institution in the SADC Region

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Tulimevava Kaunapawa Mufeti

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ABSTRACT

Collaborative partnerships aimed at strengthening institutional capacities are a long established trend in academia. Recent developments in Information and Communications Technologies (ICTs) have fostered a renewed interest in collaborative initiatives in the academic sphere, however, and at the same time, have created new ways of working together. Current research models do not provide sufficient methods to guide collaborations in capacity-building processes in virtual environments, especially in contexts associated with inadequate resources. Conceptual tools are therefore needed to guide the implementation of partnerships that use technology to mediate capacity building in these contexts.

This research study was aimed at understanding whether and how virtual partnerships can be used to facilitate capacity building in tertiary education institutions in the SADC region. It is based on a single case study of the SANTED Virtual Classroom Project, a partnership between the Departments of Computer Science at Rhodes University (RU) and the University of Namibia (UNAM). In the project, ICTs were used to mediate the process of building teaching and research capacity in the department at UNAM. The dynamics of the partnership are explored as the implementation process developed over a period of three years.

The research adopted a sociocultural perspective in the analysis of the project"s implementation. It uses activity theory and the notion of communities of practice as conceptual frameworks to explore how the two departments organised themselves and how they harnessed the virtual environment to enable the capacity-building partnership. Activity theory provided a lens to understand the complex relationships between the different elements of the partnership activities mediated by technological tools. The concept of communities of practice, on the other hand, enabled participants" progress to be analysed, as they went through the various transition stages of the capacity-building process.

The thesis identifies the following four categories of challenges inherent in the implementation of virtual partnerships: infrastructural, institutional, cultural and individual expectations. It also emphasises the need for identifying the different transition stages corresponding to the levels of participation in the capacity-building process. The thesis recommends that the implementation of virtual partnerships for capacity building purposes in the SADC region must focus on: identifying the appropriate capacity building strategies at

each transition stage; finding appropriate, light-weight virtual classroom solutions; identifying appropriate pedagogic models to suit available technology; addressing systemic tensions that can arise as a result of different institutional cultures; and developing and nurturing virtual communities of practice to ensure sustainability. The research findings contribute to the body of knowledge exploring the use of technologies to develop and strengthen human resource capacities in developing contexts in a sustainable way. More importantly, it contributes to the literature on collaborative virtual partnerships in the SADC region, and demonstrates one way in which the operations of such a partnership may be supported in similar contexts.

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LIST OF ACRONYMS

AAU	Association of African Universities
ADSL	Asymmetric Digital Subscriber Line
AT	Activity Theory
AusAID	Australian Agency for International Development
AVU	African Virtual University
BSc	Bachelor of Science
CHE	Council for Higher Education
CMC	Computer-mediated Communications
FAS	Facilitation Activity System
ICT	Information and Communications Technologies
IGCSE	International General Certificate of Secondary Education
IP	Internet Protocol
HBI	Historically Black Institution
HIGCSE	Higher International General Certificate of Secondary Education
HCI	Human Computer Interaction
HESA	Higher Education South Africa
HEQC	Higher Education Quality Committee
HWI	Historically White Institution
LAS	Learning Activity System
LPP	Legitimate Peripheral Participation
MAS	Management Activity System
MSc	Master of Science
NEPAD	New Partnership for Africa˝s Development

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NCHE	National Council of Higher Education
NQA	Namibia Qualifications Authority
NQF	National Qualification Framework
PCAS	Project Coordination Activity System
PVC: AAR	Pro-Vice Chancellor: Academic Affairs and Research
RU	Rhodes University
SADC	Southern Africa Development Community
SANTED	South Africa Norway Tertiary Education Development Programme
SARUA	Southern Africa Regional Universities Association
SAQA	South African Qualifications Authority
SIDA	Swedish International Development Cooperation Agency
TAS	Teaching Activity System
TCP/IP	Transmission Control Protocol / Internet Protocol
UFH	University of Fort Hare
UNAM	University of Namibia
UNESCO	United Nations Educational, Scientific and Cultural Organization
VCP	Virtual Classroom Project
WASC	West African Cable System

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CHAPTER 1: INTRODUCTION

This chapter introduces the work done in this research. It starts with the context of the research and introduces the SANTED Virtual Classroom Project as the case study. It then explains the motivation for the research and describes the problem to be addressed. The scope of the research and the methodology used are also briefly presented. A summary of the findings of the thesis is then provided, and the constraints limiting the research process and findings are highlighted. The chapter ends with an outline of the rest of the thesis.

1.1 Research Context

Inter-institutional collaboration was defined by Michael Neil in 1981 as a commitment between two or more institutions based on a formal agreement to form an active working partnership (Moran & Mugridge, 1993). According to Neil, collaboration in academia was crucial because it enabled institutions to create and share resources, improve the quality of learning materials, increase access to a wider student population, respond to political pressures, and to guide and initiate changes in societies. A decade later, Austin and Baldwin (1991) described collaboration in the academic field as a growing phenomenon that enhances the quality of scholarship and teaching. According to them, collaborative partnerships in tertiary education were becoming popular because they promoted greater intellectual creativity, increased productivity through mutual goals, and provided an atmosphere for mentoring and role modelling. At the moment, academic partnerships aimed at mentoring and role modeling are particularly fuelled by the call of the global community to build capacity in developing contexts (UNDP, 2009a; Parker, 2010), as well as the continued growth in internationalisation and globalisation of education (Anderson & Maharasoa, 2002; Bashir, 2007; Marco, 2009). The growth of these types of partnerships is also attributed to recent developments in Information and Communications Technologies (ICTs), which mediates communication between geographically dispersed educational institutions (Gray & Burke, 2008; Shaughnessy, Purves, & Jackson, 2008; Johnson, Humphrey, & Allred, 2009).

The use of ICTs to mediate partnerships across institutional boundaries is called "virtual partnership" in literature (Goldman, Nagel, & Preiss, 1995; Payne, Keating, & Myers, 1997; Ratcheva & Vyakarnam, 2001). Virtual partnerships are broadly defined here as collaborations between geographically dispersed institutions, enabled by the use of

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telecommunication technologies. Traditionally, partnerships relied heavily on the physical collocation of partners. Although face-to-face encounters are still considered the richest medium for communication (Sherblom, 2010), virtual environments have become a favourable choice to bridge geographical distances between individuals and institutions where physical contact is not possible (Erickson, Kellogg, Shami, & Levine, 2010). In virtual partnerships, telecommunication technologies are used to facilitate communication and maintain a working relationship between the partners (Ratcheva & Vyakarnam, 2001). This added dimension of telecommunication technologies has made partnerships more affordable and feasible, especially between educational institutions that are geographically thousands of kilometres apart. Research has shown, however, that virtual partnerships are not simply an addition of technological infrastructures to traditional partnerships (Ratcheva & Vyakarnam, 2001; Barbera, 2004; Wainfan & Davies, 2004). While appropriate technologies are undeniably crucial for success, institutions implementing virtual partnerships face many more challenges than those involved in traditional partnerships.

In the early years of the 21st century, virtual partnerships were proposed as a remedy to the challenges faced by tertiary education institutions in Africa (Keats, Beebe, & Kullenberg, 2003; Kuroda & Shanawez, 2003). In his visionary paper written in 2003, Dr. Stanley Moyo of the African Virtual University (AVU) Project of the World Bank explored the numerous prospects that ICTs can offer to education in Africa, and proposed the establishment of the "Virtual Partnership of African Universities" (Moyo, 2003). According to him, the partnership would not only enable African Universities to harness ICTs to jointly award degrees and certificates, but it would also harmonize higher education provision in the continent. Through the Southern Africa Regional Universities Association (SARUA) established in February 2005, various technological possibilities have been explored to enhance collaboration, linkages and partnerships among higher education institutions in the quest of harmonizing education systems in the SADC region (Kotecha & Perold, 2010). Despite this development, however, there are not many virtual partnerships in Africa in general and the SADC region in particular, because of the lack of quality ICT infrastructure needed for successful regional collaboration (Kotecha, 2008).

This thesis investigates the use of ICTs to mediate (or facilitate) a capacity-building collaborative partnership between two departments of tertiary education institutions in the

SADC region. It uses as its case study the SANTED Virtual Classroom Project (VCP), a partnership initiative between the Departments of Computer Science at the University of Namibia (UNAM) and Rhodes University (RU) funded by the South Africa - Norway Tertiary Education Development (SANTED) Programme. The aim of the partnership was to harness ICTs to build teaching, research and staff capacity in the department at UNAM. The research uses a case study approach to explore the viability of using technology to engage in capacity-building in the SADC region.

The field work studied the activities of the SANTED VCP, and spanned a period of three years, starting from January 2008 to December 2010. Each year of the project implementation was expected to improve the capacity in the department at UNAM. In each year, observations of partnership activities and experiences of participants with different roles in the project were gathered using a variety of methods, and analysed using Activity Theory and the notion of Communities of Practice. Results from the analysis were used to identify critical stages of virtual partnership implementations that aim to build capacity in tertiary education departments in the SADC region, and the challenges facing such projects. The thesis addresses issues surrounding one of the promising initiatives in confronting educational challenges in developing societies, that of co-operation between higher educational institutions with insufficient resources. The core of the thesis contributes to the body of emerging knowledge on the formation of regional partnerships between tertiary education institutions in developing contexts, mediated by ICTs.

1.2 Introducing the Case

This study explores the relationship between The Telkom Centre of Excellence in Distributed Multimedia (CoE) hosted by the Department of Computer Science at Rhodes University (RU), and the Department of Computer Science at the University of Namibia (UNAM). The two departments informally started their relationship in 2001, when I, as a staff member from UNAM, was seconded for further studies at RU to do an Honours degree and later a Master of Science in Computer Science. Talks on the possibility of collaboration naturally emerged after I returned to UNAM in 2004. The formalization of the relationship started with the signing of a Declaration of Intent to collaborate in September 2004. The envisaged collaboration would specifically focus on staff exchanges, staff development and training, undertaking of joint research, and sharing of information in areas of expertise. Immediately

after signing the agreement, however, it became evident that the department at UNAM was not fully geared to participate in the proposed collaboration because of its insufficient number of lecturers, heavy staff workloads (up to 14 hours of teaching per week) and very limited bandwidth (512Kbps) in comparison to the department at RU. The collaborative ambitions were therefore temporarily suspended to enable the two departments to secure funding for this purpose.

In 2007, the department at UNAM reviewed its degree curriculum in line with the requirements of UNAM and Namibia's National Qualification Framework (NQF). During the review process, the staff in the Department of Computer Science expressed concern that the department did not have adequate human and infrastructural resources to implement the requirements of the new curriculum. Because of the relationship that existed with the Department of Computer Science at RU, the two departments agreed to jointly seek funding for this initiative. The South Africa - Norway Tertiary Education Development (SANTED) Programme agreed to fund the initiative for a period of three years, starting in January 2008.

The role of the department at RU in this project was to provide support for the implementation of the requirements of the new degree, while at the same time developing teaching and research capacity in the department at UNAM. In the project, a selected group of students would be fast-tracked into the new curriculum, allowing them to graduate with a single-major Bachelor of Science (BSc) in Computer Science directly in 2008, 2009 and 2010 instead of only in 2011 as per the curriculum implementation plan of UNAM. At the end of each year of implementation, the two top students from the programme would be given an opportunity to pursue a Master of Science (MSc) degree in Computer Science the following year at RU, with full sponsorship from UNAM. The intention was to have at least six Namibian students returning to the department at UNAM as staff members by the end of the project. Once they completed their MSc, it was expected that these students would be well prepared to contribute to the consolidation of the implementation of the single- major degree as well the MSc degree offered by UNAM.

Since the two departments are located in different countries, face-to-face contact sessions for the duration of the project was not feasible because of the limited finances, the number of courses involved, and the lecturers' obligations to their students at RU. A virtual environment was therefore deemed necessary to support the distance provision of all course content and

research. The virtual environment would be used to support traditional, synchronous lectures to the students, while at the same time utilized as a tool to facilitate research collaboration. Being the main communication medium between the two institutions, the virtual environment was a critical component of the realization of this partnership.

1.3 Research Motivation

Tettey (2006) reported that the expertise base of African Universities has eroded, and that there is currently insufficient capacity in all educational institutions in the continent to provide quality education to all African citizens. In this era, when regionalization and internationalization is on the increase, higher education institutions have been urged to consider engaging in collaborative partnerships to address capacity challenges, as well as for efficiency purposes (Eddy, 2010; European University Association, 2010). The benefits of collaborative partnerships are widely reported in literature (see for example (Moran, 1990; Moyo, 2003; Ajiferuke, 2005; Kezar, 2005; Kotecha, 2010a; Walsh & Kahn, 2010)), and have consequently resulted in a proliferation of collaborative partnerships in academia (Kezar, 2005; Amey, Eddy, & Ozaki, 2007). Recent developments in ICTs have also fuelled the wide adoption of academic partnerships, while at the same time, enabling virtual partnerships as an alternative to traditional partnerships. Researchers have previously suggested that the greatest potential impact of virtual partnerships in education is in Africa, where there is a greater need to increase participation levels in higher education (Keats, Beebe, & Kullenberg, 2003; Moyo, 2003).

Successful virtual partnership initiatives reported in literature involved mainly institutions in developed countries with highly developed infrastructure (Wheeler, Valacich, Alavi, & Vogel, 1995; Verbaan, 2008; Scheinbuks & Pina, 2010). The few that involved developing contexts had limited virtual presence, and are reported from the perspective of developed contexts (Paxton & Heredia, 2004; Plane & Venter, 2008). Consequently, the viability of implementing these types of partnerships in developing contexts such as the SADC region is not established. Educational institutions in the SADC region are characterized by challenges such as insufficient funding, inadequate infrastructures, expensive and scarce bandwidths, and cross-cultural differences among staff and students (Twinomugisha, 2008; Kotecha, 2008b). Researchers that have worked in similar contexts have also reported that possibilities offered by ICTs in these contexts are hampered by many challenges (Thatcher, Katz, &

Trepess, 2000; Plane & Venter, 2008; Ramos & Tajú, 2009). This further discourages institutions in contexts with limited infrastructural resources from realizing the possible benefits of ICT for development (ICT4D). Collaborative partnerships mediated by ICTs in these contexts therefore warrant immediate attention of researchers (Twinomugisha, 2008; Kotecha, 2010a).

One of the assumptions underlying this study is that collaborative virtual partnerships can be used to build capacity in tertiary education institutions. These partnerships can, however, only be successfully replicated if there are available guidelines that are contextualized to the settings in which they are implemented. At the moment, there is a paucity of research literature aimed at identifying systematic approaches to implementing these types of partnerships in contexts such as the SADC region. The available literature seems to suggest traits for ensuring partnership success, but these are derived from unique contextual experiences, often with no underlying theory (Brinkerhoff, 2002; Kezar, 2005). The approach to implementing virtual partnerships in these contexts therefore remains unclear. In addition, key considerations for partnership implementation, including possible technologies to use, possible difficulties to anticipate, institutional adaptations needed to enable collaboration, and methods to encourage active participation have not been fully articulated in the literature (Kezar, 2005; Amey, Eddy, & Ozaki, 2007; Eddy, 2010). This makes it difficult to replicate successful experiences from one partnership to another. It also makes it difficult to design appropriate environments for collaboration (Poltrock & Handel, 2010). There is therefore a need to identify and address the challenges for creating sustainable virtual partnerships that involve capacity building in institutions in developing contexts.

Inter-institutional collaboration has reportedly not proven to be easy in practice (Paxton & Heredia, 2004; Ramos & Tajú, 2009), and is also associated with high failure rate (Eddy, 2010). Traditionally, tertiary education institutions guarded their autonomy and did not want to indulge in extensive collaboration with other institutions (Moran & Mugridge, 1993). Kezar (2005) also argues that educational institutions are not structured to support collaborations, and that their organizational units occlude partnerships. As a result, collaborative partnerships are characterized by "irregular success" and have a "high chance to collapse after a depressingly short time" (Moran & Mugridge, 1993, p. 2; Kezar, 2005; Eddy, 2010). The use of technology in partnerships introduces newer and much more sophisticated

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ways of working together, necessitating new understandings of how collaboration in these types of partnerships changes (Jarvernpaa & Shaw, 1998; Ratcheva & Vyakarnam, 2001; Pallot, Martinez-Carreras, & Prinz, 2010).

1.4 Research Problem

Critical shortages of infrastructural and human resources exist in many tertiary education institutions in the SADC region (Mihyo, 2008; SARUA, 2009; Tettey, 2010). A concerted, collaborative effort in addressing these shortages is recommended as the most viable way of maximizing capacities and capabilities (Kotecha, 2008b). Through the 1997 SADC Protocol for Education and Training, member countries recognized the importance of a concerted effort in addressing the challenges of the region, and aspired to harmonize, standardize and revitalize education systems in the region. SADC member countries have therefore been called upon to form collaborative partnerships that will enable them to work more closely together in sharing scarce resources and expertise.

Although collaborative arrangements aimed at addressing infrastructural and human resource shortages in the region are not uncommon, these arrangements tend to be ad hoc rather than coordinated at institutional, national or regional levels (Butcher, et al., 2008). Traditionally, such partnerships are characterized by high staff and student mobility (Butcher, Wilson-Strydom, Hoosen, MacDonald, Moore & Barnes, 2008; Kotecha, 2008b), but the funding required to enable this mobility is scarce (Watson, 2010). The developments in ICTs are slowly transcending time and distance barriers, however, enabling geographically dispersed institutions to collaborate virtually. But institutions in developing countries in general, and in the SADC region in particular, have not fully taken advantage of these possibilities because of insufficient infrastructure and scarcity of bandwidth (Twinomugisha, 2008). Developing virtual partnerships between educational institutions in the region is one way of achieving the regional cooperation aspirations of the 1997 SADC Protocol for Education and training, while at the same time maximizing effective utilization of the recent broadband acquisitions in the region (Twinomugisha, 2008).

This research aims to find out if virtual partnership initiatives aimed at building capacity in higher education institutions can now be launched in the SADC region. It uses the SANTED Virtual Classroom Project as a testing ground to explore whether institutions, their

infrastructure and their processes are ripe for supporting capacity building through virtual environments. The main research question informing the study is:

> Can virtual environments be currently used to build capacity in departments of tertiary education institutions in Southern Africa?

To answer the above question, the following subsidiary questions will be considered:

- What challenges arise in the implementation of virtual partnerships for capacity-building purposes in tertiary education institutions in the SADC region?

- How can the institutions harness the virtual environment to support capacity-building initiatives?

- How can the institutions re-organize themselves to facilitate capacity building?

The research explores the various solutions used in the SANTED Virtual Classroom Project, in which the Computer Science departments at RU and UNAM are collaborating in the delivery of training programmes, staff development and undertaking of joint research. As a primary objective, the project aspires to build teaching and research capacity in the department at UNAM. The study explores the viability of the implementation of partnerships using technology to develop the required capacity in a department with an insufficient number of lecturers and infrastructural resources. It brings a theoretical perspective to the use of ICTs in facilitating the process of capacity building. The research also describes how the two departments, and in turn, the institutions, reorganized themselves to support the process and culture of collaborative work. As a spin-off of the research, the thesis concludes with recommendations that can serve as a guide for the implementation of virtual partnerships between educational institutions in similar contexts.

1.5 Research Methodology

The research and data collection process involved the study of a single project, the SANTED virtual classroom project. The research methodology employed is therefore the single-case study (Yin, 2003), primarily because the project was a once-off implementation with a limited time-frame. According to Yin (2003, p. 47), a rationale for using a single-case design

could be to test a "well-formulated theory with a specified set of propositions and circumstances under which the propositions are believed to be true". In order to validate, contradict or extend the theory, a single case that "meets all the conditions for testing the theory may be used to determine whether the theory's propositions are correct, or whether some alternative set of explanations are more relevant" (Yin, 2003, p. 41). Virtual partnerships in developing contexts such as those of the SADC region are claimed not to be successful because of insufficient infrastructural resources and lack of funding (Twinomugisha, 2008). Through the SANTED funding, barriers related to infrastructural resources and lack of funding are minimized in the project. The single-case study can therefore contribute to knowledge and theory building by confirming whether such failures can be attributed to these barriers alone or whether future investigations should focus on other factors.

Another rationale for using the single study method as cited by Yin (2003) is the limitations of a researcher to influence the research environment. The researcher was involved in the case study as a project coordinator at UNAM, but had no direct control over the implementation stages of the project. As such, the researcher could not influence the teaching methodology, the chosen technologies to provide a virtual environment and many other conditions available in the everyday situation of the project.

The data collection process that would provide answers to the research questions in this study necessitated a multi-method approach that would enable the collection of data from people in their everyday situation, and not within the controlled confines of laboratory experiment. Yin (2003) suggested that studies that are constrained by these barriers are better carried out using the single-case study method.

A variant of the single-case study used in this thesis is the embedded single-case study design (Yin, 2003). In the embedded single-case study, the study occurs within a single unit, but it involves more than one unit of analysis. The case study of this research focuses on a single project: the SANTED virtual classroom project. Each year of implementation is taken as a single unit of analysis, and there are four modules taught in every year for each of the three years of the implementation of the project. The embedded design enables the researcher to give attention to subunits (i.e. each of the four courses taught in a year) of the implementation of the project, thereby enabling several units of observation and analysis. At the same time,

the embedded design also provides a larger holistic perspective of the project, ensuring that the focus does not remain at the subunit level but returns to the larger target of the study.

There is a paucity of methodologically sound models for implementing virtual partnerships for capacity-building purposes in developing contexts. It was thus unrealistic to restrict the participants" engagements in the case under study without knowing how best to implement the partnership. The implementation therefore adopted an experimental approach, intended to support the participants in their exploration of the possible mechanisms for attaining the projects" objectives in a reflective way. As a result, the participants" choices such as technologies used and approach to lecture delivery were not restricted to specific prescriptions. This provided the participants with the flexibility to choose and develop their own methodologies and tools to use, as well as to search for and adopt solutions to tackle their daily problems and challenges as they emerged. In this way, the participants adopted an action research approach, which enabled them to deliberately work towards improving their practice in a variety of situations.

The thesis uses activity theory to guide the reporting, as well as to analyse the implementation of the project. Activity theory defines an activity system as a minimum unit of analysis, and defines the basic elements of an activity system, which are: subject, object, tools, community, division of labour and rules. It postulates that an activity is object-oriented (i.e. driven by a particular motive or a need) of a subject. All the actions in an activity system can only be meaningfully interpreted when the activity"s motive is understood. The subject uses historically accrued semiotic and material tools to mediate their actions. In carrying out the activity, the subject interacts with the community and is guided by the rules and division of labour in the activity system. In this thesis, Activity theory is used to understand the difficulties, challenges and tensions experienced in using a virtual environment to build capacity. It provides the means to understand how the activity of capacity building developed, and how it both shaped and was organized around the context of implementation. This provided a framework against which the specific activities carried out in the project can be reported and investigated.

The second analytical framework used in the thesis is the concept of communities of practice, and specifically the notion of Legitimate Peripheral Participation (LPP). LPP differentiates between participants in a community of practice, classifying them as either novices or

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experts. It also defines how (through participating in a community of practice) a participant may traverse from being a novice to becoming an expert. Using LPP provides the means to understand how capacity building may be analysed, and how it can be enhanced through building a community of practice.

1.6 Scope of Research

This research examines how technologies were used to mediate the process of capacity building within the context of two relatively small departments of two relatively small institutions in the SADC region. Using a case study of the SANTED VCP, the study focuses on understanding the virtual partnership, how the institutions organized themselves and collaborated to enable capacity building, and the challenges that arose during the implementation.

In reality, there are multiple ways of implementing capacity-building initiatives that rely on ICTs to facilitate the partnership. There are also multiple technologies that may be used in such a partnership. Evaluating them all falls outside the scope of this research, which primarily focuses on the technologies available to, and used in the SANTED Virtual Classroom Project. The researcher also did not have control over the choice of technologies that were used in the project. The evaluated solutions are therefore regarded as demonstrative rather than exhaustive.

The SANTED Virtual Classroom Project focuses on the implementation of a single, specific capacity-building initiative within a limited timeframe of three years. In real life, capacity-building partnerships may have wider areas of focus, and the real benefits of such collaborative activities are usually only realized after longer time periods. As reported in the thesis, the participants felt the three years was a period of getting to know one another. The findings of the partnership implementation under study are thus only reported within this limited time frame.

Considering the above limitations, this thesis does not claim to provide a clear-cut blueprint for the implementation of virtual partnerships in the region. Rather, it demonstrates only one way in which the operations of such a partnership may be supported in similar contexts. By

doing this, it contributes to building literature on collaborative virtual partnerships in the SADC region.

1.7 Summary of Findings

The study aimed at establishing whether virtual environments can be used at this point in time to facilitate capacity building in departments of tertiary education institutions in Southern Africa. To answer this question, the study analysed the challenges that arose in the implementation of the case study, investigated how the virtual environment was used to support capacity building, and examined how the institutions organize themselves to facilitate capacity building. Overall, the findings indicate that the implementations of virtual partnerships for capacity-building purposes in tertiary education institutions of the SADC region are hindered by several challenges at this stage. Factors that can affect the success of the implementation include infrastructural resources, institutional factors, cultural issues and individual expectations.

The investigation of the use of a virtual environment demonstrated that the approach taken in choosing a technological solution affects the outcome of the capacity-building process. The approach used in the case study was unique because it did not recommend the use of any one specific technology. Rather, different technological solutions were explored, and different pedagogical models were adopted depending on the availability and usefulness of technology. In the thesis, the salient factors that contributed to the success of using different technologies were isolated.

Overall, the study found that there are many factors that can hinder the implementation of virtual partnerships in developing contexts in general, and the SADC region in particular. The thesis therefore recommends that the implementation of virtual partnerships in the SADC region must put emphasis on finding appropriate, light-weight virtual classroom solutions that are always available and accessible. In addition, the implementation must find ways to deal with systemic tensions that can arise as a result of different institutional cultures; and develop and nurture a virtual community of practice, where emphasis is placed on the different stages of participation.

1.8 Limitations of This Research

While this research is aimed at determining the viability of building virtual partnerships between educational institutions in the SADC context, it does not offer a universal blueprint solution to all tertiary educational institutions located in this region. The findings of the research are, in reality, influenced by a number of factors including the involvement of the researcher, the context of the research, funding available for the virtual partnership initiatives, as well as the type of technologies used in the research. These factors are briefly described below.

Funding

The partnership case study used in this thesis began with external funding of all its operations from SANTED. SANTED funded the acquisition of basic infrastructure used by the lecturers and students, payment of a telecommunication broadband contract, and the reimbursement of lecturers and facilitators taking part in the project. In other cases, institutions will not have a budgetary allocation to launch these types of activities. They will therefore be required to utilize their existing departmental budget, making it more difficult to implement virtual partnerships than what is described here.

The researcher's involvement

The researcher is a lecturer in the Department of Computer Science at the University of Namibia, and at the same time, registered for PhD studies with the Department of Information Systems at Rhodes University. Prior to the commencement of the SANTED virtual classroom project, the researcher had extensive relationships with both departments; she completed her first Bachelor's Degree in Computer Science at the UNAM, and continued with further studies for a Master of Science in Computer Science at RU. Through her personal relationship with both the staff and students in the departments, it was possible to foster collaboration between the two departments. Throughout the duration of the project, the researcher was also responsible for coordinating the implementation of the project at UNAM, under the guidance of the main Project Coordinator based at RU. Having such an interest and the level of involvement of the researcher in both departments may affect the findings and in the long run, the reliability and validity of the findings.

Limitations in the research process

The findings presented in this thesis are illustrative rather than exhaustive. When considering inter-institutional partnerships such as those described in this thesis, it is important to keep in mind that their real value and outputs are recognizable in much longer timelines than those described in this thesis. It is also important to ensure that all possible technologies and scenarios are tested for viability. The data collection processes used here, however, focused only on salient information within the established time frame and the resources available to the two departments participating in the SANTED virtual classroom project. In other cases, institutions will have different technological resources that may be more advanced or more out-dated in comparison to those used in this thesis. The results presented here should therefore be interpreted with these considerations in mind.

Rapidly changing technology

Developments in ICTs, particularly in the SADC region, are currently at a dynamic stage. The African Tertiary Institution Connectivity Survey (ATICS) of 2004, for example, concluded that none of the tertiary educational institutions in the SADC region had sufficient bandwidth for research and educational purposes, and the majority of institutions were using terrestrial based leased lines or satellite connectivity with an average bandwidth of 706/1254 Kbps upstream/ downstream (Gakio, 2006). Although different institutions in the region still have different provisions for bandwidth, the situation has improved since 2004. Twinomugisha (2008), for example, observed that all countries in the SADC region have either joined or are in the process of forming their National Research and Education Networks (NREN), which would function as a bandwidth consortium to enable education institutions to jointly acquire bandwidth in bulk. In 2009 and 2010 alone, at least three submarine cables (Seacom, Lower Indian Ocean Network (LION) and East African Cable Systems (EASSy)) with a total capacity of 4 Terabits/second became available to some SADC countries (Twinomugisha, 2010). In June 2012, Namibia and Botswana also gained access to a submarine cable through the West African Cable System (WASC). Because of the new technological advances taking place in the region on a daily basis, the technological status presented in this thesis and consequently, the concluded findings are only a snapshot in the historical development of the region. Some of the findings of this thesis are thus likely to become out-dated very quickly.

1.9 Thesis Structure

The thesis is organized as follows:

Chapter 1 introduces the research carried out by contextualizing the problem addressed and justifying the need for the research. The problem under investigation is briefly described and situated in the case study of the research. The scope of the research is then clarified, and the methodology employed is summarized. The chapter also highlights the findings and limitations of the study and concludes with an outline of the remainder of the chapters in the thesis.

Chapter 2 reviews the relevant literature for this thesis. Due to the paucity of literature on virtual partnerships for capacity-building purposes, the review focuses on the following three themes that are deemed relevant to the thesis: capacity building, collaborative partnerships and the use of ICT in tertiary educational institutions. Firstly, the different approaches to capacity building and the conceptual framework for understanding capacity building are presented. In the second section, the factors considered critical to the success of inter-institutional partnerships are described, together with the models of collaboration that are currently reflected in the literature. The last section looks at the type of ICTs and how they are used in educational contexts.

Chapter 3 details the initial context of the study. The locality of the study is contextualized to tertiary education institutions in the SADC region, and a brief description of the academic developments in Namibia and South Africa is provided. It then gives background information for the Virtual Classroom Project, describing how the project was conceived, the aims and objectives of the project, and the initial implementation plan. It also explains the changes made to the original implementation plan prior to the commencement of the study.

Chapter 4 introduces the frameworks that are used to analyse the findings of the research. Firstly, it touts activity theory as the appropriate analytical framework for analysing the activities of virtual partnerships for capacity-building purposes. The specific areas of activity theory that informed the empirical studies are identified, and the benefits of using activity theory to study the implementation of capacity-building virtual partnerships are highlighted. It then presents the important constructs of a community of practice that are used to analyse how learning may be facilitated in the context of a capacity-building partnership.

Chapter 5 presents the research design. It explains how the participants in the research and courses presented in the case study were selected. It also details the methodology followed for data collection and data analysis.

Chapter 6 describes how the actual process of capacity building was implemented using a virtual partnership. It uses activity theoretical constructs to describe the participants and activities of the project.

Chapter 7 uses activity theory to analyse the implementation of the Virtual Classroom project. It discusses the problems and opportunities that emerged from the implementation of the project.

Chapter 8 uses the notion of community of practice and specifically the selected constructs of legitimate peripheral participation to analyse the process of capacity building in the project.

Chapter 9 discusses the findings from the implementation. It describes the requirements of an appropriate virtual partnership by identifying the essential features of such a partnership from the context of the project. These features can be used to guide the implementation of virtual partnerships in similar contexts.

Chapter 10 concludes the research work reported in this thesis. It highlights the contributions of the thesis and suggests possible areas of future research development.

CHAPTER 2: LITERATURE REVIEW

There seems to be a lack of research literature specifically on virtual partnerships for capacity-building purposes. This chapter could thus not directly draw upon findings from these types of partnerships. Rather, it is organized around three key themes that are believed to be key components of virtual partnerships for capacity building: capacity building, collaborative partnerships and the use of ICT in tertiary education. It starts by defining capacity building and presents a review of frameworks designed to guide capacity-building interventions. It then explores collaborative partnerships in practice, presenting a review of the various forms and models of collaboration, and collaboration success factors as synthesized from the literature. Finally, it presents a brief review of literature on the use of ICTs in tertiary settings. For each of the three themes, the important aspects are highlighted, and a description of how these aspects are used in the rest of the thesis is provided.

2.1   An Overview of Capacity Building

Tertiary educational institutions are continuously striving to improve their educational, technical and professional resources to enable them to survive in the rapidly changing landscape of higher education. Regardless of their mission and vision, they are all constantly challenged in attracting, recruiting, retaining and developing their human and infrastructural resources for the betterment of teaching, research and service to their community (Cariaga-Lo, Dawkins, Enger, Schotter, & Spence, 2010). In the African context especially, it is generally agreed that these institutions do not have the required capacity to fulfil their primary mission and to consequently, produce the required national capacities to transit them to the expected level of development (Tettey, 2006; SARUA, 2008; Tettey, 2010). A lot of these institutions have therefore been called upon to build their human and institutional capacities in a manner that will enable them to achieve sustained improvements in their institutions (Matachi, 2006; Tettey, 2010).

There is no single definition of the term capacity building available in the literature today. The terms capacity, capacity building and capacity development are often ambiguously and synonymously used in literature (Matachi, 2006). According to Pielemeier and Salinas-Goytia (1999), the term is also substitutable by institution-building, institutional strengthening and development management. The Swedish International Development

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Cooperation Agency (SIDA) defined both capacity building and capacity development as "the conditions that must be in place for development to take place" (Bandstein, 2005). The United Nations Development Programme (UNDP), on the other hand, defined capacity development as a "process by which individuals, governments and societies strengthen and sustain their ability to achieve their own development objectives over time" (UNDP, 2009b). In the academic sphere, the terms capacity building, staff development, professional development, and academic development are often used by the research community. Although there are uncertainties surrounding the definition of all these terms, Webb (1996, p. 1) noted that the definition includes "institutional policies, programmes and procedures which facilitate and support staff so that they may fully serve their own and their institutions" needs". In this thesis, the terms capacity building and staff development are used interchangeably to connote the transformation process that individuals and institutions go through to enable them to meet their professional needs, while at the same time, supporting the attainment of their institutional mission.

It is important to note however, that the need for capacity building does not necessarily imply that there is no existing capacity (Eade, 1997). Rather, it includes the creation of new capacity (recruitment), the strengthening of existing capacities (retention) and efficient utilization of existing staff members (Tettey, 2006). In one of the definitions given by the UNDP, capacity building is perceived to be a process that "assumes that there are no existing capacities to start from" (UNDP, 2009b). Eade (1997), however, argued that all people have some capacity, although it may be imperceptible to both the holder of this capacity and to outsiders. In the case under study, for example, lecturers at both institutions have a wide variety of lecturing experiences that they have accumulated over the years. According to Eade (1997), disregarding existing capacity is not only disrespectful, but it also degrades existing capacities. It is therefore important that the case study identifies and utilizes existing strengths, to enable participants to articulate their own needs, while at the same time taking ownership of the process of capacity building.

2.1.1 Approaches to capacity building

The approach used to build capacity both in general and in educational contexts, has changed considerably over the past few years. For a long time, capacity building in general was understood as a provision of some tangible interventions to people in need, or specifically, a

transfer of resources from those who have more (donors) to those who have less (recipients) (Eade, 1997; UNDP, 2009a). According to the educational literature, a capacity-building relationship could also only exist if there are professionals with outstanding knowledge, skills, expertise, status or power, who are willing to support the development of other individuals aspiring to attain the same qualities (Sinclair, 2003). As Eade (1997) observed, however, the term capacity building was so indiscriminately used that it lost its meaning. According to Moore (1995, cited in Eade (1997)), the term caused confusion and controversy and it eventually undermined the morale of the people involved in capacity-building initiatives. Currently, many development organizations perceive capacity building as a partnership, where the involved partners work together to strengthen one partner‴s ability to overcome challenges and bring about positive changes that transform practices, lives and societies (UNDP, 2009a).

The changing approach to capacity development is well articulated by the UNDP, which has used four strategies (summarized in Table 2-1) to implement capacity building initiatives over the years (UNDP, 2009a). In their earliest strategies, the UNDP provided money and resources needed to minimize the impact of identified needs, but this resulted in beneficiaries relying even more on the aid, and the impact of the intervention ended immediately the provision of funding and resources stopped. In their second strategy, they provided technical assistance in the form of foreign experts, but the experts did not understand the local contexts well, making their interventions inappropriate for those contexts. In their third strategy, twinning agreements were made with institutions, focusing on developing local expertise by transferring knowledge, based on local policies and priorities. Twinning agreements were, however still heavily dependent on outsiders. The strategy they currently employ emphasizes partnerships, where local communities take ownership of the capacity-building process. According to the UNDP, it is this last strategy that results in long-term, sustainable development.

Table 2-1: The Evolution of the Capacity-Building Approach (UNDP, 2009)

	The Assumption	The Practice	The Result
First	„Developing countries need money"	**Development Aid** Money is given as a grant to developing countries	Focus is on investment and reporting rather than results Debt Dependence Project ends when money runs out
Then	„Developing countries should model themselves after developed ones"	**Technical Assistance** Foreign experts come in to operate their own projects, which they expect to yield similar results to those seen in developed countries	Project irrelevant in local contexts Dependence on foreign experts Unequal relationship between developed and developing countries
Then	„Developing countries should partner with developed ones"	**Technical Cooperation** Greater emphasis on training, transferring knowledge, based on national policies and priorities	Local expertise enhanced Projects aligned to local contexts Expensive Driven by outside forces
Now	„Developing countries should own, design, direct, implement and sustain the process themselves"	**Capacity Development** A focus on empowering and strengthening indigenous capabilities	Makes use of local resources Addresses power inequality Emphasizes deep, lasting transformations through policy and institutional reforms Sustainable change

Kotecha (2010) observed the same pattern of evolution for capacity-building initiatives in education in Southern Africa. According to him, many of the initiatives reported were initially characterized by condescension or benevolence, but later, evolved to provision of technical assistance. Collaborations and partnerships only became proliferated in more recent years. One of the studies that involved cooperation between several African and European universities also concluded that partnerships are currently the strategic means to support capacity-building initiatives in tertiary education institutions (European University Association, 2010). The focus on globalization has further highlighted this need for interdependence, necessitating institutions to work together in creating knowledge and solutions that address global challenges.

Bolger (2000) observed that there are two perspectives (summarized in Table 2-2) of capacity building: some view it as a process, while others view it as an objective. Those who see it as a process usually aim at reducing some specific target, while those who see it as an objective

aim at developing capacity of an individual or an organization. When viewed as a process, the focus is put on how capacity building will be achieved. When viewed as an objective, the focus shifts to what will be achieved during the capacity-building process. It is critical to understand the two perspectives because of their implications on the role of the participants in the capacity-building process (Eade, 1997; Bolger, 2000). As seen later in this thesis, the perspective adopted in the SANTED VCP adopted both approached simultaneously. According to Eade (1997), adoption of both perspectives where the "balance between the different views shifts over time" is quite common in capacity-building initiatives.

Table 2-2: Two perspectives on capacity building (adapted from Bolger (2000))

Feature	Approach	Process
Aim	Reducing a target (e.g. failure rate)	Developing individual or organizational capacity (e.g. creating policies and procedures)
Focus	How capacity is built (i.e. approaches, methodologies and strategies)	What will be achieved (e.g. skills, abilities, values, relationships)

Capacity-building partnerships are, in principle, reported to have a potential to positively impact tertiary education institutions in developing nations (Samoff & Carrol, 2002; Hertaas, 2010). In practice, however, several hindrances to the realization of this potential have been identified (Ishengoma, 2011): 1) partnerships operate in a framework of donor vs. recipients, which perpetuates the inequality between the partners; 2) the majority of institutions do not have guiding policy, operating procedures, and organizational structures that guide the implementation of partnerships; 3) partnerships are not mutually beneficial, and their form and structure is determined by the funders; 4) partnerships worsen institutional capacities by promoting brain drain or committing the best resources to the partnership; 5) funders may censor research outcomes, further constraining intellectual freedom; 6) partnerships may lead to divisions, inequity and imbalances. As a result, the efficacy of building long-term, sustainable capacity has been one of the growing concerns of the global community (Kotecha, 2010a; UNDP, 2009a; UNDP, 2009c).

Other negative connotations associated with capacity building, are where the initiatives either served interests of the funders (Hertaas, 2010; Ishengoma, 2011), or created a dependency of the recipients on the donors (Horton, 2002; Ishengoma, 2011). In some cases, capacity-building initiatives did not adequately meet the needs of local contexts, rather providing the

wrong solutions to the wrong problems (Eade, 1997; Anderson & Maharasoa, 2002). In other cases, the initiatives were also viewed in a neo-colonial context, as the resurfacing of the hegemony of developed countries over developing nations (Freire, 1970; Gaillard, 1994; Anderson & Maharasoa, 2002), and leading to further destruction of existing capacity (Horton, 2002). Because of this negative connotation and the fact that the two institutions where the case study is situated have power dynamics inherent in a colonizer/colonized relationship, the Freirean approach to capacity building in education is presented below. Freire (1970) observed that educational relationships involving the colonizer and the colonized are characterized by hopes, fears and contradictions. He provided tools in which these relationships can be critically reflected upon and understood.

2.1.1.1 *Freirean perspectives on capacity building involving former colonizers*

The two countries in which the case study of this research is situated, Namibia and South Africa share a colonial history. Namibia was colonized by South Africa from 1910 to 1990. South Africa on the other hand, was dominated by a white, minority rule which only ended when the first multiracial elections were held in 1994. Prior to each country"s independence, education in both countries was implemented according to the apartheid policy, which segregated people according to racial and social ideologies. The apartheid policy ensured that the indigenous black community (both in Namibia and South Africa) received the inferior Bantu education, while at the same time providing a relatively good education system for the white population (Amukugo, 1993). After their independence, both countries started transforming their education systems to correct the colonial injustices of the apartheid education. Namibia is, however, still economically dependent on South Africa and the effects of the colonial regime are still discernible.

Freire (1970) argued that the provision of education is never neutral; the methodology used in the delivery can result in education being an instrument of either oppression or liberation. According to him, education either facilitates transformation of the world by the people living in it, or it causes them to conform to a seemingly static world. He also observed that there are some powerful minorities, which he referred to as oppressors. According to him, it is the oppressors that define what education will be like and how it will be delivered to the people.

While the term oppression has widely been used in political contexts to refer to the acts that colonial masters enforce on the local communities, it assumed a much broader meaning in Freirean writings. He defined oppression as "any situation in which the oppressor objectively exploits the oppressed, or hinders his or her pursuit of self-affirmation as a responsible person" (Freire, 1970). He stressed that any practice that demeans or undermines the capabilities of people in transforming their own world is oppression, because it interferes with their "ontological and historical vocation to be fully human". In oppression, the oppressors conquer and dominate the oppressed, and in the process transform the oppressed into passive objects.

Freire also made a differentiation between oppressed people and liberated people. According to him, oppressed people are those who adapt to the world they live in. They do not make their own choices, but are living under the prescriptions of choices made by other people. Liberated people, on the other hand, are integrated with the context in which they live (Freire, 1973), and they have the capacity to make critical choices daily to transform their world. Freire argued that truly liberating pedagogy does not treat people as unfortunates, nor does it enforce emulation models from among the oppressors (Freire, 1970, p. 54).

Freire further stressed that in the delivery methods where education results in oppression, education is viewed as "an act of depositing, in which the students are the depositories and the teachers are the depositors" (Freire, 1970, p. 72). He called this view the "banking concept of education". The banking method accentuates the level of the teacher to the omniscient, and while minimizing the role of the student to a passive recipient of knowledge and the absolute opposite of the teacher: "an empty vessel that needs to be filled" Freire (1970, p.79). Using this method, the educators manage to impose their thoughts and world view paradigms founded on reproducing existing power structures to their students without reservations. Freire, however, viewed the banking concept of education as an instrument of oppression because it projects "an absolute ignorance" onto the students (Freire, 1970, p. 72). A striking similarity in the choice of words with Freire (1970, p.79) is reported in Section 8.6.1, where one lecturer remarked that "*they are empty vessels that needed to be filled*".

Freire also observed that in the oppressive method of education, there is a power asymmetry between the oppressors and the oppressed. The oppressors pretend that they are interested in advancing the cause of the dominated majorities, but they design and implement programmes

with their own "egoistic interests" that are "cloaked in false generosity" (Freire, 1970, p. 54). In capacity-building programmes, such designs and implementations may show up in activities that seem to genuinely improve the situation of the beneficiaries, but where a careful examination would reveal that their activities are designed to transform beneficiaries into "objects of purchasing power" (Freire, 1970). Without their will, the oppressed would submit to the decisions taken as their "gesture of gratitude" for the purported benefits that capacity-building initiatives bring, regardless of whether they agree with those interventions or not (Freire, 1970, p. 140). According to Freire (1970, p.134), this causes the oppressors to "grow more accustomed to power in guiding, ordering and commanding" the oppressed. Freire (1970) further argued that this can result in a cyclical effect, further demonstrating that the oppressed are only interested in preserving their hegemony, and will undoubtedly work against anything that is a threat to their domination.

Although commonly accepted as an appropriate pedagogy both in education and other spheres that try to bring about social transformation, the Freirean pedagogy is not without criticism. A common critique of its theory is that it does not offer a remedy for critical pedagogy. Knight and Pearl (2000) observed that even in the most flexible education systems in the world, educators will reinforce, at one point or another, a dominant and hegemonic influence, which makes absolute equality impossible to attain. Knight and Pearl (2000) also criticized the approach of critical pedagogy, stressing that it lacks theory because it was neither derived from practice nor does it inform practice. They therefore concluded that it does not support the democratic education that the students need in order to transform their own education.

Despite the criticisms, however, Freirean pedagogy has been used as a voice for the down-trodden and the oppressed, especially in the Third World Countries. Eade (1997) outlined what she called the "lasting contributions" of Freirean pedagogy to the process of capacity-building. First, it is the importance of acknowledging the contributions of the learners, their own experience and knowledge. Second, it is the recognition that awareness, learning, self-esteem, and capacity for political action are mutually reinforcing. Third, it is the realization that the poor and marginalized people have the right and the capacity to organize and challenge authority in order to create a society that is not based on exploitation and oppression.

Freire‟s views as presented above have critical implications for a capacity-building virtual partnership such as the one implemented through the SANTED virtual classroom project. It implies that capacity building should not simply be seen as a programme to impose an agenda and the objective of the donors on the recipients (Eade, 1997). Neither should it be seen as an imposition of teaching methodologies or content considered superior in the eyes of one partner. Rather, it should strive to understand the constraints and challenges that the recipients experience in achieving their goals. Once the challenges and constraints are identified, the donors and the recipients should work **together** to find appropriate solutions to enable them to overcome these challenges. „Together‟ is emphasized in this case to stress the importance of the input of the recipients to the proposed solutions.

2.1.2   Conceptual frameworks for capacity building

Many approaches to building capacity in tertiary education institutions reported in literature have focused on developing the capacity of individuals, targeting mostly staff knowledge and skills (Paxton & Heredia, 2004; Dias, Mills-Tettey, & Mertz, 2005; Plane & Venter, 2008). This is because it was traditionally assumed that the benefits of developing individual capacity will automatically filter down to the organization (Matachi, 2006). In a study conducted by Massell (1998), however, she noticed that successful capacity-building initiatives placed emphasis not only on the individual level, but also on the policy mechanism used to build the capacity. Her study recommended that the strategies for capacity building should be more systematic, and should include the broader socio-economic and socio-political context in which individuals operate. She also suggested that capacity-building initiatives in education should occur on at least two levels: at the individual and at the organizational level. More recent studies (Davies & Salisbury, 2009; Griffiths, Hryniewicz, & Thompson, 2010) involving capacity building in tertiary education also recommended that capacity building should occur at both the individual and institutional level in order to be sustainable.

Approaches currently used to conceptualize capacity development in educational institutions organizations have thus focused on different levels to ensure proper capacity building. The different levels of focus were explained as a set of dimensions ranging from the micro level of the individual to the macro level of the overall operating environment (UNDP, 1994). The

different levels, their focus and examples of activities that can take place are summarized in Table 2-3.

Table 2-3: Dimensions of Capacity Building (adapted and summarized from UNDP (1994)

Dimension	Focus	Example of Activities
Training and Education	Supply of capable managerial, professional and technical personnel	Training, Mentoring, Coaching, Recruitment, Conferences, Seminars, Sabbatical Leaves, Salaries
Organizations and their management	Improvement of management system to ensure staff retention and improve staff utilization	Performance-based Incentives, Organizational culture, Leadership
Network and linkages among organizations	Coordination of activities in the network of organizations	Interactions among organizations, Coordination (e.g. inter-institutional)
Public Sector environment	Policy and institutional environment	Changes in Law and Regulation, Development of Policies and Procedures (e.g. policies affecting cross-accreditation, recruitment, salary structures, operating procedures and budgetary support to the institutions)
Overall Context	Broad economic, social, cultural and political environment of the organization	Governance Programmes (e.g. SADC Protocol on Education and Development, Millennium Development Goals)

- **Training and Education**, (also termed the micro level): this level aims to train, coach or mentor individuals for effective performance of their duties in the organization. It also includes interventions that aim at providing or improving infrastructural and technical assistance to the organization.

- **Organizations and their management**: capacity building at this level aims at capitalizing the organization and its linkages to utilize and retain skilled people.

- **Network and linkages among organizations**: this level considers how activities that extend beyond a single organization will be coordinated to facilitate the achievement of particular objectives in the network that the organization belongs to.

- **Public Sector Environment**: this level tackles the laws, regulations and policies affecting the institutional environment to carry out its tasks.

- **Overall Context**: this level deals with the broad action environment of the organization, and refers to the economic, social, cultural and political context in which the organization operates.

A more recent framework (Matachi, 2006) has combined the last three dimensions into one dimension called the societal or enabling environment. It has also renamed the first two dimensions to individual and institutional (or organizational) dimensions respectively, and has re-designed the framework as a set of concentric levels shown in Figure 2-1.
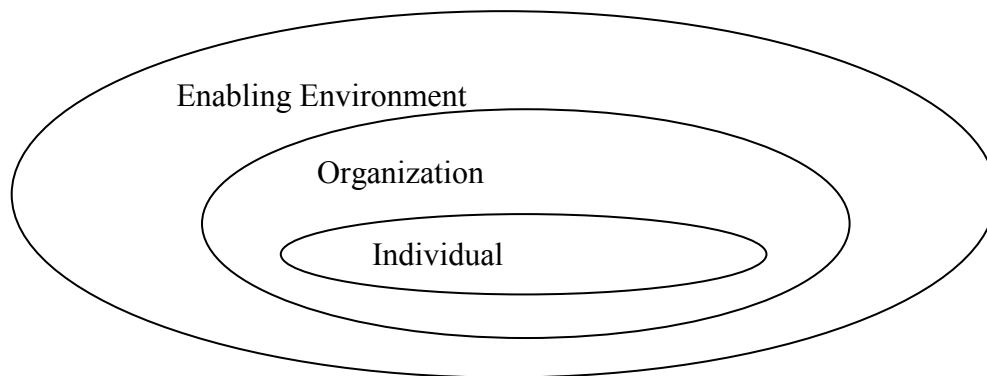
Figure 2-1: Levels of Capacity (Matachi, 2006, p. 4)

Apart from demarcating the levels, the conceptual framework shown in Figure 2-1 also demonstrates the interrelationship between the individual capacity, organizational capacity and the enabling environment. It shows that individual capacity is only useful to the extent that the organization"s overall operating environment enables it to be. This recognizes the importance of individual capacities, but it also stresses the importance of creating opportunities for people to use and further develop those capacities, i.e. the individual"s potential is bound (enclosed) by the organization in which they work, which in turn is bound by the overall environment in which the organization operates. The individual"s reach is thus limited if there is no enabling environment. In addition to developing individual capacity, the model therefore also emphasizes the importance of creating an enabling environment in which individuals are able to exercise their full potential.

One of the critical issues in the implementation of capacity-building initiatives is the identification of appropriate learning pathways of individuals. Researchers have emphasized the need for a standard where professional practices before and after capacity building may

be compared against each other (Webb, 1996; Lawless & Pellegrino, 2007). Articulating this standard will make it possible to chart the development path of the participants. Dreyfus and Dreyfus (1980) also supported the need for pathways that progressively define and address appropriate issues during the process of capacity building (which they called skills acquisition). The development path can only be determined, however, if what constitutes capacity building in specific contexts is defined. Dall"Alba and Sandberg (2006) pointed out that determining this is difficult to do in practice because of the multiplicity of methods, in which practice may be understood or carried out, even for a single skill level. They therefore argued that it is not always possible to determine what characterizes skilful performance in a discipline. According to them, attempting to define the learning pathway shifts the focus to the process of capacity building, rather than keeping it on what needs to be developed. They therefore suggested that in addition to identifying these stages, emphasis must also be put on promoting the understanding in, as well as the understanding of, the practice.

Many conceptual frameworks available in literature are based on a fixed sequence of steps that progressively lead to the accumulation of knowledge and skills (Dall'Alba & Sandberg, 2006). A person who is less knowledgeable or less skilful in the practice or skill under observation is then classified a novice, while those who are more knowledgeable or more skilful are classified as experts (Lave & Wenger, 1991). During the capacity-building process, participants" knowledge and skills increase, enabling them to move from the level of being novices to being experts. While a precise development path for all participants is elusive (Dall'Alba & Sandberg, 2006), some staged capacity-building models that facilitate this transition are suggested in literature (Dreyfus & Dreyfus, 1980; AusAID, 2006). Regardless of the exact steps, Feiman-Nemser and Remillard (1995) suggested that each transition goes at least through these three stages: survival and discovery; experimentation and consolidation; and mastery and stabilization.

One of the most cited models of staged capacity building was suggested by Dreyfus and Dreyfus (1980). The model proposed the following five levels of skills progression: novice, advanced beginner, competent, proficient and expert. The model, shown in Table 2-4, posits that people are initially novices, and they progress through different levels until they become experts in their practice.

Table 2-4: Summary of Dreyfus Model of Progression (adapted from (Eraut, 2009))

Level 1	**Novice**
	Rigid Adherence to taught rules and plans
	Little situational perception
	No discretionary judgments
Level 2	**Advanced Beginner**
	Guidelines for action
	Limited situational perception
	All aspects given equal importance
Level 3	**Competent**
	Sees actions in terms of longer-term plans
	Conscious of deliberate planning
	Standardized and routinized procedures
Level 4	**Proficient**
	Sees situations holistically
	Able to prioritize in a situation
	Perceives deviations from normal patter
	Attaches varied meaning to situations
Level 5	**Expert**
	Intuitive grasp of situations
	Analytic approaches based on situations
	Vision of what is possible

The Australian Government‟s overseas AID Programme (AusAID, 2006) provided a similar staged model, which is based on a continuous assessment of existing capacities of individuals and groups. The model places emphasis on the role of the expert, and continually reflects on the novice‟s degree of reliance on the involvement of the experts. The model has the following four stages: dependent, guided, assisted and independent. Initially, beneficiaries are dependent on the experts, who will drive and make the most influential decisions in the capacity-building process. In the second stage, the beneficiaries are guided, with the expert still having a high level of control on the direction and decisions made in the partnership, but the beneficiaries also participate under supervision. In the third stage, beneficiaries are assisted. They take the prime responsibility for the work done, and are able to handle the aspects of the objective of the partnership, only asking for the experts‟ assistance when required. In the final stage, independent, the beneficiaries are themselves fully capacitated to perform the functions related to the objectives of partnership. They may still, on rare occasions, contact the builder of capacity for specialized technical requirements, but they

have the required capacity to carry out the actual work of their practice. The different levels and the involvement of experts and beneficiaries are briefly summarized in Table 2-5.

Table 2-5: Stages of a capacity-building model (derived from (AusAID, 2006))

Stage	Experts' involvement	Beneficiaries' involvement
Dependent	Drives the partnership Makes the most influential decisions	Limited to observations
Guided	High level of control on the direction and decisions	Participate under supervision
Assisted	Acts only when requested to	Take prime responsibility for work Only asks for experts when required
Independent	Minimal contact on a needs basis	Performs all the work

At each stage, participants are expected to determine their needs and develop appropriate strategies to be implemented to enable the transition to the next stage. In addition, AusAID (2006) recommends that implementation of capacity building follows the steps shown in Figure 2-2, and are briefly described below.
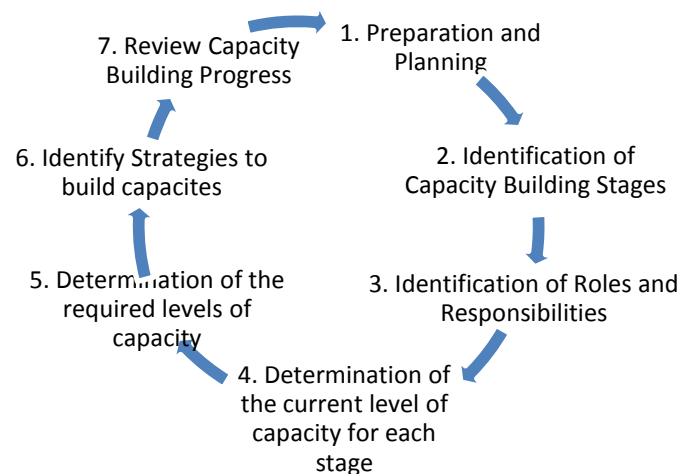
Figure 2-2: Stages for the implementation of Capacity Building (adapted from AusAID, 2006)

Step 1: Partners agree on the objectives and the strategies of capacity building;

Step 2: Partners mutually agree on the stages to be followed to ensure that local needs are met;

Step 3: Roles and responsibilities are identified and assigned to individuals from both institutions;

Step 4: Existing capacities and factors that may hinder full utilization of the capacity are identified;

Step 5: Desired levels of capacity and the implementation timescale are determined;

Step 6: The identified strategies are executed;

Step 7: Progress review is done, and the process starts all over again if the results are not satisfactory.

2.1.3   Features of capacity building crucial to this thesis

The literature review presented in this section (Section 2.1) indicates that the definition of and approach to capacity building has evolved over the years. Although capacity building still involves at least two parties (those whose capacities are being built and those who are building the capacity), the approach to capacity building has changed, and subsequently led to a change in the involvement and participation levels of the partners. There might still be an implicit donor/recipient relationship, but there should be no one individual or institution that is superior to the other; both participants should be considered equal and active participants to the capacity-building process. Capacity building involves sharing of power, control, resources, risk and uncertainty (Morgan, 1998). If the virtual partnership described in this thesis is not viewed as a partnership, or one partner is perceived to have more power or control, the partnership may be perceived as domination or an ideological imposition of programmes and methodologies from one partner to another. It is therefore important to ensure that there are benefits for all the partners involved in the partnership (Moran & Mugridge, 1993; Brinkerhoff, 2002; Kotecha, 2010a). From the perspective of this thesis, capacity building has four crucial features, which are: 1) capacity building is a partnership, involving at least two partners; 2) capacity building is targeted at addressing a specific need, mutually agreed upon by the partners; 3) partners" relationship is dynamic, where one partner starts off as an expert while the other is a novice. After going through the process of capacity building, both partners should become experts; 4) capacity building should aim at developing long-term capabilities. These considerations are summarized in Table 2-6 and are briefly elaborated below for the purposes of this thesis.

Table 2-6: Characteristics of Capacity-Building Partnerships that are crucial to this thesis

Characteristic	Supporting References
Capacity building is a partnership	(Eade, 1997; Bolger, 2000; Horton, 2002; Samoff & Carrol, 2002; European University Association, 2010)
Capacity building addresses a specific need	(Eade, 1997; Bolger, 2000; Horton, 2002; UNDP, 2009c)
Partners" relationship is dynamic	(Anderson & Maharasoa, 2002; Dall'Alba & Sandberg, 2006)
Successful capacity building develops long-term capabilities	(Freire, 1970; Eade, 1997; Horton, 2002; Hertaas, 2010; Ishengoma, 2011)

2.1.3.1 *Capacity building is a partnership*

Section 2.1 emphasized the need to view capacity building as a partnership, despite the different levels of power (in terms of knowledge, resources, reputation and expertise (Amey, Eddy, & Ozaki, 2007)) inherent these types of partnerships. The two departments involved in the case under study are different in terms of status and reputation (as described in Section 3.2). This type of difference is known to bring problems to partnerships (Gaillard, 1994; Fukuda-Parr, Lopes, & Malik, 2002). Partners are, however, interdependent in carrying out the capacity-building process, and they should share responsibility for its successes and failures (Eade, 1997). Even in cases such as the one under study, therefore, the literature alluded to the importance of equality between partners, to increase the relevance of the partnership as well as to encourage participation by those involved in the partnership.

2.1.3.2 *Capacity building addresses a specific need*

All capacity-building initiatives are targeted at addressing a specific need. Traditionally, approaches for capacity building in tertiary education settings focused only on individual needs. When identifying needs however, it is important that emphasis is not only placed on individual needs, but also on creating an enabling environment through the institutional structures in which the individuals are operating.

Before the capacity-building process commences, the strengths and weaknesses of both partners should be identified (UNDP, 2009c). To be successful, capacity-building initiatives must address the causes of these weaknesses (Eade, 1997). Although each partner has their own needs and interests, partners must not put their own interests above the mutual interests of the partnership, over shared outcomes, otherwise the partnership is prone to failure (Jie, 2010)

2.1.3.3   The partners relationship is dynamic

Section 2.1 highlighted the need for determining a progressive framework that can be followed to ensure capacity building. If the framework is available, it is possible to determine the different stages that can be followed to reach the desired state. The difficulty of determining a general framework that is applicable to all partnerships was, however, emphasized. The rationale, motivation, goals and context in which the partnership operates should all be used to determine the steps appropriate for capacity building (Eddy, 2010). In addition, the section highlighted that faculty development does not always occur at a steady, predictable and reliable pace; rather, it may take a different path, move at a different pace and occur from a variety of sources, for different people (Caffarella & Zinn, 1999). It is thus important to note that each individual takes a different route and may require a different period to achieve the desired capacity.

2.1.3.4   Capacity building aims at developing long-term capabilities

Capacity building aims to strengthen or improve the individual, institution or society"s ability in achieving their long-term goals. Section 2.1 clarified that capacity building is not only about providing a required service or resource; it is about capacitating people to enable them to be able to achieve their goals after the capacity-building process. As argued by Eade (1997), temporal satisfaction of needs makes the beneficiaries even more vulnerable than before. The capacity-building process should therefore make a deliberate aim not to create a dependency of the beneficiary on the donor (Eade, 1997; Horton, 2002; Fukuda-Parr, Lopes, & Malik, 2002). Strategies that focus on empowering and strengthening capabilities are thus deemed much more effective in achieving sustainable development rather than provision of resources or services to institutions.

2.2 Inter-Institutional Partnerships in Academia

One of the difficulties in researching inter-institutional partnerships is a variety of terms used to describe collaborative relationships (Czajkowski, 2007; Guenther, Falk, Arnott, Lucardie, & Spiers, 2008). Literature uses a range of different terms including partnerships, strategic alliances, joint ventures, consortiums, associations, inter-institutional collaborations, inter-organizational collaboration and networks of learning to describe collaborative activities between different educational institutions. Although each term expresses a different meaning

and their use in literature connotes the difference in the formality and structure of collaborative activities (Czajkowski, 2007; Eddy, 2010), they all seem to refer to arrangements and relationships that two or more institutions working together across their organizational boundaries make, to achieve some objectives.

Inter-institutional collaboration in academia is not a new phenomenon (Moran, 1990; Connolly, Jones, & Jones, 2007; Eddy, 2010; Jie, 2010). In the early 80s, Habeshaw (1980) reported that collaborative partnerships in higher education were on the increase. He observed that these partnerships were aimed at joint development and presentation of materials for teaching and research, credit transfer within and between courses and institutions and at the development of networking opportunities and linkages for personal and general institutional development. In more recent years, different motivations are credited for the increase in inter-institutional partnerships (Amey, Eddy, & Ozaki, 2007; Eddy, 2010). In some cases, institutions are mandated by their governments to collaborate in order to avoid duplicate efforts and expenses. In other cases, educational institutions viewed collaboration as the strategic means to pool resources and talent. Collaborative endeavours that are meant to satisfy personal interests and relationships are also common (Amey, Eddy, & Ozaki, 2007). Mandated collaborations are however less favourable and are reported to have a high failure rate in comparison to voluntary partnerships (Eddy, 2010).

One of reports by the Organization for Economic Co-operation and Development (OECD), an international organization that promotes sharing of good practices for economic and social development, notes that historically, tertiary education institutions did not focus on making a contribution to regional development (OECD, 2007). It highlighted the role that institutions can play in uplifting the standards of their surrounding environments. To do this successfully, the report argued that institutions need to do more than just teaching and researching; it must also engage with others in the region. By creating partnerships, institutions are able to address disparities and widen access to education in their regions. It also enables institutions to focus on indigenous development, thereby serving the needs of local communities. In order for the partnerships to be successful, the report argued that it must focus on three dimensions: knowledge creation, knowledge transfer and cultural and community development.

With the wide adoption of technologies in higher learning, enormous changes regarding how institutions collaborate are also taking place. New communication technologies are enabling

new ways of working together, where people are geographically dispersed, and they use technology, rather than face-to-face encounters for collaboration purposes. Wainfain and Davies (2004, p. 1) defined virtual collaboration as a "collaboration by people working together who are interdependent in their tasks, share responsibility for outcomes, are geographically dispersed, and rely on mediated, rather than face-to-face, communication to produce an outcome". The change in "collaborative spaces" from face-to-face to virtual also provides institutions with new forms of relationships that have changed fundamental issues about collaboration (Leach & Moon, 2008). Researchers are therefore devoting time to identify frameworks that enable institutions to engage in virtual partnerships and create a culture that facilitates collaborative work in these spaces (Scott, 2000; Ratcheva & Vyakarnam, 2001).

2.2.1 Forms of collaborative partnerships

Sommerland, Duke and McDonald (1998) identified three dimensions that are used to categorize partnerships in literature: 1) the scope of the partnership; 2) the number and homogeneity of partners involved and 3) their level of formality. Many examples of the categorization of partnerships reported in the literature are based on one of these three dimensions. Austin and Baldwin (1991), for example, defined a classification of two categories that are based on scope: collaborations in research, and collaborations in teaching. Collaborations in research range from sharing of ideas on research topics, to full participation of both stakeholders in research projects. It also includes co-authoring of publications with people in different institutions. Collaborations in teaching, on the other hand, are mainly about team teaching, and may range from sharing a topic, part of a course, a full course or the entire qualification. A classification that is based on the level of formality was done by Konrad and Small (1986), who suggested three broad categories of partnership formality: informal agreements, ad hoc arrangements, and formal arrangements. According to them, informal and ad hoc arrangements could eventually lead to formal arrangements, and at the highest level, they may even result in the formation of a new agency to manage the mutual interests of collaboration institutions. The British Council (2008) on the other hand identified the following six categories: 1) partnerships to facilitate mobility and professional development (based on scope and level of formality); 2) bilateral institutional partnerships (based on scope), 3) mono-structural consortia (based on number and homogeneity); 4) multi-

structural consortia (based on number and homogeneity), 5) partnerships linked to government frameworks (based on scope and level of formality), and 6) networks (based on scope and level of formality).

Although the scope, level of formality and heterogeneity amongst the partners are critical determinants of the context, and hence, the outcomes of the partnership, the different levels (as described in Section 2.1.2) at which capacity building takes place affect not only the outcomes, but also the process.

In the SANTED virtual classroom project, the two institutions signed a Memorandum of Understanding, and the funders required a formal recognition and support of the partnership activities by the management of both institutions. The institutions shared the teaching of full courses in the BSc qualification, and also collaborated in research. Students participated in lectures co-taught by lecturers from both universities (collaboration in teaching) and there was also joint sharing of research topics and co-authoring (collaboration in research). Using Konrad and Small‟s (1986) terminology, the partnership studied in this research focuses mainly on formal partnerships between institutions. It caters for all two types of collaboration as suggested by Austin & Baldwin (1991), and involves all the five elements of higher education collaboration identified by Habeshaw (1980) as presented above. Although collaboration was done at departmental level, it was influenced and had an impact on all the other levels, as argued in Section 2.1.2. These forms of collaboration were identified and the classification of partnerships used in the case study with regard to these forms was done to enable the reader to narrow the applications of the findings of this research.

2.2.2 Collaboration success factors

Although there is still no commonly agreed measurement of partnership success in the literature (Guenther, Falk, Arnott, Lucardie, & Spiers, 2008), specific critical factors have been credited to the success of collaborative partnerships. While different researchers have given credit to different factors, some factors are repeatedly given credit in the literature. The factors commonly discussed in literature are briefly described below.

2.2.2.1 Trust between the partners

A common factor credited for successful collaboration in the literature is trust among the partners (Ring & Van de Den, 1994; Doz, 1996; Gallican & Depledge, 2003; Huxham & Vangen, 2005; Czajkowski, 2007; British Council, 2008; Guenther, Falk, Arnott, Lucardie, & Spiers, 2008). A partnership requires two or more partners to work together interdependently; this creates a reliance of the partners on one another. Trust indicates the expectations and confidence that partners have in one another, and their ability to contribute positively to the realizations of the objectives of the partnership. If one of the partners neglect their responsibilities or do not execute them according to the requirements of the partnership, they risk not achieving the objectives of the partnership (Bachmann & Zaheer, 2006). Doz (1996) observed that partners constantly assessed and judged each other's trustworthiness. Over time, their judgment led them to either trust each other more, or become suspicious of one another.

If the partners did not know each other well prior to the start of the partnership, trust is initially difficult to establish. It improves, however, as people work more together and come to know one another (Doz, 1996; Scott, 2000). Trust is thus considered a dynamic construct that grows or shrinks with the lived experiences of the partners (Doz, 1996; Bachmann & Zaheer, 2006). In virtual partnerships especially, lack of trust is identified as the most significant hindrance to success (Jarvernpaa & Shaw, 1998; Kasper-Fuehrer & Ashkanasy, 2001; Gallican & Depledge, 2003). Moran (1990) suggested that trust must operate at and between several levels in educational partnerships – among the staff members, the partnerships administrators responsible for coordinating the activities of the partnership, the senior managements of the institutions involved in the partnerships, as well as the institutions themselves. If there is no trust between these different levels, one of the partner's attitudes towards the other may be affected.

2.2.2.2 Partnership compatibility

Partnership compatibility is another factor that is widely credited for success of collaborative partnerships. Compatibility connotes a harmonious relationship between the partners, and can refer to commonalities in organizational contexts, missions and goals, cultural backgrounds, or technological resources (Lajos, Szûcs, & Vauthier, 1996; Kuada, 2002; EU commission, 2004). Ratcheva and Vyarkarnam, (2001) observed that stronger inter-personal relationships

in virtual environments are built as a result of similar personal and professional characteristics such as background, qualifications and expertise. They also observed that more diverse partners will require more time to form strong bonds. This requires the partners to know and understand each other‟s backgrounds and processes. Doz (1996) observed that partners with similar organizational structures understand each other better. She gave an example where each of the two firms involved in the partnership borrowed their action routines from their organizational contexts, but routines led to a delay in decisions in one of the organizations, which ultimately aggravated members from the other firm. Her example demonstrated how large discrepancies in organizational structures can result in conflicts and tensions and eventually frustration among the partners.

2.2.2.3 Mutual benefits for all partners

A key challenge to capacity-building partnerships is establishing true mutual benefits for all the involved partners (British Council, 2008). As discussed already in Section 2.1, one of the partners in a capacity building partnership is inherently a provider of the capacity, while the other is a receiver. Execution of a capacity-building partnership may thus result in unbalanced benefits between the two partners, with the receiver benefiting more than the provider. Partners need to agree on the purpose and expectations of and from the partnership. Each partner may have their own expectations of the partnership, and they need to be mutually aware of each other‟s benefits and expectations. The affirmation that both partners will work towards the attainment of the benefits of the other partners is also crucial in these partnerships (Moran, 1990; Wohlstetter, Smith, & Malloy, 2005; British Council, 2008).

While imbalances in the benefits received by the partners in a capacity-building partnership may be unavoidable, Watson (2010) suggested some possible benefits that can be accrued from implementing these types of partnerships in the SADC region. For the receiving institution, she suggested that the benefits can include sharing and developing qualified staff, sharing of equipment, and developing capacity in teaching and research. For the providing institution, the benefits could include increasing the pool of available resources, building a community of scholars, promoting cultural ties and developing compatible standards in the region. Watson (2010) however also stressed that a capacity-building collaborative partnership in this context can only be successful if the involved institutions themselves agree

on the mutual benefits prior to the partnership, and maintain a strong focus on achieving those benefits during the capacity-building process.

2.2.2.4 Balance of power among the partners

Since partners jointly claim the successes and failures of partnerships, they all have an interest to protect in the partnership. Execution of the partnerships is likely to involve negotiating around different, conflicting and often not so obvious agendas of the partners. It is therefore important that decisions in the partnership are jointly made by all partners (Wohlstetter, Smith, & Malloy, 2005). Moran (1990) suggested that the style of decision making be "consensual", aiming to reach "win-win" rather than "win-lose" situations. Thomson and Perry (2006) suggested that partners do not necessarily have to agree at the time that a decision is made; they only need to be able to take ownership of the decision once it is made (Thomson & Perry, 2006). Partners must ensure that they do not completely disregard the concerns of other partners without addressing them. Thomson and Perry (2006) also observed that partners who are able to create new conditions "based on each other"s needs" will collaborate better than others. Kanter (1994) argued that if the partners decide on who will be involved in decision making, how quickly decisions will be made, what authority comes with positions and which functions work together at the early stages of the partnership, they will be able to make joint decisions without reverting to zero-sum games.

Capacity-building partnerships are generally characterized by power imbalances between the partners (Gaillard, 1994; Eade, 1997; British Council, 2008; Kotecha & Perold, 2010). This asymmetry of power relations between the partners is regarded problematic in partnerships (Fukuda-Parr, Lopes, & Malik, 2002). Partners that contribute more resources may want to exert power and control over other partners. Power in a partnership is associated with domination and mistrust, which could lead to failures in partnerships if not taken care of. Moran (1990) suggested that a balance of power be provided in a partnership using the following two ways: making sure that inputs are mutually beneficial and ensuring that all partners jointly make decisions for the partnership. It is not easy to achieve this in practice, however.

2.2.2.5 Roles and responsibilities

Since the partners are working interdependently towards a common goal, different roles and responsibilities need to be assigned to the different partners and ultimately, to the individuals involved, at the very early stages of the partnership. The roles are not necessarily divided equally between the partners, but may be allocated depending on the capabilities of each partner. Ring and Van der Ven (1994) observed that it is the execution of the roles and fulfilment of the responsibilities entrusted to the individuals that determine whether the partnership will grow or dissolve over time. Kanter (1994) also stressed the need for a broader involvement of people from the early stages of the partnership to ensure that: 1) all people involved are attracted to the partnership; 2) all people on the broader level are visionary and experienced in working with people from different cultures; 3) partnership duties will not suffer with competing full-time roles in their institutions; 4) middle management do not later oppose the relationship and undermine it. Involving individuals from the early stages is therefore very crucial. On the other hand, individuals that sense role ambiguity or overload from the early stages may manifest negative behaviours, which are associated with poor partnership performance (Jarvernpaa & Shaw, 1998).

2.2.2.6 Frequent communication between the partners

Partners in a virtual partnership often do not have the privilege of meeting face-to-face. Because of the environment in which they work, they usually also do not have sufficient time to "engage in extensive social dialog" to learn about each other (Jarvernpaa & Shaw, 1998, p. 40). If they have not worked together prior to the partnership, and they bring diverse backgrounds and organizational contexts to the partnership, problems caused by institutional and cultural differences are also inevitable (Kuada, 2002). Frequent communication between virtual partners is thus essential, to build the initial trust between the partners, to promote joint decision making and information sharing, and to reduce the cultural distance that is often an issue in virtual spaces (Arino & de la Torre, 1998; Goldstein & Pirani, 2007).

2.2.2.7 Adequate financial resources

Adequate financial resources to support the activities of collaboration are paramount to the success of collaboration. In most cases, educational institutions do not have funds allocated to collaborative activities. They will have to free funds from existing budgets and divert them to

partnerships or to secure funding from various external sources. In North-South collaborations, it is usually partners from the north or donors from their countries who supply the funds (Eade, 1997). Donors also have a tendency to favour partnerships where the leadership is made up of partners from the North (Gaillard, 1994; British Council, 2008), especially in North-South collaborations. This asymmetry in contributions of funding may lead to dominance over the partners who make smaller contributions. Provision of funds makes it difficult to ignore the interests of the donor, who may want to determine the activities and priorities of the partnership (Gaillard, 1994). While lack of finance can hinder collaborative initiatives, Gaillard (1994) observed that externally funded projects may also have difficulty in recruiting competent people who are truly interested in advancing the cause of the needs of the partnership. Rather, they attracted people who were largely interested in sourcing funds from the project.

Funding has also been largely associated with the sustainability of the project. To reach a balance between funding and sustainability, some funding formulas are recommended in the literature. Some argue that partners tend to take greater ownership of collaborative initiative if they partly fund their operations rather than obtaining all the funds from donors. This is based on the observation that many collaborative initiatives die a natural death after the funding comes to an end (Eade, 1997). As a result, the suggested formulas recommend that both the partners and the donors must contribute resources in specified proportions at various stages of the partnership. Funding could also be given for a "specific technical cooperation", but serving a general purpose that enables the partners to use them as they deem fit (Fukuda-Parr, Lopes, & Malik, 2002). Fukuda-Parr, Lopes & Malik (2002) also suggested that funding can be channelled through the normal budgeting processes of an institution, which will subject external support to institutional procedures and accountability systems. In most cases however, the funders would define their own restrictions on the usage of their resources, and make it available to the partners in what Fukuda-Parr, Lopes & Malik call a „take-it or leave-it manner" (Fukuda-Parr, Lopes, & Malik, 2002).

The partnership success factors identified in the literature and discussed above are also considered crucial to this thesis. They are briefly summarized in Table 2-7.

Table 2-7: List of factors that determine partnership success

Factor	Why it is important
Trust	Partners know what to expect and have confidence in one another
Partnership compatibility	Commonalities enable a harmonious relationship between partners
Mutual benefits for all partners	Partners focus on achieving benefits
Balance of power	Consensual decision making leads to trust and avoids dominance
Clear roles and responsibilities	Removes role ambiguity and overload
Frequent communication	Enables information sharing and reduces cultural distance
Adequate financial resources	Ensures financial security for all planned activities

2.2.3 Models of collaboration

Several collaborative models are available in the literature, but there seems to be a lack of models that are specifically focused on collaboration in the context of tertiary institutions. One of the earlier frameworks provides the following five guidelines for the implementation of inter-institutional relationships mediated by technology (Wheeler, Valacich, Alavi, & Vogel, 1995):

1) Shared Vision at the Top: Organizations should identify champions to coordinate the activities of the partnership and ensure that it has institutional support

2) Reciprocal Skills and Infrastructure: Partners must ensure that they have similar capabilities, technological infrastructure and monetary contributions to make to the partnership

3) Concrete Plans for Early Success: Partners should aim to achieve success as early as possible to demonstrate to their institutions that the partnership can deliver results

4) Coordination of Procedures: Champions should work together with involved individuals to ensure proper scheduling and delivery of lectures

5) Appropriate Partnership Architecture: Partners should jointly agree on what their actual contributions to the partnership will be.

The framework placed emphasis on what is important to ensure the success of collaboration, but very little attention is given to the actual process of collaboration. Although it is important to understand the determinants of effective collaboration, it is even more crucial to know how collaboration works and how it can be cultivated. As discussed in Section 2.1, capacity-building collaborative partnerships are not once-off, static events; they develop and evolve during the implementation process. Useful models for these types of collaborations are therefore those that view collaboration as an evolving process. From the literature,

various models that fit these requirements were proposed by Gray (1989), Ring and Van De Ven (1994), Doz (1996), Arino and de la Torre (1998) and Kezar (2005). The following section will therefore briefly discuss each of these models.

2.2.3.1   Gray's framework of collaboration

Using negotiated order theory, Gray (1989) defined a framework for understanding inter-organizational collaborative processes. The framework suggests that collaboration is a process that spans a continuum of three stages: 1) the precondition stage; 2) the process stage; and 3) the outcomes stage (Gray, 1989). In the precondition stage, potential stakeholders to the partnership develop objectives and commit to the collaboration process. They develop joint agreements on the purpose of the partnership, their expectations from the partnership and the other partners, their motivations and actual contributions to the partnership. At this stage, the partners also assess their compatibility and they may start forming a relationship based on trust (Czajkowski, 2007). Once they have agreed to work together, the partners then agree on the actual collaboration process that they will follow to accomplish their goals (the process stage). At this stage, they divide the work among themselves, and agree on a set of rules and regulations that will govern interactions and the collaboration. They also commit the required human, financial and technical resources to carry out the collaboration processes and work together across organizational boundaries towards the fulfilment of the objectives of the partnership. In the outcomes stage, the partners assess the realization of the objectives of the partnership to determine the success of the collaboration. They may also recommend a change to guide the strategies employed in further collaboration.

2.2.3.2   Ring and Van der Ven's model

Ring and Van der Ven (1994) proposed a developmental model (Figure 2-3), which consists of a repetitive sequence of three stages: negotiation, commitment and execution. At the negotiation stage, the stakeholders in the collaboration use formal bargaining and informal sense making methods to persuade, argue and haggle over the motivations, investments, uncertainties, expectations, approach and procedures to the potential partnership. In the commitments stage, partners agree on the obligations and rules for the partnership, which are presented as formal legal agreements or psychological commitments (unwritten expectations and assumptions). At the executions stage, the actual agreements are carried out by committing the resources to the partnership. Throughout the stages of the partnerships, the

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expectations of the stakeholders may change and conflicting roles and misunderstanding may arise.
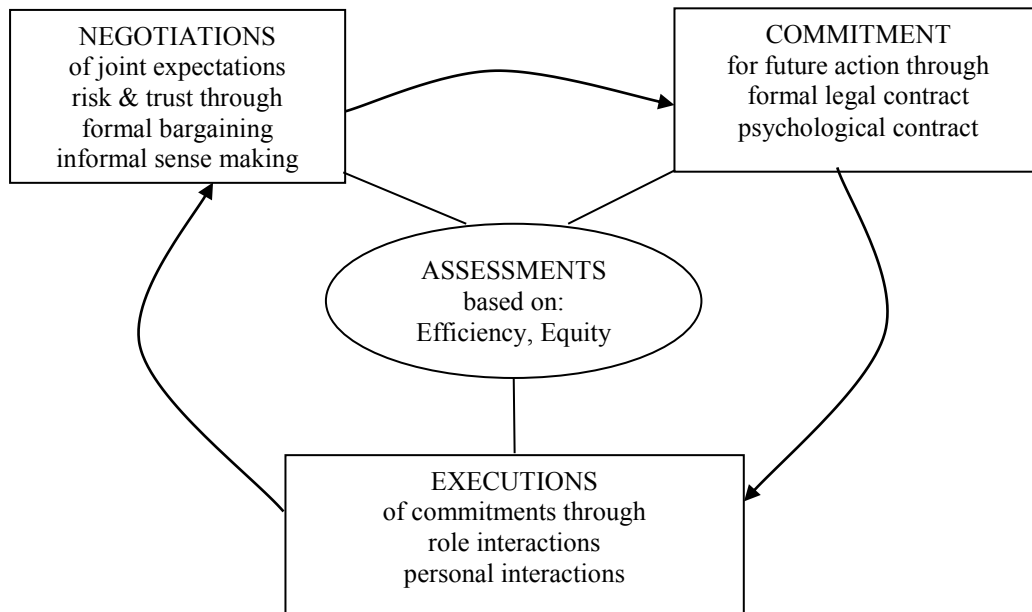
Figure 2-3: Process for the development of partnerships (Ring & Van de Den, 1994, p. 97)

Apart from the assessments that are done at every stage of the model, which may lead to new negotiations, commitments and executions made during the process of the partnership, Ring and Van der Ven"s model is very similar to Gray"s framework. Ring and Van der Ven"s improved Gray"s framework by adding the assessments stage, which emphasizes the importance of a reflection at the different stages of collaboration, and an improvement in the next phase of the execution during the entire duration of the collaboration process.

2.2.3.3 Doz's evolutionary model

Doz"s (1996) model (Figure 2-4) analyses how learning in an inter-institutional partnership evolves over time. The model is based on the observation that successful partnerships evolve through a cycle of learning, re-evaluation and re-adjustment over time. At the beginning of the partnership, the partners agree on the initial conditions of the partnership, including the aims of the partnership, the daily routines of each partner, as well as a set of expectations about performance. Once these are agreed, the actual process of executing the tasks of partnership commences. During this process, both partners will learn more about the environment in which they are operating and the task that they are performing. They will get additional skills and information about the process of collaboration, as well as a better

understanding (and perhaps an expansion) of their goals and that of their partners. They will then start to monitor the partnership for efficiency, and will evaluate each other for equity and adaptability. Their learning about the process will in turn help them to make adjustments to the partnership, which eventually may mean moving away from the initial conditions. According to Doz (1996), unsuccessful partnerships went through the first stage of learning but the partners either did not know how to put into practice what they learned, or it required them to negatively re-adjust themselves, causing them to conclude that they could not work together successfully with their partners.
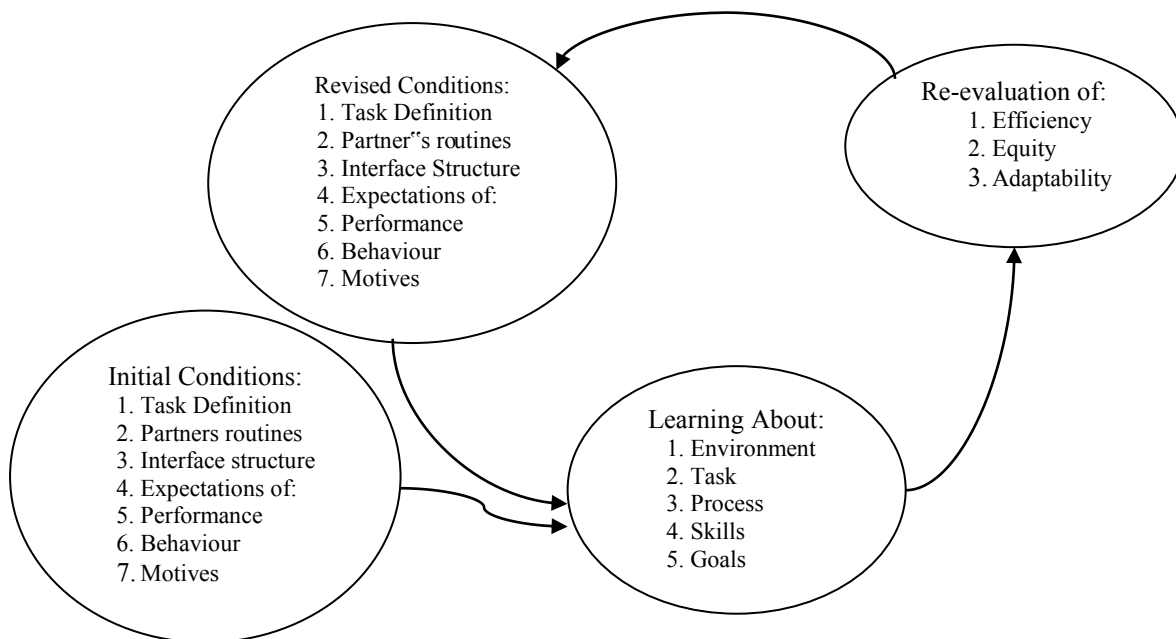
Figure 2-4: The simplified process of alliance evolution (Doz, 1996, p. 64)

2.2.3.4 *Arino & de la Torre's model*

Arino & de la Torre"s (1998) model (Figure 2-5) is based on the observation that partners assess each other continuously for efficiency and equity, as mediated by the quality of their relationship. At the beginning of the partnership, the partners will negotiate and agree on the initial conditions of the partnership. Once these initial conditions are set, execution of the activities of the partnership will commence. During this execution stage, the partners will learn more about each other. They will then assess each other to determine whether their partners are contributing as expected, a process which either builds trust and improves their relationships, or leads to suspicion of hidden agendas among the partners. Depending on the results of the assessment, the partners will decide whether to continue with the partnership or

not. If the results were unsatisfactory but tolerable to both the partners, some corrective actions are negotiated between the partners, and prescribed in the next iteration of the execution stage. However, if the results are unsatisfactory and intolerable to either or both of the partners, they may decide to end the partnership immediately and no new iterations of the execution stage will be conducted.
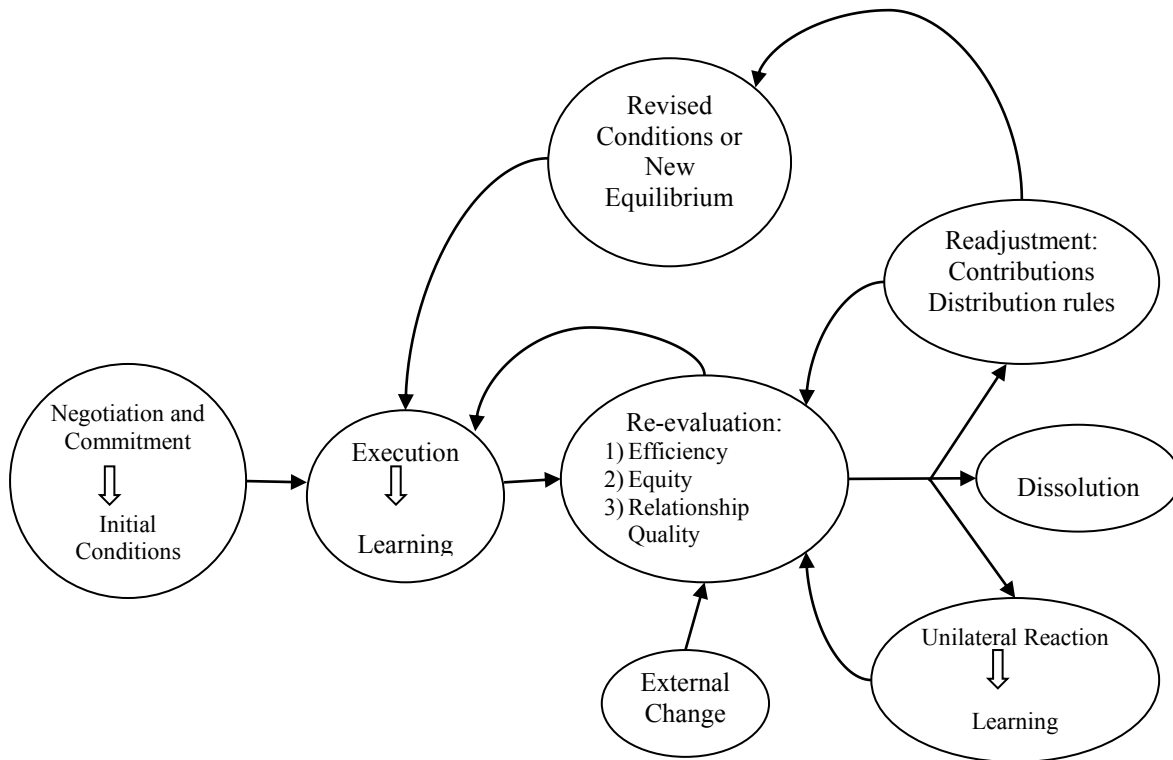
Figure 2-5: A Model of Collaborative Ventures Evolution (Arino & de la Torre, 1998, p. 308)

The model acknowledges that initial conditions are important, although they are tentative. It also acknowledges that conditions are affected by the context in which the partnership is situated and that they may change as a result of learning from the context of execution. As the partnership progresses, partners engage in a learning process that will trigger an evaluation of the initial conditions. Depending on the outcome of the evaluation, partners may have to re-negotiate the terms of the partnership, which leads to revised conditions.

2.2.3.5 Kezar's model for collaboration in higher education

Kezar"s (2005) three stage model (Figure 2-6) was specifically tailored for collaboration in higher education. In the first stage, Building Commitment, higher educational institutions will convince the relevant people in their institutions of the need to form partnerships with other

institutions. In the second stage, Commitment, senior executives in the institution will examine the mission of the institution and see how the partnership will contribute to the attainment of that mission. They are likely to support the partnership if it adheres to the mission of the institution. In the third stage, Sustaining, the institutions involved in the collaboration process will develop structures, networks and rewards to support the collaborations.

Stage 3: Sustaining
Integrating structures
Rewards
Networks

Stage 1: Building Commitment
External Pressure
Values
Learning
Networks

Stage 2: Commitment
Sense of Priority
Mission
Networks

Figure 2-6: Kezar's Model for collaboration in Higher Education (Adapted from Kezar, 2005, p. 845)

Kezar's model was tailored for use in tertiary education institutions, and thus considers the bureaucratic nature of educational institutions. It does this by recognizing that collaborations in these institutions can start at different levels of the organization, and will therefore need the blessing of senior executives in these institutions, rather than simply the individuals wishing to start the partnership. In addition, it also recognizes the importance of sustaining the collaboration by making sure that proper recognition and reward structures are integrated into the process to ensure that the collaborative process does not die a natural death.

2.2.3.6 Walsh and Kahn's model

One of the latest models for collaborative working in higher education was developed by Walsh and Kahn (2010). The model, shown in Figure 2-7, is different from the others discussed in this section because it does not view collaboration as an evolving process. Rather, it posits that collaborative working is a complex phenomenon that depends on five

essential elements in order to succeed. These elements[1] are: social vehicles, professional dialogues, context of collaboration, practice and personal engagements. The model is briefly discussed below.
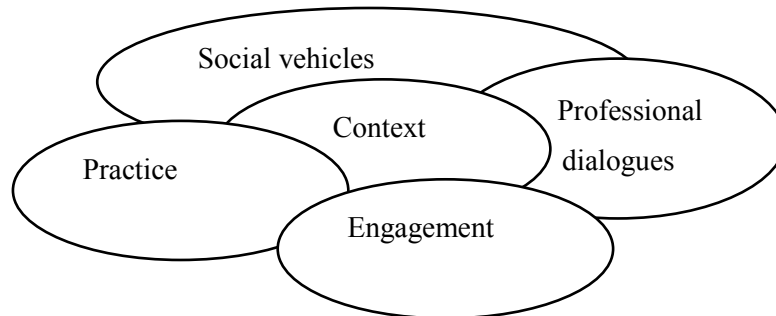
Figure 2-7: Model for Collaborative Working in Higher Education

Engagement refers to the act of participating in the activities of the group. Walsh and Kahn (2010) argued that personal engagement in collaborative initiatives is not only determined by the possible benefits that individuals may accrue from such initiatives, but depends also on the individual"s willingness and ability to participate. They therefore recommended that individuals" levels of commitment, effort, time and energy that they intend to spend on the process of collaboration is taken into consideration when embarking on such initiatives.

Practice refers to the profession that the individuals or the organization are all about. Walsh and Kahn (2010) argued that different individuals and organizations may have different approaches to practice, which in turn can have an impact on collaborative working. New interpretations of what the practice is all about may arise, which can change the approaches of others involved in the practice or place pressures on the existing practice.

Context is the unique societal contexts in which collaboration takes place. This includes the working environment in which the partners are located, and how this environment supports the collaboration process. It also includes the hierarchies in the organization, the exercise of power, availability of technological and human infrastructures, etc. Walsh and Kahn (2010) also differentiated between contexts in terms of physical or virtual spaces. They observed that

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[1] Please note that in the original model, these elements are called layers. They are called elements here because there is no apparent arrangement of layers in the model.

the presence of a staff room in a department or an organization exists for many more reasons than a cup of coffee, and that the basis for collaboration is much weaker when the staff room is absent.

Professional dialogues refer to the "ideas of criticality, professionalism and discourse" that the individuals and organizations have during the process of collaborative working. Walsh and Kahn (2010) argued that individuals and organizations must engage in appropriate discourses in order to create successful collaborative effort.

Social vehicles refer to the social structures such as relationships and the practice of individuals and groups involved in the partnership. This element is believed to be the all-encompassing element because it enables all the other elements. Individuals and organizations can only engage in professional dialogues and in their practice depending on the social structures of their partnerships.

2.2.3.7 *Conclusions on available models*

While very few of the models presented above acknowledge derivation from or relations with the other models, there are quite a number of similarities that can be noted between them. Firstly, all the models (apart from Walsh and Kahn"s model) consist of steps that are executed sequentially during the implementation of the collaborative process. They all acknowledge that collaboration consist of stages, that some stages should be executed before others, and that some stages are repeatedly executed until a desired outcome is achieved, or the collaboration process has come to an end. Secondly, they are all in agreement with the characteristics of capacity-building partnerships defined in Section 2.1.3 – i.e. they all agree that the purpose of a partnership is to address a specified need that the partners agree on; they agree that each partner has a role to play in the partnership; they all view partnerships not as a once off event, but as a process that may need several re-adjustments and executions; and that there is a desired, long-term outcome that the partners are aiming to reach.

In addition, five of the six models also seem to agree with the order of execution of the stages of a partnership. As an example, they all agree that the first step to starting a collaboration is by getting the partners to agree on the needs of the collaborative partnership as well as the contributions of all the partners to the partnership. Once the initial agreement is made and the initial conditions of the partnership are set, the execution stage of a partnership can

commence, where the partners engage themselves to fulfil their commitment to the partnership. In the process of execution however, the partners may learn and discover that the initial condition or commitments that they made do not fit well with their intended objectives. They may then need to re-evaluate their commitment or the needs of the partnership, and adjust the execution plan accordingly. Once the plan has been re-adjusted, the process of execution starts all over again.

While each of the models discussed in this section has some relevant aspects to collaborations in tertiary education institutions, all but Walsh and Kahn"s model seem to completely ignore the medium of collaboration in collaborative partnerships. Walsh and Kahn"s model, on the other hand, is not evolutionary, and ignores the important aspect of progressive improvement in the conditions of the partnership with each cycle of execution. As highlighted already, a model that takes cognizance of both context and cycles of implementation is essential for capacity-building partnerships. Partnerships that rely on technology for existence are faced by many challenges that traditional partnerships are not exposed to. None of the models considered the contradictions and tensions that can result from the constraints that institutions in developing contexts such as those of the SADC region may be faced with. Thus, none of the models presented in this section provided an entirely adequate framework for guiding the implementation of virtual partnerships for capacity building in our context. Rather the important characteristics of virtual partnerships for capacity building that the models capture were considered during the research. These characteristics were used to determine the extent to which each can be operationalized and appropriated to virtual partnerships.

2.3 The Use of ICT in Academic Collaborations

In the past, collaborative partnerships in education were mostly noticeable in institutions with a distance education orientation, while those with fulltime orientation were only possible between institutions with close geographic proximity (Moran & Mugridge, 1993; Jackson, 2007). Katz (1994) conducted a study to determine the effect of geographic proximity on scientific collaboration, and concluded that the frequency of collaboration decreased exponentially with the distance separating the partners. His study also provided strong evidence that face-to-face contact was fundamental to collaboration, while geographic separation could impede collaboration. In more recent years, numerous examples of collaborative partnerships are reported between institutions located in different parts of the

world, and different funding organizations (e.g. UniPD in Finland, DAAD in Germany, and Erasmus Mundus in Europe) seem to be advocating these types of partnerships. This could be attributed to the advances in telecommunications, which have inarguably made distance barriers between geographically dispersed institutions negligible. Telecommunications technologies have allowed faster communication and distribution of information between geographically dispersed institutions, enabling them to work together at a distance (Farrell, Isaacs, & Trucano, 2007). The numerous partnerships between institutions in different locations seem also to suggest that it is no longer geographical distance that hinders collaboration. Even with the use of ICTs, however, Bradner and Mark (2002) reported that physical proximity of people still seemed to influence collaboration. More recent research has identified a new type of distance, which is introduced when communication technologies are used to connect geographically dispersed places, as the new distance factor that is impeding successful collaboration (Lu, Watson-Manheim, & Matzkevich, 2005; Pallot, Martinez-Carreras, & Prinz, 2010).

Researchers of collaboration in virtual spaces have made a strong case against treating virtual spaces as an evolutionary development of traditional spaces. As Ratcheva and Vyakarnam (2001) argued, the difference between traditional and virtual spaces is not simply the technology that transcends time, space, and organizations. Rather, some of the distinguishing features between traditional inter-institutional collaboration and virtual inter-institutional collaboration have been based on the absence of, as well as the limits introduced by, physical presence. In traditional inter-institutional collaboration, partners often meet physically (at the same place at the same time) with each other and in the process of meeting develop inter-personal relationships. In virtual spaces however, participants do not need to be at the same place, neither do they have to meet at the same time. This time and place flexibility means participants have virtually limitless access to one another during the existence of the partnership. This requires an understanding of how virtual relationships develop in their own social contexts (Ratcheva & Vyakarnam, 2001).

Technologies used in communications (and hence virtual partnerships) are reported to decrease communication and erode social connections by creating negative effects on personal and social relations (Sherblom, 2010). Both Wainfain and Davies (2004) and Sherblom (2010) observed that there are multiple, interacting factors that should be

considered when using technologies in academic environments. Wainfain and Davies (2004) identified that the following factors that can affect the processes and outcomes of virtual collaboration: 1) the type of medium; 2) the type of task that the collaborators are working on; 3) the context of collaboration; 4) the characteristics of the group; as well as 5) the individual characteristics. More recently, Sherblom (2010) identified 1) the type of medium; 2) social presence; 3) effort of interaction; 4) individual identity; and 5) relationships between the participants, as the five factors that can have an effect on the use of technologies in academic settings. As can be seen from these lists, both Wainfain and Davies" (2004) and Sherblom"s (2010) identified the type of medium, characteristics of, or the relationship between the participants, as well individual characteristics as important characteristics. In addition, the similarities in their description of the factors led to the conclusion that there are five unique factors that are most likely to affect the processes and outcomes of the virtual partnership described in this thesis: 1) the type of medium; 2) relationship between the participants; 3) social presence; 4) the context of collaboration; and 5) individual characteristics. The interaction of these factors makes it difficult to come up with a single, coherent model of virtual partnerships in a world where technology is rapidly changing (Wainfan & Davies, 2004). The rest of this section will therefore briefly discuss these five factors.

2.3.1 The type of medium supporting virtual collaboration

A differentiating feature between traditional and virtual inter-institutional collaboration is that of the reliance on technology as the main type of communication. Technology is used in virtual spaces to facilitate communication and interaction among the participants. As explained by Moore (1997), the type of medium directly impacts the extent and the quality of communication between the students and their instructors. Tiffin and Rajasingham (2003) also argued that the selected medium determines the circumstances of learning. It not only determines what type of content is delivered to the students, but also defines how learning takes place. This was further affirmed by Sherblom (2010), who observed that the medium affects how participants interact, how they form identities, and how they develop relationships with one another over time. According to Anderson (2008), different media evoke different responses from classroom participants, and they have different capabilities of reducing transactional distances between the participants. Despite their different capabilities,

however, all media are capable of bringing timely contact between the different classroom participants and their content (Anderson, 2008).

Asynchronous communications are largely used for private, self-supervised learning, and do not require the communicating parties to be present in the same place at the same time. Earlier work in inter-institutional virtual collaboration was mainly facilitated by the use of asynchronous tools, more specifically, using static web pages and emails for communication purposes. Later, other asynchronous tools such as blogs, wikis, discussion forums and social networking technologies emerged to further support collaborative activities (Scott, 2010). Asynchronous communications were especially popular in tertiary education institutions in the early days of virtuality because of the limitations inherent in narrowband telecommunications that were available at the time (Tiffin & Rajasingham, 2003; Wainfan & Davies, 2004). While these environments are good for self-directed learning and are convenient for autonomous learners who may otherwise not be able to attend lectures due to costs, distance and complex family structures (Tiffin & Rajasingham, 2003), catering only for asynchronous modes has proven to be challenging to tertiary education institutions. Firstly, asynchronous communication limits the natural communication between the participants, making it difficult to develop a community of practice among them. Secondly, the loss of face-to-face communication between the participants reduces the essential nonverbal cues used in natural communication to 1) regulate and understand conversation, 2) indicate participants‟ perspective, power and status, or 3) move the participants towards an agreement (Wainfan & Davies, 2004).

To date, additional technologies that allow synchronous, real-time interaction have expanded the horizon for virtual collaboration. Synchronous communications require communicating parties to coordinate their transmissions, thereby enabling learning at different places, but at the same time. These technologies enable audio-conferencing, video-conferencing and web conferencing. Synchronous communications are particularly possible today because of the availability of broadband internet. In the academic sphere, live virtual classrooms are used to enable real-time communication between participants that are geographically separated from one another. Examples of technologies that provide synchronous communication include instant messages, desktop audio and video-conferencing, and even internet-based social networking. Other typical features of a live virtual classroom are shown in Table 2-8.

Table 2-8: Features of a typical synchronous virtual classroom solution

Feature	Description
Text chat	Allows participants to interact using text
Two-way audio	Allows participants to talk to one another
Two-way video	Allows participants to talk with one another while seeing each other
Polling	Enables participants to give opinions on specific issues
Hand-raising	Enables participants to simulate the practise of raising hands in the air. This feature enables the student to signal for attention without intruding on the class (e.g. to ask a question, answer a question or make a contribution)
Interactive whiteboard	Built-in drawing tools that enable participants to make notes on a board while in the session
Archive	Record and playback capability that enable asynchronous learning
Application sharing	Enables participants to share their computer screens and applications with one another
Breakout rooms	Rooms that are created during a training session to allow a selected group of users to have a separate session

The suitability of using technologies as instructional tools in academic settings has also been debated for a long time. Some researchers have argued that technologies are not suitable because of the limitations and consequences that the use of technologies bring to teaching and learning environments (Nworie & Haughton, 2008). Others have argued that they limit social integration, and increase alienation and isolation, and should hence be used with caution (Bejerano, 2008; Sherblom, 2010) only in cases where traditional classrooms are inaccessible (Bejerano, 2008). Some recent research findings, however, also seemed to suggest that certain advanced features make it possible to minimize the disadvantages introduced by communication technologies. The research found that there are certain cues available in technology mediated communication that can be used to express emotion and meaning, and that "learning the meaning of the cues is central to learning how people communicate nonverbally while online" (Riordan & Kreuz, 2010).

Conceptually, technology-mediated communications are classified into two types: those that allow asynchronous communication and those that allow synchronous communication. Those that allow asynchronous communication include web-based and one-way video and audio recordings. Those that allow synchronous communication include audio-conferencing, video-conferencing and computer-mediated communications (CMC). Both types of communications are widely used in the academic sphere (Sherblom, 2010). Since the focus of this thesis was originally on those technologies that facilitate interactivity between the

participants, the three technologies that enable synchronous communication are briefly described below.

2.3.1.1 Audio-conferencing technologies

Audio-conferencing technologies enable multiple participants in geographically dispersed locations to transmit and receive sounds between themselves. These technologies typically provide the same functionality as the telephone, but are designed in a way that enables more than two participants to take part in a call simultaneously. In the academic sphere, audio-conferencing technology has been widely used as a supplement to distance education. As early as 1982, Jenkins (cited in, Rogelberg, O‟Connor, & Sederburg, 2002) reported that it was a relatively inexpensive, spontaneous, reliable and cost-effective technology that could serve as an alternative to face-to-face meetings. With the recent advances in technological developments, audio conferencing technologies are now enabled through the use of Voice over IP (VoIP), providing further functionalities to audio-conferences that were not previously available.

The disadvantage of audio-conferencing technologies are well captured by Wainfan and Davies (2004). With its dependence on audio transmission only, audio-conferencing eliminates the rich visual cues that are inherent in face-to-face communications. As cited by Wainfan and Davies (2004), a study conducted by Harmon in 1995 when video-conferencing was not so advanced already highlighted the dissatisfactions with audio-conferencing: "people look at, and gesture at the speakers, and they have trouble taking turns to speak, identifying the speakers, and interpreting the discussions". In short, audio-conferencing completely removed all visual and other non-verbal cues from the communication, which have long been believed to provide additional information and regulate interactions (Ekman & Friesen, 1969). Despite these disadvantages however, audio-conferencing technologies are still widely used up to today (Hopkins, 2010) and are an effective means of teleconferencing especially in low-bandwidth contexts where the transmission of video content might be unfeasible (Lagebo, 2011). According to Anderson (2008), audio is still feasible in low-bandwidth contexts because it can better facilitate recall, aid retention, and stimulate higher-order thinking.

2.3.1.2 Video-conferencing technologies

Video-conferencing technologies enable geographically dispersed participants to share visual information. Its main aim was to overcome distance as a barrier to collaborative work (Wilcox, 2000). According to IGI consulting (IGI Consulting, 1991), the video-conferencing technology itself is not new. It was actually conceived by AT & T back in the 1950s, and they demonstrated their first product which they called PicturePhone in 1964. Although the demonstration was a success, video-conferencing technologies could not be embraced because of the limitations in the analogue telephone network available at the time, which could not adequately support two-way video communications (IGI Consulting, 1991).

Cost was also a prohibiting factor to acquiring a video-conferencing system in the early days. The cost of a codec of a video-conferencing system was estimated to be as high at US$250,000 in the late 1970s and early 1980s, and this excluded all the other requirements such as speakers, microphones, cameras and a conferencing room with acceptable acoustics and lighting (Wilcox, 2000). As Wilcox (2000) observed, there was clearly no motivation to invest in such expensive setups unless the organization was doing video-conferencing all day, all year. Although the costs decreased by the late 1980s and early 1990s, one barrier to the wide adoption of video-conferencing technology was the incompatibility of standards. Successful creation of video-conferencing sessions required participants at the connecting sites to have compatible video-conferencing technologies, which meant that they had to be made by the same manufacturer in order to communicate (Wilcox, 2000). The wide adoption of interoperability of standards in the market, together with advanced compression techniques available today, have enabled not only the connection of systems made by different manufactures, but have also enabled the connections to overcome the technological limitations to enable transmission of information such as those from Integrated Services Digital Network (ISDN) to Internet Protocol (IP). This has therefore ensured the wide availability of video-conferencing technology in academic institutions to date. Lagebo (2011), however, argued that video-conferencing is still expensive for developing contexts, and that it leads to a waste of resources if it is not properly aligned with the training context.

As Wainfan and Davies (2004) observed, the many improvements of video-conferencing technologies over the years have not allowed comparable developments of these technologies to face-to-face communications. In contexts where the bandwidth is insufficient, it is not easy

to have direct eye contact with the people at the remote site because of poor image resolutions. Although the high resolution cameras used today are able to pick up much more of the nonverbal cues, recent studies in the African context still regard video-conferencing as ineffective in delivering lectures at a distance due to its inability to interactively engage multi-site participants simultaneously (Lagebo, 2011). Researchers have therefore suggested the use of alternative and simpler technologies that are appropriate for these contexts (Lagebo, 2011).

2.3.1.3 *Technologies for computer-mediated communications*

Computer-Mediated Communications (CMC) is a general term used to refer to all communications that occur over (or are facilitated by) computer networks. Initially, CMC allowed only asynchronous communications, enabling the delivery of content to students via web interfaces and learning management systems such as Web CT, Blackboard and Moodle (Wang & Hsu, 2008). The use of such systems initially enabled one-way communication, where the lecturers would upload the content on the system, and the students would download it. Although responses from the students are not always guaranteed in such systems, Moore (1997) argued that the media that promote this one-way communication still had a form of dialogue between the students and their instructors.

Pallet and Pratt (2007) observed that when teaching moved to virtual environments, new opportunities were created, but new expectations also emerged. Although asynchronous tools provide many advantages to students (including learning at any time and at any place), it is widely acknowledged that it offers less social presence, and it often leaves classroom participants yearning for face-to-face interactions (Wang & Hsu, 2008). Recent developments in CMCs therefore tend to focus on elements that enable participants to create and maximize their sense of online presence.

The emergence of Web 2.0 and Web 3.0 technology brought with it many more capabilities; including the possibility of enabling all participants in the classroom generate their own content. According to Conole and Alevizou (2010), Web 2.0 evolved the web from an avenue of information repository and retrieval, to a platform that enables content generation and social mediation; the tools have also evolved from merely enabling communication and sharing of information to facilitating dialogue and promoting collaboration. Using social

networks, blogs, wikis, immersive environments and virtual worlds, individuals are not only creating their own content and sharing it with others all across the world, but are also creating new ways of teaching and learning.

2.3.2 Relationship between the participants

Although the potential of using ICTs in academic environments is long recognized, its ability to effectively enhance teaching and learning is widely debated in literature. Bejerano (2008) for example, argued that ICTs in educational environments limit the opportunities and strategies for teaching and learning, and will continue to do so until such are time that these environments can be considered comparable to face-to-face teaching and learning. Bower and Richards (2005) on the other hand reported that Computer Science students who took online practical sessions expressed that they preferred the virtual learning environment over face-to-face, and that they felt they learned significantly more in this environment in comparison to a face-to-face class. Despite the incongruity on the effectiveness of these tools in the classroom however, researchers seem to agree on one thing: that learning is fundamentally a social process, and interaction is an essential component of that process. The capacity of ICTs in supporting teaching and learning is thus only encouraged in environments where it facilitates the creation of Virtual Learning Communities (Woods & Ebersole, 2003; Swan & Shea, 2005).

Different terminologies and definitions are given to the term Virtual Learning Community. The definition adopted in this thesis sees a Virtual Learning Community as a "developed activity system in which a group of learners, unified by a common cause and empowered by a supportive virtual environment, engage in collaborative learning within an atmosphere of trust and commitment" (Ke & Hoadley, 2009, p. 489). This definition is especially important because it recognizes a virtual learning community as an activity system. The activity system is part of the activity theory framework adopted in this thesis (see Section 4.1), and later used to report (see Chapter 6) and analyse the findings (see Chapter 7) of the thesis. According to the activity theory, an activity system describes the essential elements of carrying out an activity aimed at achieving a specific objective. In a Virtual Learning Community, the typical activity system elements which are crucial for ensuring effective learning are: the subject (a group of learners that participate in the learning), the object (the common cause of the subjects – i.e. wishing to learn something new), the community (other stakeholders that

involved in the learning process including their lecturers), division of labour (which refers to the roles and responsibilities of the different participants in the activity system), tools (a supporting virtual environment) and rules (such as trust and commitment).

Wainfain and Davies (2004) have warned of the negative aspects that virtual environments can bring to group dynamics. They observed that in some cases, virtual environments can affect the decisions made by the participants, causing them to be biased in judgements and to take risky decisions without adequate considerations. In some cases, participants may also develop general negative attitudes towards other participants who are less visible in the virtual environment.

2.3.3 Social presence

One of the theories commonly associated with concept of a virtual learning is Social Presence Theory. Social Presence Theory has its roots in telecommunications literature, where it was originally defined as "the degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationships" (Short, Williams, & Christie, 1976, p. 65). In this original definition, attainment of social presence was entirely attributed to the telecommunication medium. In recent research however, other factors such as friendliness of the instructor, frequent interaction between the participants, and other social that are believed to also facilitate greater achievement of social presence (Mykota & Duncan, 2007). Social presence is thus no longer perceived to be only dependent on the medium; other factors that facilitate immediacy, and reduce the perception of distance in a virtual environment have been identified as desirable features in literature (Cobb, 2009).

Swan and Shea (2005) have argued that social presence must be part of all discourses in online learning. Aragon (2003) also believes that it is essential to establish social presence prior to online learning. Mykota and Duncan (2007) on the other hand stressed the need for establishing patterns that overcome the challenges of the virtual environment prior to commencing with learning activities. According to them, it is not easy to achieve social presence in a computer mediated environment. They therefore recommended that participants in such environments must be provided with instructional activities and requisite training before their courses, to enable the attainment of social presence.

2.3.4 The context of collaboration

Wainfain and Davies (2004) have defined the context as the immediate environment (as opposed to broader environment) in which the collaboration takes place. As explained in Section 1.2, the two Departments of Computer Science at UNAM and RU, which are two universities located in the SADC region, represent the general implementation context of the SANTED VCP. The context will thus consider the general subject of Computer Science and the location of the two departments in tertiary education institutions in the SADC context. The choice of ICTs and design for the virtual collaboration environment must therefore consider configurations that are appropriate and effective for this context (Wainfan & Davies, 2004).

The Computer Science field of study has been described as a "fertile ground" for experimenting with online teaching environments (Rößling, et al., 2010). This is because of the unique requirements necessistated by the topics and pedagogy of Computer Science, as well as the level of support that the educators would like to provide to their students. In the words of Bower and Richards (2005, p. 292), students of Computer Science are expected to "develop a logical understanding of the learning domain" while at the same time learning "the procedural capacity to implement it on a machine". Rößling, *et al.* (2010) have listed some of the requirements of an online system needed to effectively cater for Computer Science students: 1) the need to integrate dynamic visualizations; 2) simulation of computer programs, 3) algorithms and data structures; 4) integration of support code examples that can be executed by the students; 5) submission of programming assignments with automatic functional assessment; 6) discussion forums with intext references; 7) ease of integration of code in all parts of the virtual environemtn with appropriate syntax highlighting, and 8) support for specific needs of the various domains of computer science such as formal languages, computer graphics, and modelling. As shown in Table 2-8 however, a typical virtual classroom environment does not provide the capability needed to accommodate all these requirements.

Computer Science and Information Technology reseachers that have worked in the African context have often argued that the imported Computer Science curricula is not meeting the requirements of this region (Winschiers, 2001; Tedre, Ngumbuke, Bangu, & Sutinen, 2008). According to them, there is a need to contextualize the curricula to ensure synergy between

the curricula, graduate skills and industrial needs. The same need was expressed in 1978 by Lavington (1978), where he urged individuals in developed nations to consider building capacity in developing universities, and suggesting that those willing to participate in these programmes must ensure that their teaching is more specific, down-to-earth, and appropriate for the context. Tedre *et al.* (2008, p. 51) also observed that the curricular is too theoretical, and it needs to be adjusted to develop students" skills to enable them to know not only "what to do, but how to do it". A context-sensitive virtual environment, therefore, is the one that provides an opportunity for the students to develop both the theoretical knowledge and the practical capability required in the domain of Computer Science education (Bower & Richards, 2005)

Another important contextual factor that affect collaboration in virtual spaces is the technological solutions available for use in that context. Schrum & Hong (2002) found that students who had difficulty accessing the course content with the available tools were more likely to drop out, than those who have access within their reach.

2.3.5 Individual characteristics

Several researchers have indicated that student drop-out rates are higher in online learning environments than face-to-face. In an attempt to understand why some learners seem to cope better than others, research has focused on identifying personality traits that can affect online learning and virtual collaboration. Brown, Poole and Rogers (2004) found that individual traits can have an effect on the individual"s willingness to collaborate, as well as their ability to remain productive and to sustain the collaboration. Schrum & Hong (2002) reported that individuals that lack self-discipline have difficulty in coping with their daily chores, and those who experience difficulties with commitments have a tendency to drop-out of online courses. They also reported that life style factors, such as the support that an individual has from their family and the amount of responsibilities that they have at home and work, affects how they respond to teaching in an online environment. Other researchers have also identified characteristics such as attitudes, motivation, learning styles, and self-confidence as some of the important traits that online learners should possess to succeed in their courses. Of these, motivation is argued to be the most important especially for Computer Science Education (Rößling, et al., 2008).

2.4 Conclusions

This chapter has reviewed the literature relevant to virtual partnerships for capacity building in tertiary education settings. It defined capacity building as a transformative process that individuals and institutions go through to enable them to meet their professional needs, while at the same time, supporting the attainment of their institutional mission. It also described the widely adopted approach of capacity building, and explained why it is not suitable for initiatives such as the one studied in this thesis. In the last section, it reviewed the different technologies that are used in educational partnerships and discussed the need for creating virtual learning communities.

One of the issues raised in this chapter is the difficulty of measuring capacity-building efforts. As explained already, the capacity building aims to enable individuals or their organization to better achieves their mission and their objectives. There is therefore a need to identify whether individuals or institutions have truly been capacitated once they go through the process of capacity building. One way of doing this is to determine whether individuals and their organizations are able to improve and sustain their daily activities after the capacity-building process. This, however, is only possible if the expected outcome of the capacity building process is known from the beginning.

An important factor that seems to have been ignored in capacity building discussions, however, is the duration of the process. Whether capacity building is viewed as an approach or an objective or is focused on getting the job done or developing long-term capabilities as shown in Table 2-1, the time allocated to the process is an important determinant of the achievements and the successes of capacity building. The success and impact of two capacity building initiatives can also not be reliably compared if the initiatives were carried out in different timeframes. The approach and focus of capacity building is thus also likely to be affected by the time available for the process.

CHAPTER 3: CONTEXT OF THE SANTED VIRTUAL CLASSROOM PROJECT

The previous chapter presented the literature considered relevant for building a conceptual model of the work to be undertaken in this research. This chapter introduces the study case of the research, the SANTED Virtual Classroom Project. It starts by situating the research in the broader context of the SADC region, explaining the tertiary education situation and describing the key challenges faced by tertiary education institutions in the region. The background of the Computer Science Department at UNAM is then provided, highlighting the problems it was facing before the Virtual Classroom Project started. The historical context in which the Centre of Excellence at RU operates is also described. In the last section, the motivation for collaboration and the initial objectives of the project are outlined. The chapter concludes by presenting the principles that guided the implementation of the project plan.

3.1 Contextualizing the Research

This research is situated in the SADC region. The SADC is an inter-governmental organization established in 1992, whose membership comprises of the following 15 countries in southern Africa: Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, South Africa, Swaziland, Tanzania, Zambia and Zimbabwe. Each of the member countries has a history of colonial occupation, and the organization‟s original objective was to achieve political liberation for the entire southern Africa (SADC Website, 2011). Since South Africa‟s (last member country) political liberation in 1994, the SADC‟s focus has changed, and is now aimed at achieving economic liberation, social justice, and peace and security for the SADC community (SADC Website, 2011).

In 1997, SADC member countries developed a Protocol on Education and Training, where they agreed to cooperate in pursuit of the attainment of the regions‟ educational goals. In the protocol, member states acknowledged their inability to offer sustainable, quality education at affordable costs on their own. They also recognized that existing regional expertise and resources are not effectively utilized to the benefit of the entire region. The protocol therefore

aimed at providing a guideline on how cooperation in education may be pursued. It identified the specific areas of cooperation, described the institutional arrangements necessary to enable them and prescribed a funding strategy for cooperation. Through a concerted effort by all member states, the protocol aspires to harmonise and standardise the education systems to enable the region to tackle socio-economic ills that have plagued the region. By signing the protocol, member countries committed themselves to (SADC, 1997):

- maximize the effective utilization of existing regional expertise, institutions and other resources for education and training in the region, in order to ensure long-term sustainability of the co-operative effort;

- reduce and eventually eliminate unnecessary and costly duplication of effort in provision of education and training at tertiary and professional training levels;

- establish and promote regional Centres of Specialization and Centres of Excellence as a major instrument for providing efficient and effective education and training and research in the region.

The protocol suggested that cooperation in the area of higher education should focus on the following: 1) joint design and teaching of academic programmes; 2) partnerships for collaborative research and consultancy work; 3) student and staff exchange programmes to promote cultural ties; 4) using regional scholars as external examiners to facilitate the development of comparable educational standards in the region; 5) supporting the creation of professional regional associations that would facilitate interaction between scholars; and 6) creating a forum for the Vice Chancellors in the region (SADC, 1997). As will be described later in Section 3.3 of this thesis, the first four areas are directly supported in the case under study.

In February 2005, the Southern Africa Regional Universities Association (SARUA) was established to achieve the tertiary education objectives of the SADC Protocol on Training and Education. The mission of SARUA is to address the research and capacity needs of public universities in the region, and it currently enjoys a membership of 51 institutions out of 70 public universities in the region (SARUA, 2009). SARUA has so far mainly provided a forum for engagement of senior leadership in higher education, and has conducted several studies on topical issues affecting tertiary education in the region. It has also devoted a

considerable amount of time and resources in identifying strategies that can be used to strengthen and capacitate higher education systems in public universities in the region.

A study series of Higher Education South Africa (HESA) conducted in 2008 indicated that education in the SADC region is mainly based on face-to-face delivery, with distance delivery accorded only 28% (SARUA, 2009). Where available, distance education has reportedly increased access and participation levels in higher education (Butcher, et al., 2008). Given such a low percentage of distance-based delivery in the region therefore, it is not surprising that only 0,4% of the total population of the SADC region (which drops to 0,2% if South Africa is excluded) were enrolled in higher education in 2008 (SARUA, 2009). While other factors could have contributed to this discouragingly low level of participation, the lack of access to higher education in the region (in terms of both availability and affordability), is clearly also a major barrier to education. One of the issues dominating these studies is the availability and usage of ICTs in education at tertiary education institutions in the region (Twinomugisha, 2008).

One of the studies carried out by SARUA reported that 63% of SARUA member institutions have had some forms of collaborative partnerships with other institutions in the region (Kotecha, 2008). Examples cited in the study include the cooperation of UNAM with South African tertiary education institutions, where Namibian students are allowed to start their pre-engineering degree at UNAM and complete their qualification at selected South African institutions. Another example is the faculty of Engineering at the University of Botswana (UB) that jointly offers the Project Management Programme with the University of Dar Es Salaam. Lupane State University in Zimbabwe is also reported to allow staff exchanges with any other institutions in SADC. A lot of collaborative partnerships in the SADC region are however carried out with institutions outside of the SADC region, especially with developed countries such as the United States of America (USA) and the United Kingdom (Kotecha, 2008).

3.1.1 Tertiary education in South Africa

The history and structure of tertiary education in South Africa was largely influenced by the apartheid regime. Although South Africa had various tertiary education institutions before independence in 1994, education was only accessible along the lines of racial segregation. At

the dawn of independence in 1994, educational institutions were classified as either Historically White Institutions (HWI) or Historically Black Institutions (HBI). There were vast disparities in the human and infrastructural capacities of these two types of institutions, with HWI better equipped, staffed and financed than HBI to prepare graduates for the working world. In the early years after independence, the South Africa government initiated a transformation process of the education system to correct the inequitable distribution of educational opportunities for its citizens.

The Department of Higher Education and Training in the Ministry of Education is overall responsible for higher education in South Africa. The overall structure and governance of higher education is defined in the Higher Education Act No. 101 of 1997, which has defined three types of higher education institutions that can be registered in South Africa: public higher education institutions, private higher education institutions, and individual public or private higher education institutions. The Act has also defined the governance structures of all public tertiary educational institutions in the country (Higher Education Act, 1997). Section 38 of the Higher Education Act made a provision for national and regional partnerships to facilitate optimal resource utilization in higher education institutions.

The Higher Education Act (Higher Education Act, 1997) also provided for the establishment of the Council of Higher Education (CHE). The Council of Higher Education is responsible for advising the minister on the issues regarding Higher Education. As provided for in the Higher Education Act, these issues may range from quality promotion and quality assurance; research; the structure of the higher education system; the planning of the higher education system; a mechanism for the allocation of public funds; student financial aid; student support services; governance of higher education institutions and the higher education system; and language policy (Higher Education Act, 1997). In addition, the CHE has also been involved in monitoring the state of higher education, promoting quality and capacity development, promoting access to information, and auditing the quality of teaching and learning, research and community engagement in higher education institutions (Council on Higher Education, 2011).

In 1996, a report by the CHE revealed that tertiary education in South Africa was characterized by profound deficiencies that prevented it from meeting the moral, social and

economic needs of the country (NCHE, 1996). The deficiencies were characterized as inequalities, imbalances and distortions that are directly derived from the country's historical heritage. As remedy to these flaws, the Council recommended a transformation process that is characterized by increased participation by all sectors of the society, institutional responses to policy imperatives, and cooperative relationships and partnerships between the higher education and the broader society. The implementation of the actual transformation process was outlined in the Education White Paper 3 in 1997 (DoE, 1997).

The Education White Paper 3 reported the following five main deficiencies in the Higher Education system of South Africa at the time (DoE, 1997): 1) access and opportunities for students and staff were inequitably distributed along the lines of race, gender, class and geography; 2) there was a mismatch between the outputs of higher education and the needs of the country; 3) teaching and research policies favoured academic insularity and closed-system disciplinary programmes; 4) the education system was not laying the foundations of a critical civil society; 5) governance of higher education was fragmented, inefficient and ineffective with too little co-ordination and few common goals. In the light of these challenges, the following were recommended for the transformation process: increased and broadened participation for all citizens of the country, highly trained people that are responsive to the needs and interests of the society, and cooperation and partnerships between and among higher educational institutions, the government, civil society and other stakeholders.

In addition to the recommendations above, the white paper also suggested the formation of a regional consortium between higher educational institutions (DoE, 1997). The consortium was expected to enable educational institutions to jointly develop and deliver academic programmes, reduce overlap and duplication of programmes, refocus the institutional culture and mission of historically white universities and historically black universities, help build academic and administrative capacities in especially historically black institutions, and to enhance responsiveness to regional and national needs. In this regard, the white paper tasked the Department of Education together with the Council of Higher Education to determine the optimal number and type of higher educational institutions that South Africa needs. These recommendations eventually turned into institutional mergers during the years 2004 to 2005,

in which some historically white institutions were merged with historically black institutions to form single institutions with common governing bodies.

Although merging of institutions was in principle good for the transformation of higher education, it presented some challenges for higher education in South Africa. According to the CHE, the generation of new institutions required accommodating different institutional cultures and traditions. In addition, policies and procedures from different institutions had to be realigned and faculties and programmes across campuses had to be harmonized. These presented major challenges for the institutions (CHE, 2009). By the end of 2005, the merging process was completed, leaving a total of 23 public higher education institutions in South Africa. Of these, 11 are public universities, 6 are comprehensive universities and 6 are universities of technology. This figure does not include the 84 registered and 25 provisionally registered private higher education institutions that are also found in the country (Council on Higher Education, 2011).

The demand for higher education in South Africa is considerably high while the percentage of the population that has access to it is still a worrying concern. Although research has revealed that tertiary training provides higher returns for young South Africans than those who only complete matric (Grade 12), many matriculants pass with low marks that makes them ineligible for admission into universities (Branson, Leibbrandt, & Zuze, 2009). A statistical analysis of postgraduate studies conducted by the Council of Higher Education in 2009 also revealed a decrease in higher education participation rates in South Africa, from 16.34% in 2004 to 15.88% in 2007, which is below the 20% target of the South African Government (CHE, 2009b). In general, however, the statistics revealed that the challenges facing the tertiary education situation in the country were largely addressed since the CHE report in 1996, with enrolments at postgraduate levels not only having increased, but also being equitably distributed across institutions and racial groups (CHE, 2009)

In terms of Quality Assurance, the country has the South African Qualifications Authority (SAQA) established in 1995. SAQA was established to oversee the development and implementation of the National Qualifications Framework (NQF), which ensures that there is a single integrated national framework for learning achievements in the country. All tertiary educational institutions must ensure that their programmes fully comply with the rules and

regulations stipulated by SAQA, and they are required to accredit their programmes with the Higher Education Quality Committee (HEQC) before offering them to the students in their institutions (Council on Higher Education, 2011).

Although the South African public and government has continually expressed concerns over the state and quality of education over the past few years, South Africa is believed to be a regional hub of higher education in Southern Africa (Marco, 2009). Of all the public higher education institutions found in Southern Africa, about 33% (23 out of 70) of these institutions are based in South Africa (Kotecha, 2010). South Africa has also internationalized its programmes to ensure that a guaranteed number of places are reserved for international community in all its public universities. South Africa is therefore believed to be doing relatively well in comparison to its neighbours in the region, and researchers have recognized its potential to develop into a hub of higher education for the entire SADC region (Marco, 2009) .

3.1.2 Tertiary education in Namibia

The development of education in Namibia is closely linked with the general political and socioeconomic changes that the country endured. Amukugo (1993) has identified pre-Bantu Education (before 1962), Bantu Education (1962-1976) and post-Bantu Education (after 1976) as the three distinct and successive phases of educational development in Namibia. During that time, Namibia‟s tertiary education was also largely influenced by the apartheid regime, which was characterized by racial segregation. As a result, many black Namibians did not have access to secondary, let alone post-secondary education inside the country (Amukugo, 1993; Ministry of Education and Culture, 1993). The curriculum of schools for black people was also deliberately kept inferior (Hopfer, 1997; Ottevanger, Macfarlane, & Clegg, 2005), and was primarily designed to serve the interests of the minority white population. Black Namibians wishing to access post-secondary opportunities had three choices: 1) to study through the United Nations Institute for Namibia in Lusaka; 2) to enrol with institutions in other countries; or 3) to study through black teacher training colleges (Ministry of Education and Culture, 1993). Before independence in 1990 therefore, none of these three phases provided adequately for the higher education needs of black Namibians (Ministry of Education and Culture, 1993).

The first tertiary education institution in the country, the Academy of Tertiary Education, was established in 1980. The Academy had a university component, a Technikon, and a College for Out of School Training. It offered mostly non-degree programmes to limited students, predominantly from urban areas (Katjavivi, 2005). The Academy offered a total of 17 diploma and certificate courses in Agriculture and Nature Conservation, Personnel Management, Public Administration, Cost Accounting, Secretarial, and Communicative and Legal Training; a total of 13 certificate courses in Technical and Commerce/General areas, and pre-tertiary teacher training (Polytechnic of Namibia Website, 2010).

After independence, education became a right for every Namibian, assured by the country"s Constitution. The education system became one of the top fiscal priorities of the government in an attempt to reconstruct and transform the human resource capabilities in the country. Immediately after independence, a Presidential Commission on Higher Education was established, and recommended that the Academy of Tertiary Education be dissolved, and the first national university, The University of Namibia (UNAM), and the Polytechnic of Namibia be established (Coombe, 1993). UNAM was established in 1992 to cater for advanced education, research and community development in the country. The Polytechnic was also established in 1994 to provide training in technical subjects and higher vocational training. In addition, four Teacher Training Colleges were also created to prepare teachers for primary school teaching, two Colleges of Agriculture to provide training in the fields of agriculture and farming, and five Vocational Training Centres to provide a variety of artisan skills. It was envisaged that the six colleges (the four Teacher Training Colleges and two Colleges of Agriculture) would eventually merge with UNAM, while the Vocational Training Centres would eventually become part of the Polytechnic (Ministry of Education and Culture, 1993). By April 2010, all six colleges had successfully been handed over to UNAM.

Namibia has undoubtedly made progress in transforming its education sector and increasing opportunities for, and access to education after independence. In 1994, Namibia introduced the International General Certificate of Secondary Education (IGCSE) and the Higher International General Certificate of Secondary Education (HIGCSE) examinations of Cambridge International Examinations as the final exit level examination for secondary schools in Namibia. The Grade 12 candidates of 1995 were the first to write IGCSE and HIGCSE examinations. Ten years later, an assessment of the education and training system in

the country was done, and concluded that the education system was too weak to contribute to the attainment of the nations" development goals (Marope, 2005; ETSIP, 2007). The assessment also identified the following as some of the factors constraining education and training: 1) low quality of learning achievements; 2) low efficiency in the use of available resources; 3) inequalities in the distribution of resource inputs and learning outputs; 4) low capacity for knowledge creation and application; and 5) uncertain relevance of outputs to the market. To facilitate the attainment of the country"s national development plan, Vision 2030, the Namibian education sector developed the Education and Training Sector Implementation Programme (ETSIP) in 2005, which is a 15-year strategic plan of the entire education sector in the country.

ETSIP is a detailed implementation plan for each of the following educational sectors in Namibia: early childhood development and pre-primary education, general education, vocational education and training, tertiary education and training, knowledge and innovation, and information, adult and lifelong learning. For each sector, ETSIP defines what needs to be done, who will do it, and by when it should be done. For general education, it aimed at improving quality, ensuring equity, increasing access, and improving efficiency. It also cited the achievement of annual academic performance targets as one of the indicators of the success. For tertiary education and training it identified several challenges and proposed solutions as shown in Table 3-1.

Table 3-1: Challenges and proposed solutions for Tertiary Education and Training Sector as identified in ETSIP

Challenges	Proposed solution	Responsible body	Target Date
Lack of vision, coordination, standards and procedures	Operationalize the National Council for Higher Education (NCHE) to act as the central advisory and regulatory body for higher education	Directorate: Higher Education	Early 2007
Poor quality of teachers produced by the tertiary education sector	Establish an Advisory Council for Teacher Education and Training Develop a comprehensive reform plan for teacher education	Ministry of Education	Before end of February 2006
Lack of capacity for graduate studies and research	Review of existing programmes and infrastructure Establish appropriate support systems for teaching, learning and research	Individual tertiary education institutions	2007
Access to education	Develop pre-entry and foundation programmes to tertiary education	All tertiary educational institution in conjunction with Ministry of Education	2006
Improve productivity and effectiveness of academic staff	Introduce staff development opportunities to raise competencies in teaching and research	National Council for Higher Education Management of all tertiary education institutions	No date set
Deficiencies and Lack of quality assurance processes	Conduct comprehensive audits of existing quality assurance processes	Individual institutions	2007/2008
No diversity in financing resources	Identify alternative ways of raising revenue and develop an implementation plan	National Council for Higher Education	No date set
Inefficient use of existing resources	Identify sources of inefficiency and propose a workable plan	National Council for Higher Education	No date set

3.1.3   Critical challenges in tertiary education in the SADC region

A situational analysis conducted by SARUA revealed that there is one indisputable agreement among the many debates on higher education in Africa: that higher education in the continent is generally very weak (SARUA, 2008b). The specific, critical challenges that face the tertiary education institutions in the SADC region are highlighted in a SARUA Study series of 2008 (Butcher, et al., 2008). These challenges are related to access, equity, quality, staff capacity, inadequate funding and research output. They are briefly discussed below.

3.1.3.1 Access

In the quest to attain the millennium development goals, the global community and development agencies have, over the past few years, provided the financial support and backing to ensure increased enrolments in primary education (CHET, 2006; Parker, 2010). This consequently led to a higher number of students completing secondary schools, further increasing the demand for tertiary education. Universities both in Africa in general and the SADC region in particular, are as a result, experiencing major challenges regarding access to higher education (World Bank, 2010). Although the number of tertiary education institutions in Africa has more than quintupled from 52 to 316 institutions from 1960s to the early 2000 (Sawyerr, 2004), the majority of the people, especially marginalized people in Africa, are still excluded from higher education (World Bank, 2010).

According to the World Bank (2000) disadvantaged groups will continue to find it difficult to compete for place in tertiary education because the selection processes used in institutions. This is partly attributed to the selection processes currently employed by tertiary education institutions, which are believed to reinforce a history of discrimination and underachievement inherited from inadequate primary and secondary schooling (World Bank, 2000). In addition, capable students are challenged by higher costs of tertiary education, where poor students cannot secure loans to finance their education (Pillay, 2009; Pillay, 2010). This further excludes them from participating in tertiary education.

Corruption in awarding university places is another prohibiting factor that is identified by the World Bank report (World Bank, 2000). The report suggested that in some developing countries, people working at the institutions get payments and bribes to accept students at these institutions. Students that cannot afford to offer prices for such bribes become victims of discrimination, further preventing them from participating in higher education.

3.1.3.2 Equity

Due to historical reasons, access to education was not equitably distributed among the citizens of all countries. Access to education was distributed according to colour, race and gender. As a result, equity was found to be unacceptably low in term of gender, location and socio-economic status (Pillay, 2008) across the SADC region. Generally, female had less access to education than males, and poor people in rural areas had fewer opportunities to

good quality education than wealthy people in urban areas. Equitable access is still considered one of the challenges facing the SADC region today (SARUA, 2012).

Increasing equitable access to training and education is one of the priorities of the SADC Protocol on Education and Training. Although the Protocol aims to empower women, eliminate discrimination and achieve gender equality and equity (SADC, 2008), the region does not seem to have adopted a common implementation framework to address equity in tertiary education yet. A recent SARUA report however describes several mechanisms that countries in the region have introduced to address inequity (Pillay, 2009). In Mozambique for example, poor students from rural areas are given scholarships to study at selected tertiary education institutions. In Botswana and Tanzania, students from lower socioeconomic groups are given grants to study in private higher education institutions. In South Africa, the national student loan scheme targets historically disadvantaged students. In addition, enrolments at individual institutions show an increase in the enrolments of female students across the SADC region. Despite these commendable efforts however, there seems to be a lack of research results that efficiently report on equitable access in terms of gender, location and socio-economic status across the region.

3.1.3.3 Quality

The increasing number of students without a parallel increase in infrastructural and financial resources has caused a decline in the quality of education that these institutions are providing. The increasing demand for higher education has implications for lecturer per student ratio and pupil per classroom ratio, which can drastically increase if there is no parallel increase in the staff and infrastructural resources. This is further worsened by the decline in funding that public institutions receive in comparison to their student numbers.

Another factor that is hampering the quality of education in SADC is the qualifications of lecturers. Sawyerr (2004) described three generation of African scholars that are found on the African continent today. The first generation, were mostly educated before or in the 1960s, and received training of highest international standards at the expense of public funds, mostly abroad. The second generation was trained in the 1970s and the 1980s, and they still received high quality training, but under difficult circumstances as the funds both for further studies and to pay the graduates what they deserved, started to decrease. After completing their

studies, the second generation of academics started looking for greener pastures, opting to rather stay and work abroad than return to their countries of origin, thereby contributing to the brain drain. The third generation includes all the academics that came after the 1980s. According to Sawyerr (2004), these third generation of academics received inferior education. During this time, all the resources to send students abroad were exhausted or diverted to other areas of national priorities, forcing these academics to undertake their entire postgraduate education from the Bachelor's degree to the PhD studies at their home institutes. Sawyerr (2004) argued that it is these third generation academics that are currently dominating the staff numbers at educational institutions in African universities. If his arguments are true, the declining level of quality at tertiary education levels in African universities is not surprising.

3.1.3.4   Staff capacity

Lindow (2008) reported that African Universities are rapidly losing their qualified faculty members to industry and retirement, while at the same time finding it difficult to educate and attract new PhD holders to the academic world. Tettey (2010) also reported that institutions are unable to attract sufficient academics to meet their teaching and research needs, and that enrolments for postgraduate students from which the next generation of academics could be drawn have remained relatively very small over the past decade. This further erodes the hope of producing sufficient human resource capacity, while at the same time increasing the continent's inability to handle tertiary education challenges that it currently faces.

Sawyerr (2004) reported that before the year 2000, it was previously difficult for graduates with Master's degree qualifications to be accepted as academic staff members in the University of Dar Es Salaam. From the year 2000, he observed that it was not uncommon to find lectures employed at the same institution with Bachelor's Degree qualifications.   Both Sawyerr (2004) and Tettey (2010) also reported that Africa has lost its expertise base to developed countries in search of greener pastures, leaving insufficient capacity to provide the desired training for the new generations of citizen. Staff migration has been attributed to a number of factors, including non-competitive salaries and lack of satisfaction in the job. Tettey (2010), for example, observed that the University of Botswana (UB) was consistently one of the universities in the region that successfully attracted and retained qualified staff in the region. Today however, UB is also now struggling with attracting qualified personnel in

the senior levels because the services required at these levels are in high demand in a competitive job market (Tettey, 2010).

3.1.3.5 Inadequate funding

In the SADC region and many other countries of the developing world, funding for the majority of tertiary education institutions comes mainly from government subsidy and student fees (Kotecha, 2008). A study carried out by SARUA however found that public funding to these institutions is generally inadequate, inequitable, inefficient, and not generally integrated with planning (Pillay, 2008). Where funding is adequate, considerable political pressures have been reported to ensure the public"s commitment to education (Pillay, 2010).

In relation to collaborative partnerships, Sawyerr (2004) argued that lack of funding has led to an imbalance between those who have financial resources (usually from developed countries) and those who do not (usually from developing countries). He observed that the role of diminishing academic support has reduced the role of collaborators with fewer resources to "data gatherers", a role which he described as "intellectually enervating and debilitating" to institutions, and affecting faculty morale, creativity and institution prestige. Both Tettey (2010) and Sawyerr (2004) therefore argued that complementary funding models are required to ensure that tertiary education institutions produce high quality training and retain a pool of high quality academic personnel.

3.1.3.6 Research output

The diminishing research output of universities in Africa in general and in SADC in particular is a growing concern and challenge of tertiary institution in the region. In comparison to the worldwide growth rate of scientific papers published in the citation indexes of the Institute for Scientific Information (ISI), SADC countries are reported to have declined over the past ten years (Mouton, et al., 2009). In addition, the limited publications did not seem to be fairly distributed over the region. Of the 95,711 papers that were submitted in journals of ISI Web of Science by 14 SADC countries during the period 1990–2007, 79% were published by South African institutions, with the rest of the SADC having published only 21% (Mouton, et al., 2009). Institutions in the region are therefore lacking international recognition due to lack of sufficient high quality journals and resources for efficient peer review and editorial practices across the region (Mouton, et al., 2009).

In another study of eight universities in the SADC region carried out by SARUA, lack of awareness of already produced research results was raised as a major constraint to undertaking research in the region (Abrahams, Burke, Gray, & Rens, 2008). This lack is mainly attributed to poorly organized, non-indexed and unpublished research and scientific output in the region. Peer reviewed research publications from African universities are also reportedly poorly organized due to lack of incentives to capture details of publications (Boshoff, 2010). The diminishing research output in the continent and the SADC region in particular has also been attributed to lack of funding, deteriorating research infrastructure and lack of maintenance or replacement of old equipment in tertiary institutions (Mouton, et al., 2009). If universities in the region are to be on par with other tertiary institutions worldwide, it is essential to establish initiatives that strengthen the research output of this region.

3.2 Background to the Virtual Classroom Project

Antecedents to the partnership are believed to affect the final outcome and sustainability of the partnership (Eddy, 2010). This section therefore gives the background of the three main stakeholders to the SANTED VCP: The Department of Computer Science at UNAM, the Centre of Excellence in Distributed Multimedia hosted by the Department of Computer Science at RU, and the SANTED Programme. It also describes how the interactions between the individuals from the three stakeholders eventually lead to the formation of the virtual classroom project. Understanding the backgrounds of the individuals involved in the partnership helps to understand their motivations and interests, and can give insight into the role they play as well as their expectations of and from the partnership.

3.2.1   The context of the Department of Computer Science at UNAM

The University of Namibia (UNAM) was established by an Act of Parliament, Act 8 of 1992. In the Act, UNAM was tasked with the responsibility of managing the programmes of the former Academy of Tertiary Education and assigned the following six objectives and functions: 1) to provide higher education and carry out research; 2) to advance and disseminate knowledge; 3) to provide extension services; 4) to provide growth and nurture cultural expression of the Namibian society at large; 5) to provide for social and economic development of Namibia; and 6) to foster relationships with any person or institution, both nationally and internationally.

At inception, UNAM had a very limited number of Namibian scholars among its academic staff, and was heavily dependent on international experts. The institution is obliged to have a staff population that is largely Namibian, while at the same time retaining international experts to maintain its international reputation (Ministry of Education and Culture, 1993). UNAM has continually acknowledged its difficulty in attracting and retaining well-qualified human resources (UNAM, 2004). The need to recruit, retain and motivate staff was identified as one of the top challenges that the institution faces in achieving its objectives in its five year strategic plan of 2006–2010 (UNAM, 2006). Both the Higher Education Act and the University of Namibia Act (University of Namibia Act, 1992) also encourage the establishment of linkages with international educational institutions to enable UNAM to benefit from international experts.

Since the year 2006, UNAM has reported in its annual reports a continued rise in programmes of international cooperation and productive networking and partnerships (UNAM, 2006; UNAM, 2007; UNAM, 2009). The activities of these programmes and partnerships included lecturer and student exchanges with other educational institutions, and are believed to have increased the national status of the University. In some cases, UNAM signed Agreements of Cooperation with universities both in the region and abroad to enable the joint offering of specialized degree programmes with those institutions. An example of these is an agreement that provided an opportunity for undergraduate students to commence with the first two years of a specialized degree programme at UNAM, and to transfer to other educational institutions such as the University of Witwatersrand (Wits), the University of Cape Town (UCT) or the University of Pretoria (UP) in the third year of study (Ilemobade & Ballim, 2005). UNAM is also currently involved in collaborative partnerships with other tertiary institutions in Africa, as well as outside Africa (such as the University of Oulu in Finland, and the University of Washington in the United States of America) (UNAM, 2009; University of Namibia Website, 2011).

UNAM has a staff development office that has been in operation since 2000. It is aimed at strengthening the Namibian staff capacity in order to create a sufficient human resources level required by the University (UNAM, 2007). The office provides funding for professional development of existing staff members (called Staff Development Status Holders), where staff are given an opportunity to enrol in courses leading to attainment of qualifications that

will enhance efficiency in their departments. The staff development office provides funding and facilities needed for the duration of their studies, while at the same time, paying a portion of their salary and other fringe benefits. In 2009 alone, 87 members of staff were pursing PhD degrees while 29 were enrolled for Masters" degrees both in the SADC region and abroad, through the staff development office (UNAM, 2009). As shown in Table 3-2, the number of candidates participating in staff development had increased significantly from 37 to 87 PhD and 25 to 29 Masters" Degree candidates from 2004 (UNAM, 2004).

Table 3-2: UNAM Staff supported by the Staff Development Office (UNAM Annual Reports 2004 - 2009)

Year	PhD	Masters	Bachelors	Total	Computer Science
2004	37	25	4	66	0
2005	35	30	1	66	0
2006	63	30	4	99	0
2007	-	-	-	-	0
2008	86	35	8	129	2
2009	87	29	21	117	2

In addition to strengthening existing capacities, the staff development office, is also responsible for recruiting future academics from a pool of final-year students at UNAM (called Staff Development Fellows). Working in collaboration with Deans of Faculties and Heads of Departments, the office identifies Namibian students in their final year of study who demonstrate academic potential and offers them a fellowship to register for Honours, Masters and PhD degrees in various universities worldwide. In the late 1990s and early 2000, this was especially critical to correct the Namibian/non Namibian academic Staff ratio at the university. Despite this remarkable capacity-development intervention however, Namibian academic staff in critical departments such as Geology, Engineering and Computer Science remained extremely low, and UNAM has been importing expatriate skills to meet the minimum qualifications required for lecturing positions in these departments.

To qualify as a Staff Development Fellow in the Department of Computer Science, a candidate must have a BSc with Computer Science as a major subject and a level of attainment of a B grade minimum (higher than 65%) average or higher. Under exceptional circumstances candidates who attained lower than a B grade average are also considered,

provided that they attained adequate marks and meritorious performance in Computer Science (UNAM SDF Policy, 2011). Potential fellows are recruited through the process of advertisement, but candidates may also be identified from UNAM"s graduates on merit, on condition that they obtain their qualification by the time that the fellowship is expected to commence (UNAM SDF Policy, 2011). As a final-year BSc student, the author of this thesis was awarded the first ever staff development fellowship of the department in January 2000. The author was subsequently sent to study for a Bachelor of Science with Honours and later a Master of Science (MSc) Degree in Computer Science at Rhodes University. The second candidate from the department was awarded a staff development fellowship only in 2008, and is expected to complete his PhD studies in 2011. As shown in Table 3-2, the Department of Computer Science sent only two staff development fellows for the period 2006–2010. Although the fellowship opportunities targeting final year Computer Science students were advertised year after year, the department failed to attract students during the years 2002–2007 to add to the pool of insufficient staff members and unfilled vacancies still existing in the department (Mufeti T. K., Thinyane, Terzoli, & Foster, 2010). This is not surprising, considering the competition posed by Namibia"s labour market. Through the SANTED VCP, the fourth and fifth fellowships were awarded in 2009 and 2010 respectively. The number of fellowships awarded per year for the period 2001–2010 is shown in Table 3-3.

Table 3-3: Number of Staff Development Fellowships awarded in the Computer Science Department at UNAM

Year	Number of New Fellowships	Expected Qualification	(Expected) Year of Completion
2001	1	MSc	2004
2008	2	PhD	2011
2009	1	MSc	2011
2010	1	MSc	2012

Further training and career development is not a condition of service for staff members who at the time of recruitment have qualified at UNAM. Rather, staff development holder status is awarded on a needs basis, provided that there is funding available for the department. Individual staff members are therefore given leeway in choosing whether to improve their qualifications or not.

During the planning stages of the VCP, the department had a staff complement of five lecturers (all with Masters" degrees), four tutors (all with Bachelors" degrees) and one technician. The lecturers were responsible for Computer Science modules, while the tutors

were responsible for Computer Literacy, which is a compulsory module for all UNAM first year students. As shown in Table 3-3, there was no staff development support aimed at improving qualifications of staff members in the department between the years 2002–2007. After the commencement of the VCP, two Staff Development Status Holders (to existing staff) and two Staff Development Fellows (to new staff) were awarded to the department, two of which are a result of the VCP.

Despite the challenges experienced in recruiting new and developing existing staff members in the department between the years 2002–2007, the number of students admitted to the department has remained consistently high. In addition, each lecturer taught an average of six modules per year (equivalent to 21 contact hours per week), which exceeded the recommended staff workload of 12 hours per week (UNAM, 2004). The total number of registered students in the department a few years prior to the commencement of the project is shown in Table 3-4. Although the total number of students decreased with the introduction of the single-major degree in 2008, the department still reported staff overload, with more teaching hours and very little time to devote to research and publishing (Computer Science, 2008). In the years 2001–2008, limited research activities and outputs were reported in the department‟s annual report, with no journal publications recorded during that period.

Table 3-4: Number of UNAM Computer Science students per year from 2005 - 2008

Year of Study	2005	2006	2007	2008
1	120	127	120	80
2	70	55	58	62
3	45	48	47	30
4	30	31	30	37
Masters	2	2	2	2
Total	265	263	257	211

In addition, the department has continually expressed problems concerning physical space and technological infrastructure in its yearly annual reports (Computer Science, 2008; Computer Science, 2009). Each group of students (per year of study) had their own computer lab, with the number of computers allocated as shown in Table 3-5. Each of the labs was connected to the internet through the UNAM LAN, which had a limited bandwidth of 2Mbps in 2007.

Table 3-5: Computers and Computer Laboratories dedicated for teaching Computer Science at UNAM in 2005 to 2008

Year of Study	Number of labs	Computers per lab
1	1	40 + 20
2	1	25
3	1	35
4	1	24
Masters	1	2
Total	5	146

In 2007, UNAM reviewed its entire undergraduate degree curriculum in line with the National Qualifications Framework (NQF) and Namibia‟s Vision 2030 (UNAM, 2007). The curriculum review process was also consonant with ETSIP, the SADC Protocol on Education and Training, which called for equivalence and standardization of education systems in the region. The reviewed programmes adopted credit points as an indicator of the amount of teaching and learning that a student underwent and were expected to comply with international accepted accreditation standards. Prior to the review, UNAM offered double major, undergraduate degrees introduced in 1996 as a preparation for admitting the first Namibian students who wrote International General Certificate of Secondary Education (IGCSE) and High International General Certificate of Secondary Education (HIGCSE) examinations (Kirby-Harris, 2003). Although the degrees were offered over four years, they were not equivalent to Honours degrees offered by South African Universities, necessitating UNAM graduates to first register for an Honours degree before they could pursue a Master‟s degree in South Africa. The reviewed undergraduate degree on the other hand is registered at NQF level 8, making it equivalent to an Honours degree from a South African University (UNAM, 2007). It was expected that when the first cohort of students graduate in 2011, the new undergraduate degree would enable UNAM graduates to directly pursue Masters‟ level qualifications without first having to register for an Honours degree.

The review of curriculum in the Science Faculty resulted in all double-major BSc degrees being changed to major/minor degrees, where the major is offered by the department hosting the student, and the minor could be from any other department in the Faculty of Science. In addition to the modules offered in the major, the Computer Science Department also introduced a minor in Information Technology. The introduction of a minor, however, meant

that the Department would teach many more new courses that were not part of the old curriculum (see Table 3-6 for the difference between the numbers of courses taught in 2007 under the old curriculum and in 2008 under the new curriculum). The addition of these new courses had, unfortunately, not been paralleled by an increase in staff members in the Department, further increasing the workload of already overloaded lecturers.

Table 3-6: Number Computer Science modules at UNAM under the old and new curriculum

Year of Study	Old Curriculum	New Curriculum
1	2	6
2	3	11
3	4	12
4	9	17
Masters Year 1	8	8
Masters Year 2	3	3
Total	29	57

3.2.2   The context of the Telkom CoE at Rhodes University

The Telkom Centre of Excellence (CoE) programme was established by Telkom South Africa as a response for the identified shortage of skilled engineers, computer scientists and other specialized professions in South Africa (Browne, 2009). The programme was launched in 1997, initially with seven CoEs specializing in unique research fields hosted at various universities (including Rhodes University) in South Africa. It provides financial resources to enable tertiary institutions to carry out research in communication technology related fields, as well as bursaries to potential candidates for postgraduate studies at the various universities associated with the CoE. The programme is reported to provide funding to approximately 250 full time postgraduate students each year who are registered at different tertiary institutions across South Africa (Browne, 2009).

At Rhodes University, the CoE is hosted by the Department of Computer Science, specializing in Distributed Multimedia. It not only is the mainstay funder for research, but it also provides the research direction in the department (Rhodes University, 2002). As reflected in the annual reports of the university, several postgraduate Computer Science students have carried out research that is directly linked to the activities of, or funded by the CoE. Examples of these research project include the design of a telephony system for the deaf (Rhodes University, 2002), development of a softswitch PABX facility (Rhodes University,

2003), development of a media services platform (Rhodes University, 2009) and several field trials of products developed under the CoE in the local community (Rhodes University, 2005). Over the years, the Department of Computer Science at RU has also attributed its research activities and its ability to attract industry funding to the presence and previous successes of the CoE (Rhodes University, 2007; Rhodes University, 2009). As shown in Table 3-7, the number of postgraduate students in the Department has remained consistently high. Through the CoE, the Department at RU has also received a notable number of awards and recorded several achievements. In 2002 for example, an overall evaluation of research conducted within the Centre named the CoE at RU as the top performing research group among the 22 research groups that were funded in the ICT programme at the time (Rhodes University, 2002). In 2004, two students won first and second prizes in the regional round of the Innovations Fund competition (Rhodes University, 2004). Several other praises of the centre and its products are recorded in the annual research reports of RU.

Table 3-7: Number of Postgraduate students in the Department of Computer Science at RU over the years (Source: Rhodes Annual Reports from 2001–2006)

Qualification	2001	2002	2003	2004	2005	2006
Honours	-	24	20	22	22	22
Masters	-	16	16	19	17	17
PhD	-	2	2	7	8	8
Total	45	42	38	48	47	47

Soon after inception, the CoE at RU was partnered with the University of Fort Hare (UFH), a historically black institution (HBI), for capacity-building purposes. Telkom believed that by pairing HBIs which were previously disadvantaged with historically white institutions (HWI) which are historically advantaged would enable the previously disadvantaged institutions to learn from their counterparts until they are in a position to independently operate their own CoEs (Browne, 2009). In the partnership, the CoE at RU was responsible for facilitating the delivery of course modules at the fourth year (Honours-level) in the Department of Computer Science at the UFH. Supervision of UFH postgraduate students was also jointly done with RU. Because the two departments are approximated 90km apart, the delivery of courses was done using mainly a video-conferencing solution (Halse, 2007), although a small fraction of the lectures were also delivered partially in attendance (Rhodes University, 2002). The

building of a postgraduate programme at UFH was successfully facilitated, enabling it to become a fully independent CoE at the end of 2002. To date, the Honours and Masters" degree programmes are taught by the UFH lecturers, and several PhD degrees have already been awarded from the same department.

Through the collaboration, the two departments at RU and UFH started a rural communications field trial in the remote villages of Dwesa and Cwebe, situated on the wild coast in the Eastern Cape Province of South Africa (Rhodes University, 2004). In addition to the two institutions, the local community of Dwesa is also actively involved as a partner in the field trial, which was also known as the Dwesa-Siyakhula project. According to Thinyane (2009), the original aim of the project was to develop an eCommerce prototype that would enable the community to market their arts and crafts to the wider international community. The prototype was developed using the metaphor of a shopping mall, and ICT infrastructures were deployed and a computer literacy crash course given to the community members to enable them to use the portal (Thinyane, 2009). Both departments from RU and UFH, several postgraduate students were also involved in the project and have, in addition to eCommerce, also developed components to bring eHealth, eGovernment and eJudiciary services closer to the communities. After achieving the original objective in 2008, the Dwesa-Siyakhula Project focus has now shifted to that of a living laboratory for conceiving and testing new innovation, and has been renamed the Siyakhula Living Lab (SLL).

Although Telkom has been the mainstay sponsor of the CoE programme, several industry partners have also stepped in to fund the activities of the CoE. In 2002, funding partners, Comparex Africa and Letlapa Mobile Solutions, were added to the CoE (Rhodes University, 2002). The funds were further supplemented by the Department of Trade and Industry"s Technology and Human Resources for Industry Programme (THRIP), which provides matching funding to the CoE on an annual basis. In 2004, Comverse, Verso Technologies and Business Connection were added to the list of funders (Rhodes University, 2004). Additional funding was secured from Storage Technology Services and Tellabs in 2005 (Rhodes University, 2005) while Amatole Telecommunication Services, Mars Technologies, and Bright Ideas Projects 39 – all small, medium and micro enterprises (SMMEs) – were added as partners in 2007 (Rhodes University, 2007). To date, the CoE programme is described as a

collaboration between Telkom, various ICT companies, government and tertiary education institutions in South Africa.

Telkom South Africa also called upon the CoEs to institute collaborations in postgraduate teaching and research cooperation in the fields of telecommunication and IT with tertiary institutions in other African countries in support of African Union‟s New Partnership for Africa‟s Development (NEPAD) (Browne, 2009). As a result of this call, the CoE at Rhodes University, which had an informal relation with the Department of Computer Science at UNAM, started negotiations for a collaborative partnership in August 2004. Crucial to the success of the collaboration however, was the availability of financial resources from both partners to devote to the effort. These resources were not available from the UNAM side, and the collaboration effort was temporarily suspended.

3.2.3   The context of SANTED

Several researchers have investigated the impact of funding on academic partnerships (Samoff & Carrol, 2002; Ishengoma, 2011). Samoff and Carrol (2002) argued that, when external donor funding is involved, the partnership tends to be rooted in the assumptions, understanding and practices of the funder. This was also confirmed by Ishengoma (2011), who further reported that the main players and drivers of academic partnerships involving universities in Africa were donor institutions. He further argued that these partnerships did not manage to build the anticipated capacity because they were not reciprocal. Instead, they perpetuated continued dependence on the builders of capacity, and they included activities which had little effect in building capacities in the institutions. As discussed in Section 2.1, all these actions can impede capacity building.

Taking all of this into account, it is important to understand the funder‟s background and perspective in partnerships. The next section presents background information on the South Africa–Norway Tertiary Education Development (SANTED) Programme, which funded the project in the case study. It describes how the programme was formed, its objectives, and its involvement in the projects that it funds.

3.2.3.1 Background of SANTED

The SANTED Programme was a 9-year partnership between the Norwegian Agency for Development Co-operation (NORAD), the Department of Education in South Africa and higher education institutions in South Africa. The programme started as a result of a bilateral agreement signed between the Government of South Africa and the Government of the Kingdom of Norway in June 1997 (CEPD Website, 2011). It was initially launched as a five year programme in November 2000, as a response to the challenges facing the South African higher education sector at the time. The sector was characterized by the lack of financial and managerial capacities, poor quality of graduates from tertiary institutions and poor enrolment and completion rates (Smith & Cross, 2010). The goal of the programme was to support the DoE in the process of restructuring and transformation of higher education in South Africa. Through the SANTED project, the Government of the Kingdom of Norway provided financial support to enable the DoE to implement programmes that promote equity, social justice and capacity building in the South African higher education system (CEPD Website, 2011).

At the beginning of the SANTED programme, three thematic areas of focus were identified: improving access, retention and success rates of students; capacity building; and increasing South African institutions" cooperation with other institutions in the SADC region. It was targeted at students and staff from disadvantaged backgrounds in South Africa and the SADC region in general. Several projects that are related to these thematic areas were funded in the duration of the programme. According to the SANTED website (2011), projects focused on improving access, retention and success rates focused on providing access to education to disadvantaged students, as well as the promotion of multilingualism on campuses. Projects on capacity building were mostly done in historically disadvantaged institutions, and were aimed at building administrative, academic and management capacity. Projects in the thematic area of SADC collaboration were aimed at enhancing co-operation and building partnerships between higher education institutions in South Africa and other SADC countries (SANTED Website, 2011). According to SANTED, this focus area represented a considerable level of complexity because it involved collaboration between stakeholders not only at institutional, but also at national, and regional levels (Smith & Cross, 2010).

Initially, it was expected that the SANTED programme would fund four major projects, based at four South African institutions, over a period of five years (SANTED, 2003). At the end of its fifth year, however, the programme had supported more than 10 projects involving more than 15 institutions (Hansen, Africa, & Boeren, 2005). In addition, the programme had also extended its boundaries to include universities in other SADC countries, thereby directly supporting the implementation of the SADC protocol on higher education and training. In 2005, an independent review was carried out to assess the activities of SANTED sponsored project against the business plan between the years 2001–2005. Overall, the review concluded that the programme had effectively achieved its goals, and that its implementation and monitoring processes were done efficiently (Hansen, Africa, & Boeren, 2005). It also highlighted some difficulties and challenges experienced in the implementation of the projects, including: the shorter time-frame of the project in comparison to the time required to establish good working relationships; and challenges in implementation and sustainability of project activities that were not embedded in existing organizational structures. It further recommended an extension of the programme for another four years, and provided a set of recommendations on the changes that need to be made to ensure its success.

In 2005, the project was extended for a further period of four years (2006–2009) (CEPD Website, 2011). This second funding phase, called SANTED II to differentiate it from the first funding phase, included a lot of recommendations from the lessons learned in SANTED I. These recommendations included considering only funding proposals that have a potential for longer-term collaboration, developing performance indicators for each project and closely monitoring them, ensuring that institutions take ownership of the project, and expanding the coverage of institutions to go beyond South African borders into other SADC countries. It was during this second funding period (SANTED II) that the VCP received funding and officially became a partner with SANTED.

3.2.3.2   *SANTED's requirements and expectations*

All institutions that participated in and benefited from the SANTED funding had to submit a funding proposal for a project related to the thematic areas. The proposal was to outline the goals and objectives of the project, the project plan, the budget as well as the output. In addition to choosing projects within the three thematic areas, SANTED wanted projects that support local institutional missions, systems and priorities, are supported by institutional

managements, and can be anchored in existing institutional programmes. Local institutions were also expected to provide material support for the project, to ensure commitment to it, and eventually, sustainability of activities when the SANTED funding and leadership has come to an end.

One project leader was selected for each of the projects that benefited from the SANTED programme. The project leader was the contact person for the project, and worked directly with the Programme Director at the SANTED headquarters. In addition to the day-to-day monitoring of the implementation of the project, the project leaders were also required to submit periodic reports on the progress of the project implementations. These reports detailed the activities carried out in the project, as well as any problems that might have been experienced during the implementation. In addition, the Programme Director visited beneficiary institutions twice a year to monitor the progress of individual projects. During these visits, stakeholders, including students, lecturers and administrative staff members, were voluntarily given questionnaires or face-to-face interviews about the implementation of the project. An end of the year report was also required, and it was this report that summarized the achievements and failures of each project. SANTED would then analyse the achievement of the project by comparing it to the expected outputs stated in the business plan. If there was a variance in the expected output, the factors that caused non-achievement were identified. They would then be integrated into the work plans of the following year.

Funds for institutions were disbursed to the SANTED account located at the leading institution. Each institution was required to create a SANTED account where the money would be paid. Once the account is created, individual institutions were allowed to follow their own procurement procedures when dealing with financial transactions. Twice a year, each institution would issue an invoice according to the approved work plan and budget. Institutions were also required to submit a financial report twice year, which included a statement of the account signed by the institutions" finance department.

Although funds were already pre-approved for the project, disbursement of these funds every year was not an automatic process. During the review process, SANTED analysed the accounts to determine that projects were executed within and according to the approved budget. Only once they were satisfied with the progress of the implementation, as well as the

achievement of the goals would they decide to pay or not. SANTED therefore stressed the need for adequate reporting and accountability structures in order to ensure that problems are identified and dealt with as soon as they are experienced in the project.

3.2.4 The start of collaboration

In accordance with the staff development rules at UNAM, I, as a staff member who was sent for MSc studies in Computer Science at RU, returned as a lecturer in the Department of Computer Science after completion of my studies in 2004. In the same year, the coordinator of the CoE at RU visited UNAM to initiate a discussion on the possibility of cooperation between the two departments. Over the next year, staff in both departments agreed on the concept of cooperation and the focus areas, and a concept paper outlining the objectives of the cooperation was submitted to the Pro-Vice Chancellor: Academic Affairs and Research (PVC: AAR) at UNAM.

The submitted concept paper did not immediately receive the support from UNAM senior management, however. Management raised the concern that the concept paper did not clearly outline how UNAM would benefit from such an initiative, and it did not bring to light the financial implications of the collaboration, and how the finances would be secured. UNAM management therefore suggested that the paper be further expanded to explicate these concerns before the commencement of collaboration.

As a result of this suggestion, the two departments agreed to jointly develop the concept over the next few years, and opted to rather sign a letter of the intent to collaborate on the occasion of the 2004 Southern Africa Telecommunication and Networks Applications Conference (SATNAC), an annual networking platform where CoE sponsored students highlight their research achievements. Thereafter, a second visit from the representatives of the CoE was made to UNAM in 2005, to install a softswitch (called iLanga) developed by the VoIP group at RU. The purpose of the softswitch was to facilitate voice communication between the universities, which was very expensive from UNAM using ordinary means. A workshop with students and staff was conducted on that occasion, to introduce VoIP in general and the installed iLanga softswitch. As a result of this workshop, the first two students were registered for a Master of Science in Information Technology degree at UNAM, with

supervision shared with RU. Cooperation between the two departments during these first three years, however, was limited to research co-supervision.

A further opportunity to officially begin the collaboration came at the beginning of 2007 during UNAM‟s curriculum review process. Like all the other departments at UNAM (UNAM, 2007), the Department of Computer Science consulted experts from the industry and other institutions all across the continent to assist in assuring the quality of the curriculum review process. More specifically, the Department worked closely with the Department of Computer Science at RU during this review process. One of the concerns raised from RU was the many more new courses that the department was expected to teach in the new curriculum, that did not form part of the previous, double-major degree offering. Another concern was the dramatic increase in the number of courses in a department that did not have sufficient human resources and infrastructure to support the teaching requirements even before the introduction of the new curriculum (Computer Science, 2008). At the completion of the curriculum review consultation process, the two departments agreed that UNAM required extra assistance (in terms of staff members, teaching resources and knowledge) to implement the proposed courses. They therefore agreed to work together in finding a solution to implement the new curriculum in the department at UNAM.

A major obstacle to the proposal however was the finances required to fund the activities of the implementation of the new curriculum. While some of the activities from RU could be supported through the CoE, the department at UNAM did not have other sources of funding apart from the limited funds allocated to it from the university‟s central budget at the beginning of each year. Budgets at UNAM are approved a year before the implementation; the collaborative activities for 2008 were not part of the approved budgetary allocation to the department. There was therefore a need to secure funds to enable the commencement of collaboration.

Because of the immediate need for the partnership in implementing the modules of the new curriculum, however, the need to commence collaborative activities could no longer be postponed. During the implementation of the new curriculum, it was expected that some of the modules would be sourced from RU, which made it essential to identify a source of funding to pay for lecturers based at another institution, as they would have to be teaching

these courses outside of their normal teaching duties. The students that volunteered to participate in the project also needed some form of motivation to actively participate; this could come in a form of bursary to cover their tuition and accommodation expenses, as well as the possibility of guaranteed further studies and employment upon completion of their studies. It was also expected that the students and the lecturers would meet virtually for the lecture sessions, meaning that each student needs a multimedia-enabled computer, with speakers, a video camera, and a microphone. All these requirements required additional funding that was not available at the time that implementation of the partnership was expected to commence.

At about the same time that the two departments were conducting the curriculum consultation process (around the month of June in 2007), there was an opportunity for funding cooperation between tertiary educational institutions in South Africa and those in the neighbouring countries from SANTED. SANTED was already funding projects in other departments at both institutions during this time (Smith & Cross, 2010). The two departments jointly drafted a funding proposal for consideration by SANTED, which detailed the budget and the intended plan for the teaching of UNAM courses by RU lecturers using mainly technological solutions. SANTED agreed to fund the collaborative project at the end of June 2007, and called on the two departments to jointly develop a business plan. Henceforth, the project was called the SANTED Virtual Classroom Project (VCP), and the funding was requested for the following items in the business plan:

- Acquisition of infrastructural equipment for remote delivery of courses. This included dedicated personal computers for the students and their lecturers;

- Financial support to act as an incentive for the students participating in the project;

- Payment of lecturers involved in the delivery of the courses;

- Payment of project running costs, including telecommunications and travel.

Table 3-8 provides a summary of events involving the two departments prior to the VCP.

Table 3-8: Events Leading to the VCP

Timeframe	Event
January 2000 – December 2003	First Staff Development Fellow sent for MSc in Computer Science from UNAM to RU

Timeframe	Event
January 2004	Return of the Staff Development Fellow from RU to UNAM
August 2004	First visit of the Head: Telkom CoE at RU to UNAM
September 2004	The two departments sign a Letter of Intent to cooperate at the SATNAC 2004 Conference
August 2005	Second Visit to UNAM by representatives from the CoE Installation of iLanga Softswitch
February 2006	Registration of first MSc in Information Technology candidate at UNAM, jointly supervised by lecturers from UNAM and RU
March 2007	The department at RU assists the department at UNAM with the Curriculum Review Process

3.3 Project Objectives

The SANTED VCP had five major objectives. The first of these was to develop the curriculum and content of the new courses in the department at UNAM, to ensure that the department could teach the new modules introduced as part of the new curriculum by the time that these courses were officially activated in 2010. This would be achieved through a pilot project that would fast-track the introduction of the new, single major BSc degree directly in 2008. The fast-tracking processes in the VCP would implement the newly introduced modules of the third and fourth years in 2008 and 2009, rather than waiting for these modules to be sequentially phased in over a period of three years in accordance with the UNAM's curriculum implementation plan. This would provide the opportunity to pilot the newer part of the curriculum even before its adoption by the entire department in 2010. It would also help ensure that the content is developed before the entire cohort of student start doing the single major degree in 2010.

The second objective was to develop the teaching capacity in the department at UNAM to enable UNAM lecturers to teach the courses after the project has come to an end. At the onset, it was agreed that UNAM lecturers would be involved in the delivery of course content as local facilitators throughout the implementation of the project. A local facilitator would participate in the development and delivery of the course content for capacity-building purposes. Once the project has come to an end, the facilitator would be expected to take responsibility of the implementation of the module at UNAM.

The third objective of the VCP was to increase the staff complement at UNAM to enable them to cope with increased teaching load required by the new curriculum. The intention was to identify five capable final year students who are able to cope with the work pressure inherent in the fast-tracking nature of the VCP to graduate with a single-major BSc. At the end of each year, these students who participated in the project would qualify for registration for a Master of Science degree by research at RU. The two top students who demonstrated academic potential are offered the possibility to register for MSc at RU with full sponsorship from UNAM's Staff Development Office. After completing their studies, the students are expected to return to UNAM to start an academic career, with at least a two year commitment. Once they complete their studies, the new staff members are expected to assist with the implementation of the new curriculum, and at the same time reduce the existing heavy workload in department.

The fourth objective was to strengthen existing staff capacity at UNAM, through registration of higher degrees with RU. Current lecturers (who are all Master's degree holders) would be given an opportunity to register for PhD studies and conduct joint research with experienced professors at RU. The lecturers would still be based at UNAM, but would be registered either on a full-time or part time basis with Rhodes University. Since UNAM also has a PhD qualification, the lecturers who wished to register at UNAM would also be given an opportunity to do so, with supervision shared with RU. It was also envisaged that this offer would be extended to the tutors currently employed in the department to enable them to acquire a Master's degree in Computer Science, further increasing the pool of lecturers that are able to teach Computer Science courses.

The fifth objective, which this thesis directly aims to address, was the design and implementation of research enterprises that benefit the universities in the SADC region. The project aimed at developing a blueprint for similar interventions linking universities across Africa to build capacity in tertiary institutions, using recent developments in telecommunication to reduce the problem of distance.

A final, long-term objective of the SANTED VCP is to forge a stronger collaborative link between the two departments of Computer Science. The ultimate aim of the two institutions is to enable cooperation on staff development and training, short courses, undertaking of joint

research projects, sharing of information in areas of expertise, seminars, technical training programmes, and joint marketing and delivery of professional training programmes (see the MoU signed between the two institutions in Appendix 3).

3.4 Initial Implementation Plan

At the beginning of the project, the initial implementation plan was guided by the business plan, as well as the project implementation rules enforced by SANTED. According to the SANTED rules, the institution with a stronger track record in regional and international cooperation would take a lead in the collaboration process (Smith & Cross, 2010). In the VCP, RU was appointed by SANTED as the lead institution to provide the link between the project participants and the funders. As the lead institution, RU was responsible for the overall management of the project, financial control and the reporting of the project progress to SANTED. All the funds approved for the project would also be disbursed to RU on behalf of the two institutions. Any financial transfers required for project activities at UNAM had to be made by applying against the specific budget items from RU. At the beginning of the project, SANTED also made it clear that the project progress would periodically be reviewed to assess the implementation against the requirements, expectations and deviations from the original funding proposal submitted by the two departments.

One project coordinator was nominated from each department to oversee the implementation of the project. The coordinators were responsible for managing the project activities, engaging the critical people required to make the project a success, as well as monitoring the day-to-day logistics of the project. Immediately after approval of the funding proposal, the project coordinators presented the project to their respective institutional managements, who both highly supported the initiative. UNAM was especially enthusiastic about the project aimed directly at addressing staff shortages because the Computer Science department had struggled to attract qualified personnel over the past years (Mufeti T. K., Thinyane, Terzoli, & Foster, 2010). The Computer Science Department at Rhodes University had, through its CoE, already started building capacity in other Computer Science Departments in South Africa, and this project was viewed as a continuation of that work. Because the proposed activities supported the existing goals of both institutions, the project gained initial support of senior management at both institutions.

The project coordinators also devised the initial project implementation plan according to the three main activities of the project. These are: teaching activities, research activities and administrative activities. The plans are briefly discussed below.

3.4.1 Teaching plans

In the initial project plan, it was agreed that five courses of the new curriculum would be offered under the VCP every year. Each module would consist of 20 lectures delivered over 4 consecutive weeks. The modules would be delivered remotely, with the students based at UNAM and the lecturer based at RU. This required the identification and acquisition of an appropriate virtual classroom solution that would be used for the duration of the project. Each of the module would also have at least one local facilitator, who is a lecturer based at UNAM. The local facilitator would act as a link between the students and the lecturers, and would be the first point of contact for the students at UNAM. An optional one week of face-to-face contact was also provided for in the project. During this week, the lecturer can travel to be physically present at UNAM, to allow for longer contact sessions with the students. The timing of visit for the face-to-face sessions was left at the discretion of the lecturers.

One of the courses required the students to select a short research topic that would be co-supervised by the lecturers at RU and UNAM. The short research topics were however subject to approval on the basis of their feasibility at UNAM, especially in relation to existing academic capacity, as well their suitability for the development of research areas that are sustainable at the UNAM. Topics where there is expertise at RU and interest on the part of the staff at UNAM were given high priority.

The Project was structured in three stages, with each stage corresponding to a year of implementation. The first stage piloted the implementation, because it was during this stage that a feasible technological solution for use in the duration of the project was supposed to be identified. During this stage, modules for which the expertise and personnel were available at UNAM would be taught face-to-face while the other modules would be taught remotely by a lecturer from RU. This was done to minimize travelling time and cost, as well as to allow the lecturers to take up their full responsibilities with RU without interference from the VCP. The implemented technological solution was expected to mimic the face-to-face interactions as much as possible, using solutions such as a live virtual classroom or video-conferencing.

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Modules that were taught remotely were co-facilitated by a lecturer from UNAM for capacity-building purposes. The facilitator guided the students in the absence of the lecturer, and acted as an intermediary between the students and the lecturers.

In the second stage, most lectures would still be developed and delivered from RU, but the facilitators were expected to co-teach a selected number of lectures with the lecturer. This mechanism would ensure that the transfer of expertise is done properly, to enable the facilitators to take over the lectures after the period of the project has lapsed. The actual number of lectures delivered by the facilitator is different for each course, and is agreed upon by the lecturer and facilitator themselves.

The last stage was the handover of modules taught in the project to the department at UNAM. During this stage the facilitator would now assume the lecturer role, and the lecturer from RU would sit in on selected lectures delivered by the facilitator. The aim was for the lecturers at RU to observe the lectures delivered by the local facilitator and give useful comments to the lecturer at UNAM.

3.4.2 Research plans

One of the weaknesses identified at the beginning of the project was lack of research focus and a low number of publication outputs from the department at UNAM. This was attributed to the lack of local research capacity in the department (UNAM, 2006; Computer Science, 2008). Capacity building in research was therefore one of the initial implementation goals of the VCP. The target for the project was to identify common research areas that the two departments could focus on, and conduct joint research projects in those areas. Joint publications and co-authoring of papers between the staff members was also considered as a possible initiative to boost the research publication output of the department at UNAM.

Academic exchange programmes mainly in the form of student and staff mobility was identified as one of the capacity development strategies. Academic staff members from RU would give presentation on their research interests to the staff members and students in the department during their visit for face-to-face sessions with the students. Likewise, the UNAM staff members that visited RU would get an opportunity to talk about the research interests in the department at UNAM, as well as to explore possible topics for their PhD research.

Another area of research collaboration is that of joint supervision of postgraduate students. The final year students at UNAM have to complete a fourth-year Research Project, in which they are expected to conduct a research project, present it to the department, and write a research report. There was a possibility of co-supervision in these undergraduate research projects, where the main supervisor is based at UNAM, and the supervisor at RU acting as a co-supervisor. In addition, the Masters" students are expected to complete a dissertation in their second year of study, and the requirement for a Masters" supervisor is a PhD qualification. The lecturers at RU were therefore required as main supervisors in these projects, with the lecturers at UNAM co-supervising the projects.

The final activity of research collaboration planned in the project was that of joint presentation of seminars between the two departments. In joint presentation, a researcher presenting their research results at UNAM or RU were expected to do so in a video-conferencing enabled room to enable the participants from the other department to participate in the presentation. The aim was to enable researchers in both institutions to share research experiences and results. The long-term aim was to identify common research focus areas that two departments could work on jointly.

3.4.3 Administrative activities plans

One of the major administrative plans was the annual planning of the activities to be completed during a specific year of implementation. Each year, the project had different objectives and expectations that needed to be met. The different activities that would enable the realization of these objectives therefore needed to be coordinated and managed. The annual plan included the scheduling of the courses for the year, selection of the participants in the modules, increasing opportunities for participation in the project, identification of the equipment needed and how and when they would be acquired, the budgeting and payment processes as well as the reporting to the funders.

Another administrative activity of the project has been that of recognition of modules done in the project by both institutions. Prior to the project, for example, tertiary institutions in South Africa would not directly admit graduates from Namibian institutions for an MSc degree. The lack of an appropriate framework for accreditation, quality assurance and recognition of foreign qualifications is therefore one of the challenges preventing capacity-building virtual

partnerships in many tertiary education institutions today (World Bank, 2007). The aim in the project was to ensure that the delivery of courses could result in quality courses that are relevant and appropriate to the needs of both institutions. This was to be done through the new revised curriculum that is approved by both institutions, and the development and presentation of teaching materials that is acceptable by both institutions.

Monitoring and evaluation to ensure the realization of the project goals detailed in the implementation plan was another administrative activity done at the project level by the project coordinators. The responsibilities included ensuring that the project targets for the year are met. At the end of the project, it is important to ensure that the lecturers that participated in the project continue teaching the same courses after the programme has come to an end. It is also crucial to ensure that the students that participated in the project are provided with funding in order to complete their postgraduate studies at RU, and that all students sent to RU have signed a contract with UNAM, obliging them to work in the department for a time not less than the time that they spend studying for the postgraduate qualification.

3.5 Conclusion

This chapter introduced the SANTED VCP as a collaborative project between the departments of Computer Science at UNAM and RU. The main aim of the project is to build teaching and research capacity in the department at UNAM. Prior to the project, the department at UNAM had challenges in meeting its curriculum and human resource needs. The VCP is thus embraced, as it has the potential to enhance the professional development and recruitment of potential staff at UNAM, the development of the curricula and teaching.

CHAPTER 4: ANALYTICAL FRAMEWORKS: ACTIVITY THEORY AND COMMUNITY OF PRACTICE

This chapter introduces Activity Theory and the notion of Communities of Practice as the two frameworks used to analyse the virtual partnership case study described in this thesis. For each of the frameworks, the chapter describes its critical perspectives, its principles and how it is used in this thesis.

4.1 Activity Theory

Activity theory is a research framework used to analyse individual and social aspects of human behaviour. Researchers have traced its philosophical roots to the work of Karl Marx, while its historical and sociocultural perspectives are credited to the work of Lev Vygotsky (Engeström & Miettinen, 1999; Sannino, Daniels, & Gutiérrez, 2009). It emphasizes the role that the context and the society have in shaping the behaviour and actions of individuals. In its early days, it was mostly applied in the domains of learning and cognition. To date, its application has broadened to include a wide variety of disciplines, and it has especially been recommended as an analytical tool for the implementation of new cultural tools and the development of work activities in organizations (Engeström & Miettinen, 1999).

Nardi (1996) described activity theory as a descriptive tool rather than a predictive theory. According to her, activity theory provides a set of concepts and perspectives that can be used for describing everyday human activity, but it does not offer "ready-made techniques and procedures" (Nardi, 1996, p. 4). Rather, it provides a vocabulary for describing an activity, enabling researchers to examine the actual activities in which people are engaged. Engeström and Miettinen (1999) have described it as a multidisciplinary framework, because it can be used to analyse a variety of socio-historical contexts. Daniels and Gutierrez (2009) described it as a practice-based theory, which enables the researcher to be deeply involved in the observation of the daily happenings of the activities under scrutiny. Because of its strong focus on context as a unit of analysis (Kuutti, 1996), the concepts of activity theory are widely used to study learning and development in organizational contexts (Engeström Y. , 2001; Junor Clarke & Fournillier, 2012).

Researchers have used activity theory as an analytical framework in a variety of studies. Activity theory is widely used in studies that analyse conflicts between the different subjects" beliefs and their practices. In addition to identifying cultural and social challenges related to the introduction of new technological tools in the society, activity theory has also been used to provide insights on how subjects can transform their social practices. Andreassen (2000), for example, used activity theory in a collaborative virtual learning scenario to evaluate how students organized their work. He followed three graduate teacher trainee students that were taking courses at one university, but were geographically distributed across three cities. The students used a groupware tool called TeamWave Workplace to, firstly, learn about techniques for creating genuine interdependence in work, and secondly, to apply what they learned by working collaboratively on creating a web-based learning environment for primary school students. Regarding the first aim, the students worked well to learn the use of the software for genuine interdependence. They agreed on the division of labour and created different rules for communication. When they realized some contradictions within the system, they agreed to remediate their interactions using different tools. Regarding the second aim, however, he found that the students did not work in a collaborative manner, but rather worked individually on their tasks, and later combined the outcome of their individual work. He therefore concluded that the students did not recognize the potential of the software for facilitating genuine interdependence. Through the use of activity theory, he was able to inculpate failure to recognize the potential of the software to contradictions among and within the activity systems. He realized that students were registered in other courses and not only in the course he was examining, and the motive of the activity systems differed. Because the course in collaboration was not evaluated by their instructors, they always opted to pay more attention to the other courses that were more important for their graduation than the collaboration course.

Wake (2001) used Activity Theory to understand how instructors and facilitators in a collaborative telelearning scenario called VisArt, organized their work and learning activities. Collaboration in VisArt also used the TeamWave Workplace groupware tool. Using a variety of data collection methods such as interviews, participant observation, transcripts of online activity captured from TeamWave and analysis of email communication, Wake (2001) was able to identify and characterize how the different tasks, behaviours and roles that different instructors performed and assumed were organized in the scenario. Using the principle of

contradiction, he was also able to identify discrepancies between the perceptions of the role and tasks performed by different instructors.

In a study that aimed to understand contradictions, disturbances and transformations experienced by faculty when designing and teaching online courses, Peruski (2003) also used activity theory as the analytical framework. Focusing on the faculty members" experiences and outcomes, she was able to reveal contradictions experienced by the faculty in their new teaching context, which was in conflict with their developed thinking and actions from the face-to-face context. Despite the contradictions, faculty"s commitment to teaching and learning remained high, which in the end led to positive transformations instead of anxieties and frustrations. According to her, activity theory enabled her to see how these transformations led to innovation and change in work processes and systemic thinking.

Activity theory is however not without shortcomings and criticism. Because of its flexibility and its ability to be mapped onto a variety of problem domains, researchers have interpreted and used its concepts in a variety of contradictory ways. Rogers (2008, p. 247) compared it to a "bobbing head dog", arguing that it appears in different forms and shapes and that several researchers have been tweaking it to suit their own needs. Both Rogers (2008) and Bedny and Karwowski (2004) also observed a confusion in the use of activity theory terms such as actions and tasks, where they are used conflictingly and interchangeably by different researchers. Bedny and Karwowski (2004) argued that the translation of activity theory from its original Soviet Union context to the western context suffers many limitations and it therefore needs to be developed as a unified psychological theory if it is to be used in the study of work.

Despite its shortcomings, however, several researchers have proposed the use of activity theory to analyse activities that involve learning (Kuutti, 1996; Nardi, 1996; Jonassen, 2002; Engeström & Kerosuo, 2007; Junor Clarke & Fournillier, 2012). Jonassen (2002) argued that learning is a purposive activity, which is socially mediated by the affordances from, as well as the actions on, the environment. He also argued that learning always occurs in some activity system, and it is the activity system that defines and constrains the nature of learning that occurs. This is the same theoretical foundation underlying the analysis of the SANTED VCP examined in this thesis. The research therefore does not only focus on the outcomes of capacity building, but also on the contextual setting (including all mediation systems and

interdependent activity systems) that affects whether or not capacity building occurs and how it occurs.

4.1.1 Generations of activity theory

A number of researchers and ideas have contributed to the development of activity theory. Three of these researchers, namely Lev Vygotsky (1978), Alex Leont"ev (1978) and Yrjo Engeström (1987) are widely acknowledged in literature as having made unique and important contributions and expansions to the development of activity theory. Each of the researchers" contributions has led to the evolvement of activity theory, causing Engeström (2001) to identify three distinct generations of activity theory: the first generation, which is attributed to the work of Vygotsky (1978); the second generation, which is attributed to the work of Leont"ev (1978); and third generation activity theory (1987), which is attributed to the work of Engeström. The three generations and their core concepts are briefly described below.

4.1.1.1 *First generation activity theory: The concept of mediated activity*

First generation activity theory relies heavily on Vygotsky"s (1978) concept of mediated activity. Vygotsky"s research was aimed at developing a comprehensive framework for understanding the historical development of human behaviour. His work rejected the theory of linear development of higher psychological processes that was prevailing at the time, rather favouring a dialectical process that is constantly shaped by historical and cultural activities. Before his research, approaches to understanding human mental processes were derived from experiments used on animals such as apes and frogs. Vygotsky argued that unlike animals, humans have higher intellectual processes that lead to unique behaviour. The focus of his research therefore, and hence the findings, described the development of psychological processes that are specifically unique to humans.

Vygotsky (1978) argued that unlike animal development that is characterized only by natural memory, development in humans is characterized by two types of memory: natural memory and self-generated stimuli. Natural memory retains natural experiences and is directly stimulated by the environment. It represents unmediated or elementary forms of behaviour, and is deemed close to perception. Vygotsky (1978) observed that natural memory is reflected in animals, and typically dominates illiterate people. He illustrated this concept

using the formula shown in Figure 4-1 (Vygotsky, 1978, p. 39). In the formula, S represents stimuli, while R represents the response. The arrow indicates that the response occurs directly as a result of the inputs (such as information or events).

$$S \longrightarrow R$$

Figure 4-1: Natural or Unmediated Memory (Vygotsky, 1978, p. 39)

Vygotsky emphasized, however, that natural memory is not the only kind of memory in people. He observed that human response does not simply result from stimuli, but is a complex result of societal interactions mediated by cultural tools (Russell, 2002). The unmediated stimuli-response structure shown in Figure 4-1 assumes that it is only nature that affects people, and hence man's historical development is only determined by natural conditions. It does not acknowledge the effect of society (or nature) on man, and in turn of man on nature. He therefore concluded that the relationship between stimuli and response is not always direct in humans, as it is mediated by various factors such as available tools and other people in the society. It is these factors that enable people to determine their reactions and behaviour (Lektorsky, 1999), thereby defining new conditions of existence (Vygotsky, 1978). The mediated stimuli-response structure is represented in Figure 4-2, where X represents the mediating objects such as instruments, tools, languages and other cultural artefacts.
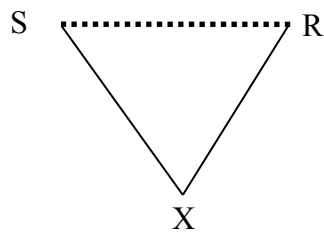
Figure 4-2: Mediated Stimuli-Response Memory (Vygotsky, 1978, p. 40)

The notion of mediation is premised on the understanding that individual actions (or responses) are embedded within social contexts, and that the context and the individuals shape one another. This understanding allows one to appreciate how the society and the available tools are closely linked to one another, but it also emphasises that actions are much more complex than stimuli-response connections (Jonassen, 2002). When faced with a situation or a problem, people's actions are determined by the meaning that they attach to those situations. The meaning is absorbed from the belief and values of the communities in

which they live, or those that they had previous interactions with. In researching virtual partnerships for capacity building therefore, it is not only important to consider the participants and their actions, but it is important to look at the contextual setting in which the actions and activities occur. The contextual setting on the other hand prescribes the tools and mediating artefacts that the participants use, and it is in this setting that the actions and constraints of individuals can be understood.

The zone of proximal development

Vygotsky (1978) concluded that individuals have two levels of development: the zone of actual developmental level and the zone of proximal development. The zone of actual development defines the capabilities which an individual is able to use to carry out his activities. The Zone of Proximal Development (ZPD), on the other hand, signifies the potential capabilities, where the individual has not yet developed the competencies to carry out specific activities on their own, but they can with the assistance of more capable peers. The underlying belief of the Zone of Proximal Development is central to capacity building, which as explained in Section 2.1, is also founded on the assumption that people have the potential to develop and acquire more skills and competencies by collaborating or working together with more capable peers. The ZPD is also grounded on the belief that individuals can learn by listening to others, watching others perform or becoming more involved in joint activity (Russell, 2002). The complexity of determining the learning pathway discussed in Section 2.1.2 is however, also acknowledged in ZPD, which posits that "developmental processes do not coincide with learning processes", and that those developmental and learning processes are "never accomplished in equal measure or in parallel" (Vygotsky, 1978, p. 90).

Analysis of developmental processes

Vygotsky (1978) observed that human activity transforms nature and the society. In order to understand this transformation, an analysis of developmental processes of human activity is necessary. He suggested that this analysis should be guided by the following three principles (Vygotsky, 1978):

1) It should focus on processes rather than objects. He observed that objects are reconstructed in the development processes. If the focus is placed on objects rather than processes, it becomes difficult to trace this development.

2) It should seek explanations of the "real, causal and dynamic relations that underlie phenomena" rather than descriptions.

3) It should trace the historical development of every phenomena involved in the developmental process.

The above suggestions have implications for the analysis of the virtual partnership case study in this thesis. Firstly, the historical development of the partnership should not to be ignored at the expense of the objects. The focus in this research is therefore not on the product of the partnership only (i.e. on the outcome of capacity building), but it is on the process followed to achieve the outcome. Hence, explanations of the collaborative processes followed in the implementation are provided, taking cognizance of the different competence levels of the participants, and detailing how the participants worked together to ensure the achievement of required competence levels. Secondly, it is not only the descriptions of what happened (or what actions were performed) that are important; rather, the analysis should look beyond the stimuli-response instances (or individual instances) of an action, as these are not sufficient to explain participants" behaviour and the development of the partnership. Thirdly, activities are not constant, but are continuously undergoing change and development. Thus it is only by looking at the historical development of the capacity-building process that the various stages and outcomes of the process can be understood.

4.1.1.2 *Second generation activity theory: Collective activity system*

The second generation of activity theory is credited to Leont"ev (1978), who expanded Vygotsky"s (1978) theory by explaining the concept of activity. Leont"ev (1978) critiqued Vygotsky"s focus on mediation by cultural tools and signs only, at the expense of the role played by other people within the social and cultural world. He argued that the mediated stimuli-response formula shown in Figure 4-1 did not account for external actions that might influence the individual and that it was subject to internal interpretation of the individual. According to Leont"ev (1978), external actions are innate to many living beings and even to

non-living beings, for they all react differently depending on the conditions they are exposed to. This, he summarized as follows:

> "*If we understand as internal conditions the on-going condition of the subject exposed to that effect, then it will contribute nothing new to the formula S→R. Even non-living objects, when their conditions are changed, reveal themselves in various ways in interaction with other objects. On damp, softened soil, tracks will be sharply imprinted, but on dry, hardened soil, they will not. Even more clearly is this apparent in animals and in man: the reaction of a hungry animal to a food stimulus will be different from that of a well-fed animal, and information about a football match will evoke an entirely different reaction in a man who is interested in football than in a man who is completely indifferent to it*" (Leontyev, 2009, p. 30).

Leont'ev (1978) therefore argued that behaviour cannot be understood by looking only at the subject and the tools used to mediate the achievement of objects. According to him, focusing only on the interaction between the subject and the object ignores the most important component - the processes through which the subject realizes the object. He called these processes an activity, and argued that it equally enriches human behaviour. An activity consists of a number of elements that contribute to the achievement of the objective. Together, these elements are called an activity system, which Leont'ev (1978, p. 6) defined as "a unit of life, mediated by psychic reflection, and the real function of which is to orient the subject in the objective world". He further explained that the activity of each individual depends on their place in society, where society is defined as an external environment that provides individuals with social conditions where the activities may be undertaken. In Leont'ev's (1978) view, it is these social conditions that determine the underlying actions and intentions, as well as the possible techniques that can be used to carry out an activity. He therefore argued that an activity is intrinsically bound to its social context, which is the life of society. Outside the relationships of that society, an activity might have a different motive and many other different options of executing it. It is thus simply not a response to stimuli as proposed earlier by Vygotsky; rather he viewed it as a system that has structure, with its own internal transitions and transformations which allows it to develop itself to adapt and survive.

Engeström (1987) further expanded Leont'ev's (1978) idea of activity by introducing the activity system (see Figure 4-3). He argued that Vygotsky's representation did not account for the collaborative and collective nature of human activity, while Leont'ev's work was

erroneous as it did not consider semiotic mediation (Daniels, 2008). According to Engeström (1987), Leont"ev work did not unify the instrumental and communicative aspects of activity, making it difficult to account for societal relations in the activity system. He therefore proposed an Activity Triangle Model (or activity system), which comprises the following minimum elements: a subject, an object, an outcome, instruments (also known as a mediating artefacts or tools), community, division of labour, and rules. These elements are briefly described below:

- **Subjects** are the individuals or groups of people who carry out the activity, and are regarded as the centre of analysis in the activity system. In the VCP, subjects include students, lecturers, project coordinators, and the funders. Each individual participating in an activity system is also at the same time participating (or has previously at other times participated) in many other activity systems, bringing a "history of diverse involvements" from those other activity systems (Russell, 2002, p. 69). The participants will change and learn as they participate in activity systems over time, which provides them with new opportunities to enrich their other activity systems that they participate in.

- The **Object** refers to the purpose of the activity. In the VCP, the object of the activity is building teaching and research capacity in the Department of Computer Science at UNAM. Different individuals also have their own personal objects in the activity system (i.e. each subject participates in the activity system for different reasons). In the VCP, for example, the students want to learn and pass their examinations to enable them to graduate; the lecturers want to teach the students to enable them to learn; the project coordinators want to appease the funders, etc. In addition, there is also a collective motive of the activity system, which is a shared purpose which all the subjects in an activity system work towards. Since there are many subjects working together in an activity system, the object may not be immediately obvious by examining the individual tasks that these subjects perform. At times, it may even appear that their tasks contradict or are in conflict with the collective object of the activity system.
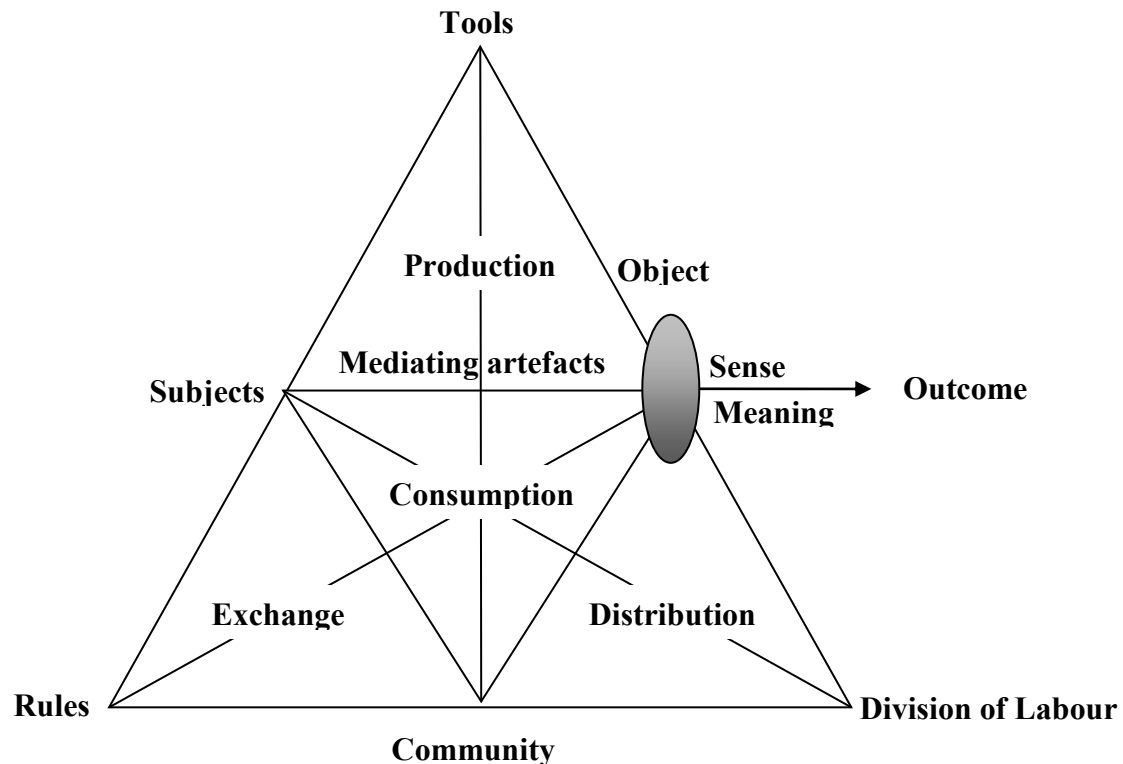
Figure 4-3: Activity System model (From (Engeström, 1987), (Engeström, 2001, p. 133))

- The **Outcome** is the consequences that result from the participation of the subjects in the activity system. As the subjects perform their tasks towards a specific object, their actions translate into an outcome. The desired outcome for the VCP, for example, is UNAM lecturers who are able to teach the modules of the new curriculum without assistance.

- **Tools** are instruments or artefacts used to mediate the relationship between the subjects and objects. Subjects use different tools (physical and psychological) to meet the specific objectives of the activity system. The same tools may be used differently depending on experience, availability, and culture. Different subjects might therefore use different tools that are available to them to meet a single objective. In the VCP, some lecturers present the lectures through a synchronous virtual classroom solution simultaneously to the students and facilitators; others pre-record the lectures to enable the facilitators to go through them prior the lecture sessions; yet others prescribe readings from recommended books and use the virtual classroom as a discussion platform. Each lecturer uses the tools that are available to them, and those that they believe would best enable them to achieve the object of the activity.

- Several subjects are working together to achieve the objective of the activity system. There needs to be a **division of labour** to assign the roles and responsibilities to the subjects carrying out the activity. The division of labour defines what each participant in the activity system must do to achieve the collective object of the activity. These may refer to single actions that are required to achieve an objective, or several actions that must be performed to contribute towards the achievement of the overall goal. In the VCP, the project coordinators facilitate the day-to-day running of the project; the lecturers direct the learning process; the facilitators facilitate student‟s understanding of the content, and act as a link between the lecturers and the students; and the students use a variety of learning activities and content to construct knowledge.

- **Rules** define the set of implicit (expectations) and explicit (regulations and conventions) guidelines, procedures and habits that guide the actions and interactions among the subjects. The rules may include cultural norms, and policies and procedures of institutions. They "shape the interaction of subject and tools with the object" (Russell, 2002, p. 71). In the case under study, rules include, lecturing timetables at the two institutions, admission and registration rules, promotion rules, and other institutional rules that affect the operations of the VCP.

- The **Community** refers to other people who may also have a stake in the activity system, although they are not directly involved in carrying out the activity. The community defines the socio-cultural context where the activity system is situated. It may include the faculties in which the two departments are hosted, the institutions, and the SADC community as a whole, which is interested in promoting collaboration between tertiary institutions in the region.

The components Exchange, Distribution, Consumption and Production are subsystems each with three different elements:

- **Exchange** refers to the rules exchanged by the subjects and community to govern the operations of the activity. Individuals in the community will exchange social and cultural norms in their work community, which will determine the nature of the work culture as well as the climate for those involved in the activity system (Liaw, Huang, & Chen, 2007).

- **Distribution** has the elements Community, Object and Division of Labour, and defines how the different roles and responsibilities are assigned to community members in order to achieve the object of the activity.

- **Consumption** includes the elements Subject, Object and Community, and it describes how the subject works together with the community to produce the object of the activity.

- **Production** includes the elements Subject, Object and the Tools used in an activity and refers to the use of some cultural tools by the subject to produce objects in order to achieve specific outcomes of the activity.

General structure of an activity

Leont"ev (1978) defined a framework in which the structure of an activity can be understood. According to him, activities are designed to meet a specific need (object) of a subject. All actions executed in the activity system are therefore directed towards meeting this need. Once the object is satisfactorily met, the activity is terminated. According to this view, it is possible to have activities that appear similar, but, in reality, are different because of their objects. The execution of these activities will also be done differently depending on their different objects. Leont"ev (1978) introduced the object as a true motive behind the activity. He therefore concluded that an activity cannot be understood apart from its motive.

The main contribution that Leont"ev (1978) made to the study of activity is the separation of individual and collective activity. Individual activity is performed by an individual, and is directed at meeting the objectives of individual subjects. Collective activity, on the other hand, is directed at meeting the objectives of several subjects, and may require a social process performed collectively. This requires a division of labour and cooperation of the individuals involved in an activity. Division of labour in this case refers to the actions that every individual is expected to carry out in order to contribute to the collective activity. Leont"ev (1978) explained, however, that individual contributions do not directly answer the needs of collective activity; they produce intermediate and partial results. These results are then merged through social interaction with others contributors, to result in the collective attainment of the objectives of the activity.

Leont"ev (1978) further argued that individual activity is achieved through the execution of successive actions. Each action is subordinated to a goal, which is not necessarily the same as the general objective of the activity. This implies that actions themselves are directed toward

the realization of some goals, which may not necessarily correspond to the motive of the activity. It also means that one action can contribute to the achievement of different activities. Leont"ev (1978) further asserted that by looking at the actions and the goal alone, it is not possible to tell the motive of an activity. The only thing therefore then, that defines an activity is its motive.

Determination of goals and their corresponding actions is not an easy process. Hegel (cited in, Leont'ev, (1978)) argued that goals for acting can only be determined once an action has been performed. Leont"ev (1978), on the other hand, argued that once the action and the goal are determined, there is still one more level of complexity that needs to be resolved: the means used to perform the action in order to realize the goal. According to him, this constitutes the operational aspect of the activity, in which operations dependent on the objective-object conditions are carried out. He defined operations as methods for accomplishing actions, and explained that an operation is a result of a transformation of an action. An action may have several operations, which may be executed under different conditions. Once all individuals have performed the operations needed to complete their actions in contribution of the realization of the overall activity, then collective operations, actions and in turn the processes will meet the objectives of the activity.

To model the general structure of an activity described above, Leont"ev (1978) used a hierarchical, three-level model shown in Figure 4-4. At the highest level is a collective activity, which is driven by a motive. At the second level is the individual (or group) action, which is driven by a goal. At the bottom level are automatic operations that are determined by the conditions and tools of action at hand.

Activity ⟶ Motive

Actions ⟶ Goals

Operations ⟶ Conditions
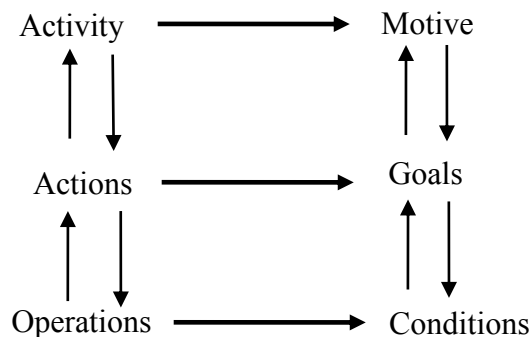
Figure 4-4: The three level hierarchical model of Activity (Leont'ev, 1978)

Leont"ev"s (1978) general structure of an activity is crucial to this thesis because it demonstrates the relationship between collective and individual activity. Collective activity is oriented towards its object, which is the motive of the activity. Collective activity, however, is performed by different subjects (such as project coordinators, lecturers, facilitators and students in the VCP), necessitating a division of labour. The labour of a single subject or group of subjects (e.g. the labour of lecturers only) does not meet the motive of a collective activity, but it produces partial results, which is a share of the entire activity. In order to achieve these partial results, it is important that subjects are able to consciously identify their attainment, and hence the idea of goal setting (i.e. they must know what they want to achieve). In order to attain a specific goal, however, operations (the actual work) must be executed under specific conditions. Through this structure, it is possible to see how the context of implementation and the operations that are carried out, as well as the goals and their corresponding actions, are performed in the case study to meet the motive of the collective activity.

It is important, then, that there is a separation between individual activity and collective activity, because the goals and motives do not always overlap. The following example illustrates the concept of an activity system from the point of view of the lecturers in the VCP:

The **Subjects**, who are the centre of analysis in this example, are lecturers in the Department of Computer Science at RU. The **Object** of the lecturers is to deliver courses offered in the project to students at UNAM and to build capacity for the facilitators based at UNAM. The intended **Outcomes** for the facilitator is confidence in presenting the courses the following year, and for the students is to register for an MSc at RU, to enable them to become lecturers at UNAM upon completion of their studies. The outcomes of the activity system are to develop an understanding of the course content in the students and facilitators. Unintended outcomes may include students not able to understand the course (failing the course), and facilitators who refuse to take over the courses the following year. The **Tools** used include the communication medium (internet and the virtual classroom solution) and the recommended books for the course. The **Community** consists of other lecturers participating in the virtual classroom project, project coordinators, and the students. **Division of labour** refers to the division and allocation of tasks between the lecturers, the facilitators, the project coordinators

and the students. Finally, the **Rules** are the regulations (written and unwritten) that must be followed in the VCP including how often and when the class will be held, how often the students are expected to attend class, the measurements of outcomes, criteria for rewards.

The above example however, was modelled from the perspective of the lecturers. If the activity system was described using the students, project funders, or the individual institutions as a subject, it may have had a different object altogether.

4.1.1.3 Third generation activity theory: Interacting activity systems

Engeström (2001) argued that the components of the activity system will not have meaning when they are interpreted outside the activity system. He further explained that an activity system does not exist in isolation, but it interacts with other activity systems within its broader context. Kuutti (1996) also observed that activities are like nodes in networks, in that they can be influenced by other activities and changes in their surrounding environment. Engeström (2001) therefore stressed the importance of analysing an activity system in its network relations to other activity systems. Figure 4-5 demonstrates how interactivity between two activity systems may be conceptualized. In reality however, more than two interacting activity systems might be needed to demonstrate all the possible activity systems in a network. In a virtual partnership involving three partners for example, a minimum of three activity system that captures the unique contexts of each partner may be necessary. The network relations under these circumstances are therefore likely to be much more complex.
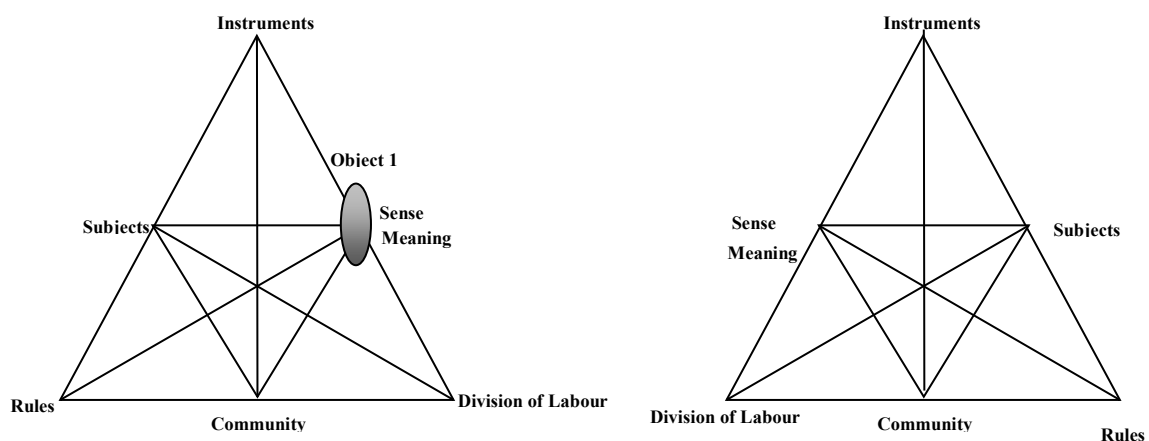
Figure 4-5: Two interacting activity systems (from Engeström, 2001, p. 136)

In Figure 4-5, a collective activity is described not merely as a context where the different elements of an activity system interact to achieve the motive of the activity. Rather, multiple interacting activity systems are taken as a unit of analysis. This is especially important in the context of a virtual partnership, where there are multiple organizations from different contexts operating in unique contexts. This view enables the identification of neighbouring activity systems, with a view of identifying possible tensions that can arise as a result of the interaction between the two systems. It also enables the overall operating environment of the partnership (as discussed in Section 2.1.2) to be considered, giving a holistic view of the partnership.

4.1.2 Basic principles of activity theory

In order to understand how the various perspectives of activity theory can be used to understand virtual partnerships for capacity building, this section discusses the basic principles of activity Theory. Different principles including tool mediation, internalization and externalization, consciousness, and context have been identified as forming the basic principles of Activity Theory in literature. This section presents the following five principles identified by Engeström (2001): 1) activity system is the basic unit of analysis; 2) an activity system has multiple voices; 3) historicity; 4) contradictions are sources of change and development; 5) possibility of expansive learning.

4.1.2.1 Activity system as the basic unit of analysis

One of the central issues that differentiates the ideas of Vygotsky, Leont"ev and Engeström and consequently also led to the evolution of activity theory is the element taken as a basic unit of analysis in their frameworks (Engeström, 2001). Although Vygotsky"s (1978) idea of mediation of actions by cultural artefacts meant that individuals could no longer be understood separately from their cultural context, and that society cannot be understood apart from the individuals that produce and define the use of tools, his unit of analysis remained at the level of an individual (Engeström, 2001). Leont"ev"s (1978) main contribution to activity theory was that of separating individual and collective activity. He argued that by simply studying the individual, it will not be possible to fully understand the contributions and roles of other people and the tools used to mediate the tasks. He therefore recommended that an activity be taken as a unit of analysis.

Engeström (1987) on the other hand argued that even an activity by itself does not fully reveal the relations among the individuals, the tools and their social contexts. Like Lave and Wenger (1991), Engeström (1987) believed that the unit of analysis needs to be situated in the context of use. He therefore suggested the activity system, with all its minimum elements, as a unit of analysis.

Taking the activity system as a basic unit of analysis forces one to consider all the actions performed in relation to the desired outcomes or the object of an activity. Activity theory posits that "all activities are oriented to motive" (Kaptelinin, 1996), and all processes are carried out with the bigger aim of transforming the object into an outcome. According to Kuutti (1996, p. 27), "transforming an object into an outcome" is the key issue that "motivates the existence of an activity". An activity system therefore does not focus on the actions of an individual, but it takes into consideration the social and cultural elements of interactions and relationships in the process of transforming objects into outcomes.

4.1.2.2 *Multi-voicedness of activity system*

This principle captures the multiple perspectives that are found in an activity system. According to Engeström (2001), these multiple perspectives are created by the different participants that participate in the activity system. Every participant brings their previous experiences and background knowledge to the activity system. They also bring with them experiences of using different cultural tools to carry out different tasks in activity systems. Their different histories, tools, traditions and interests bring a diversity of viewpoints to the activity system.

Gray (2008) analogized "achieving collaboration" to "becoming multi-voiced or polyphonic". According to her, collaboration requires an "appreciation for the diversity of viewpoints that multiple parties bring to a problem, while at the same time corralling and challenging this diversity into problem solutions that all parties can accept" (Gray, 2008, p. 666). In the academic partnerships that are explored in this thesis for example, all partners bring with them the different institutional traditions and cultures. They also have different objectives (e.g. personal development versus remuneration for participation) and expectations of the partnership, which shape their motives and goals for participating in a virtual partnership.

Within one virtual partnership activity system, therefore, the partners will participate in different activities while working toward a common objective of the partnership.

As explained on the website of the Centre for Activity Theory and Developmental work research of the University of Helsinki (2011), activity systems do not exist in a vacuum. Similar to the idea of situated practice in capacity building, an activity system is also not a solitary unit, but is embedded in a broader cultural and social setting. In this setting, activity systems interact with and influence one another, thereby creating a network of activity systems. The VCP activity system may also be influenced by the institutional activity system, which will impose certain rules such as number of lectures per semester, course durations, examination dates, etc. It may also impose cultural instruments on the VCP activity system such as delivery medium, and the teaching and assessment methodology. In other cases, outcomes from one activity system may also be passed down into another activity system. As foreign elements pass down from one activity system to the next, they are modified and internalized to become part of that activity system. As Engeström (2001) and Kuutti (1996) observed, the multi-voicedness characteristic can be a source of innovation, but it may also lead to conflicts and trouble in an activity system. In the process of internalizing elements from other activity systems, imbalances may be also experienced within and between the activity elements, which are known as contradictions (Kuutti, 1996) and are discussed in Section 4.1.2.4.

4.1.2.3 Historicity

Activity theory emphasizes the importance of historicity of an activity system. Historicity is defined as a "concrete historical analysis of the activities under investigation" (Engeström,1999, p. 23). This principle emphasizes the need to identify and analyse past activities of the activity system. It acknowledges that activity systems are dynamic in nature, causing them to evolve as a result of constant transformation over time. Analysing the historical development of an activity gives a practical explanation of how an activity changes, and why it was carried out in a particular way. Engeström (2001) suggested that two types of history should be analysed: the local history that demonstrates how an activity and its object have evolved over time, and the theoretical ideas and tools that have shaped the activity.

Understanding the historical development of an activity system is enabled by the concept of internalization and externalization, which are fundamental to activity theory. In internalization, people acquire social and cultural knowledge about the activity being carried out, such as learning how to use a specific tool to perform an activity. It is related to "reproduction of culture" at an individual level (Engeström & Miettinen, 1999, p. 10). People are not only assimilating an established culture, however, but their involvement in collective activity enables them to formulate new cultural norms. In externalization, they create new tools to use in an activity and new activities that can use already developed tools for different objectives of an activity. Cole (1996, p. 145) observed that "cultural mediation implies a mode of developmental change in which the activities of prior generations are cumulated in the present as specifically human part of the environment". This acknowledges that activities do not just develop from nowhere, but are a direct result of previous activities or special conditions in the social world that were created for those activities to occur. The different developmental and historical levels are therefore needed to understand why and how activities coalesce in society over time (Cole, 1996).

4.1.2.4 Contradictions as sources of change and development

Contradictions are defined as "historically accumulating tensions between and among activity systems" (Engeström, 2001, p. 137). According to Engeström (1987), these contradictions arise from the division of labour, which causes an activity to have a dual existence: that of total societal production (total activity system) and one specific production (individual action) among many. Because individual actions are independent of, and at the same time subordinated to, the total activity system, there is usually a clash between the two.

Contradictions arise when there is a change in one of the elements of an activity, which often happens as a result of external influences from other activity systems. According to Kuutti (1996, p. 34), contradictions indicate an "anomaly within elements, between them, between different activities, or between different developmental phases of a single activity", and they usually manifest themselves as "problems, ruptures, breakdowns and clashes". All through literature, they are however regarded as a normal and healthy part of activity systems, partly because they facilitate change and development. Engeström (1987) identified four different levels of contradictions within an activity system, which are depicted in Figure 4-6.
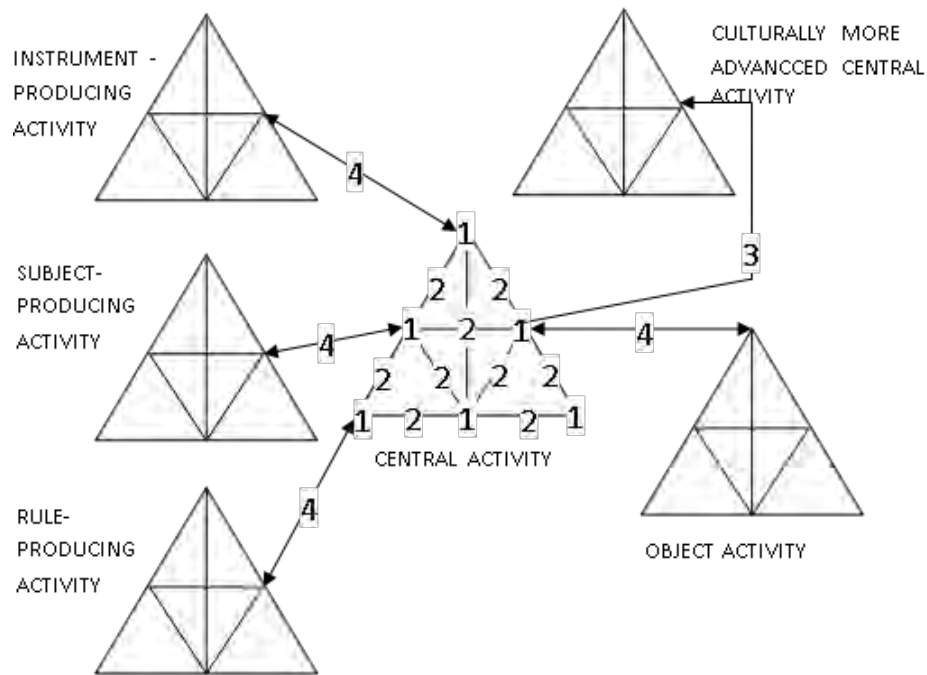
Figure 4-6: Four levels of contradiction with an activity system

The central activity (Figure 4-6), represents the activity system for which an analysis is being done. Each of the numbers 1–4 represents a type of contradiction that may appear in the activity system (1 for primary, 2 for secondary, 3 for tertiary and 4 for quaternary contradictions), and it also shows the positions where it may occur.

Primary contradictions are the inner contradictions that are spread through all elements of the activity system, and are denoted as 1 in Figure 4-6. As the figure demonstrates, primary contradictions are a result of "a misfit within and between the elements" (Kuutti, 1996, p. 34), and are located at each corner of the three triangles present in an activity system. According to Engeström (1987), these contradictions occur between the use and exchange values in a capitalist society. The website of the Centre for Activity Theory and Developmental Research (University of Helsinki, 2011) provides a good example of primary contradiction, taken from Leont"ev"s (1978) work as follows:

> "*The doctor who buys a practice in some little provincial place may be very seriously trying to reduce his fellow citizens" suffering from illness, and may see his calling in just that. He must, however, want the number of the sick to increase, because his life and practical opportunity to follow his calling depend on that.*"

The contradiction in the above excerpt is in the object of the doctor"s activity system. The doctor has two, conflicting aims in this case: to minimize the number of people suffering of pain by treating his patients, but at the same time, she is interested in having as many patients as possible to recover her investments in the practice. This contradiction occurred between two elements of the activity system (i.e. the subject and object of the activity system). Contradictions can also be found by focusing on any other element in the doctor"s work activity system.

Secondary contradictions arise when an activity system adopts a new element from outside. The new element may collide with the existing elements of the activity system, which can generate disturbances and conflicts in the activity system (Engeström, 2001, p. 137). An example of a secondary contradiction in the SANTED VCP is the virtual environment adopted for collaboration, which caused conflicts between the availability of the tools, and the participants" willingness to use it for collaboration. Forcing them to use the tool would have made it difficult for the participants to reach their objectives. They eventually abandoned the tool and made use of alternative tools to realize their objectives.

Tertiary contradictions occur when individuals participating in an activity introduce a culturally more advanced form of the central activity into a dominant motive of the central activity. In the virtual partnership example, a student may participate in the partnership mainly because of sponsorship incentives. The dominant motive of the student in this case is getting a scholarship. But the lecturers and the university would like the student to pass with good grades so she can be sent for further studies to become a lecturer at the University one day (a more advanced motive from the University"s point of view).

Quaternary contradictions arise when influences from neighbouring activities intrude the central activity. Engeström (1987) identified the following four types of neighbouring activities: 1) activities into which the objects and outcomes of the central activity are embedded (called object-activities), 2) activities that produce key instruments for the central activity (instrument-producing activities), 3) activities that produce subjects of the central activity (subject-producing activities), and 4) activities that provide the rules and legislation for the central activity (rule-producing activities).

A summary of each type of contradiction and where it occurs in the activity system is shown in Table 4-1.

Table 4-1: Levels of contradictions and their place of occurrences in an activity system

Contradiction	Occurrence
Primary contradiction	Within each constituent element of the central activity
Secondary contradiction	Between each of the constituent elements of the central activity
Tertiary contradiction	Between the object/motive of a central activity and a culturally more advanced form central activity system
Quaternary contradiction	Between a central activity and its neighbouring activities

4.1.2.5 Possibility of expansive learning

Activity theory posits that human behaviour is embedded in collective social practices. Each of the participants from the two different institutions brings their own experiences to the VCP, which may not be congruent with others‟ experiences. These experiences, together with influences from the different institutions and the other networks of activity systems in which they are involved, bring contradictions to the collective activity of the VCP. Engeström (1999) observed that every time a contradiction emerges, there is a need to dialogue and resolve how to coexist with one another in the same activity system. This usually causes the object of the activity to change, and it may also result in a new form of practice. The theory of expansive learning argues that when the original object transforms into a new object, the transformation can only be "fully grasped when the logic and history of its development are traced" (Engeström, 1999, p. 382). This is because new objects emerge only as a result of resolving the inner contradictions of an activity system. The principle of expansive learning therefore proposes a long-term focus on the collection of data, in order to get a rich understanding of how participants work together to search for, and construct new solutions of their activity systems (Engeström & Kerosuo, 2007).

Expansive learning adheres to the following sequence of actions, as described in Engeström (1999, p. 383) and depicted in Figure 4-7:

1) The individual subjects involved in the same activity start questioning, criticizing, or rejecting some aspects of the accepted practice and the existing practice.

2) They then analyse the situation to determine its causes, the needs and possibilities for development. Analysis involves a historical analysis to trace the evolution of the situation, and the actual–empirical analysis of the inner systemic relations.

3) An explanation for the causes found in the previous step is then modelled to explain and offer a solution to the problematic situation. A new model for the activity is created.

4) The model is examined and experimented upon to determine its dynamics, potentials and limitations

5) The model is implemented and concretized through practical applications and conceptual extensions

6) A reflection on the processes followed to implement the model and an evaluation of the model is then done

7) The outcomes of the process are consolidated into a new, stable form of practice

7. CONSOLIDATING THE NEW PRACTICE

1. QUESTIONING

2A. HISTORICAL ANALYSIS

2B. ACTUAL-EMPERICAL ANALYSIS

6. REFLECTING ON THE PROCESS

3. MODELING THE NEW SOLUTION

5. IMPLEMENTING THE NEW MODEL

4. EXAMINING THE NEW MODEL
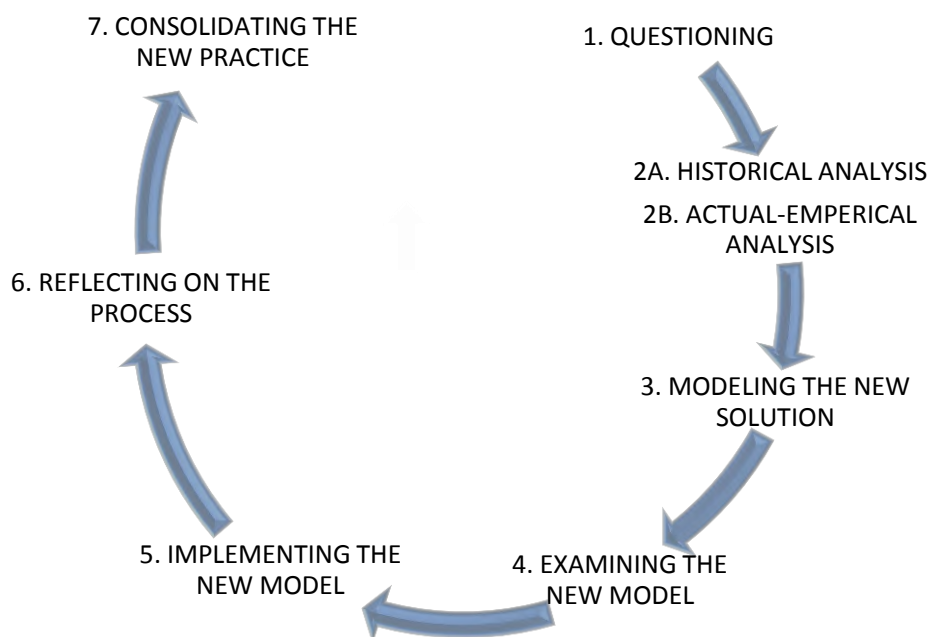
Figure 4-7: Engeström's sequence of epistemic actions in an expansive learning cycle

One of the important issues in historical analysis is that of determining the appropriate period or pattern of historical events to analyse (Engeström, 1999). While it is easier to determine the beginning and ending of activities, the long, historical cycles of activity systems and their

interconnection with other networks of activity systems makes it difficult to determine their beginning and their ending (Engeström, 1999). For the activities in the Virtual Classroom Project, however, the cycle of analysis is limited by the duration of the project. The important issue is thus to determine the unit of analysis, which in this case, is defined to be a full year of implementation (see Chapter 6).

Engeström (2001) observed that learning theories usually focus on the processes that ensure that knowledge, skills or lasting change in the behaviour of the subjects are achieved. According to him, this is only possible if the knowledge and skills that need to be acquired are stable and well-defined. In situations where the learning content is not stable and not well understood, or where subjects are involved in a collective practice to construct a collective learning endeavour, he suggested the use of the following four central questions together with the principles of expansive learning:

1) Who are the subjects of learning, how are they defined and located?

2) Why do they learn, what makes them make the effort?

3) What do they learn, what are the contents and outcomes of learning?

4) How do they learn, what are the key actions or processes of learning?

Although the content to be taught in the project may appear well-defined and well understood from the beginning, the knowledge required to build capacity is not well defined. Even for the content, it is very difficult to describe it as „stable" in the ever-changing field of Computer Science. In addition, participants from the two institutions bring their own „voices" and experiences, which require dialogue and a common understanding to achieve the objectives of the project. Analysis of the virtual partnership explored here therefore requires a critical analysis of the four questions stated above. This will enable us to better understand the collective learning endeavour that the subjects are jointly pursing through their participation.

4.1.3   The rationale for using activity theory to analyse virtual partnerships

Because of its usage in multidisciplinary contexts across the social sciences, it becomes necessary to describe how activity theory can be used in a virtual partnership context. This section examines the appropriateness of activity theory as a framework to understand virtual partnerships by giving examples of studies that used activity theory both as a conceptual and theoretical framework.

4.1.3.1 Aim of the partnership

As mentioned in Section 2.1, a clear view of purpose, objectives and the desired outcomes is one of the critical success factors of capacity-building partnerships. All capacity-building partnerships aim at empowering or enabling individuals or groups of individuals in an organization to achieve some desired outcomes. Individuals and institutions participate in the partnership because they can identify with the proposed outcomes, or the potential of the partnership. Determining the aim for which the activities of the partnership are directed is therefore important before the implementation of the partnership commences, to ensure stakeholders" commitment and a common understanding of purpose among the stakeholders.

Due to the involvement of more than one organization in a partnership, the partners" interests can be divergent. It is thus important that each partner"s goals, interests and expectations are clarified from the beginning. This will hopefully provide some measurable outcomes that can be used to determine the success of the partnership at the end of the partnering process.

Activity theory assumes that all activity systems are object-oriented. An object is the key element of an activity system, and it defines the purpose of an activity. Activity theory provides the means to focus on the societal, rather than the individual motives of an activity. It also guides the focus of analysis on the actual activity, rather than the everyday actions, giving it a broader perspective. Using the principle of activity system as a unit of analysis therefore enables the researcher to determine the shared purpose and the proposed outcomes of the partnership. It also enables the researcher to determine the goals, and the results (Davydov, 1999, p. 39) of an activity system. As Kuutti (1996) observed however, "object are neither finite, nor can they be determined exactly; they are characterized as a horizon of possibilities and possible objectives that unfolds in the process of the activity." Rather than just focusing on the activities, therefore, activity theory also focuses on the goals, intentions and outcomes of the individuals collectively involved in the activity.

4.1.3.2 Identification of stakeholders

A crucial characteristic of capacity-building partnerships is the multiple stakeholders involved in the partnership. As discussed in Section 2.1, capacity-building partnerships are characterized by the collaboration of all partners working together to accomplish their shared goals and not one privileged partner doing all the work for individual benefits. Every partner

in the partnership brings their own rules and regulations, cultures and expectations. Identifying the stakeholders before the partnership commences is therefore important, as it enables also the partners to include all the relevant stakeholders that will be needed to achieve the objectives of the partnership. Apart from identifying the individuals" and organizations that are needed to realize the objectives, stakeholder identification also explore what or how the stakeholders can contribute to the partnership, as well as identifying their interests in relation to the purpose of the partnership (i.e. how they too will benefit from the partnership).

Activity theory focuses on societal rather than individual contexts. The subject and community components of activity system allow the researcher to identify the stakeholders to the collaborative virtual partnership. Using the multi-voicedness principle of activity theory, the researcher can analyse different activity systems from the specific points of view of the different stakeholders. The activity system can for example be analysed from the point of view of funders, facilitators, lecturers or students. Activity theory therefore makes it easy to see who is involved in the partnership, why they are part of the partnership, what their stake in the partnership is, the relationship and dependencies to other stakeholders, as well as their commitment to the partnership.

4.1.3.3 Roles and responsibilities

The collaborative nature of true partnerships requires that the different activities and tasks needed to ensure the success of the partnership are assigned to the different stakeholders. This requires a clear description of what needs to be done, and who should do it. In activity theory, this is achieved by using the division of labour component of the activity system. As explained in Section 4.1.1.2, division of labour refers to the distribution of tasks among the participants of the activity system. It also reflects the interdependence of the participants on one another. Different individuals work on tasks assigned to them in the process of division of labour, and their collective work are aimed at achieving the objectives of the activity system.

Two different types of division of labour are observed in activity systems: the horizontal and the vertical division of labour. Horizontal division of labour refers to the distribution of tasks between and among peers, thereby assuming equality between the participants of the activity

system. Vertical division of labour on the other hand refers to the distribution of tasks that takes into consideration the status of the participants and their position in the division of labour, which directly reflects the power of individuals in the activity system. As Jonassen (2002) observed, different organizations use different types of division of labour. In some, the labour is divided on an activity-by-activity basis, depending on the knowledge, experience and competencies of the partners (horizontal). In others, the division is mandated hierarchically, from the top management down to the workers at the bottom of the pyramid (vertical). The method used in a partnership is important because it influences the nature of the work culture and the climate of those involved in the activities (Jonassen, 2002). Activity theory provides the means to analyse how the different participants develop a shared understanding on the different tasks that need to be performed, as well as the people that will be responsible for performing those tasks.

4.1.3.4 Rules and cultural practices

The different individuals that participate in an activity system are simultaneously involved in other activity systems with different policy frameworks and cultural practices. Any given society also has norms and practices, as well as rules and regulations that govern the operations of the society and how the members of the society relate to one another. Bringing together partners from different organizations with different rules therefore requires a conscious effort to negotiate and establish the boundaries that will determine acceptable interactions and behaviours in a partnership. The element of rules in an activity system enables one to capture the norms, conventions, actions and behaviour that govern the stakeholders" participation in the activity system. It also provides the means to analyse how the working environment facilitated trust and communication among the partners working together. It allows the identification of assets and circumstances of each context, thereby providing a way to investigate how different policies and the regulatory framework in which the partners operate affected the partnership.

4.1.3.5 Use of tools to support virtual partnerships

Virtual partnerships are characterized by technology-mediated rather than face-to-face collaborations. Different types of technology and media are used to mediate collaborations, including technologies for the production, processing and distribution of audio, video and computer-mediated communications (Wainfan & Davies, 2004). The introduction of

technological artefacts to mediate capacity building introduces two new changes: changes in the nature of the activity performed in the context of technology, as well as changes in the human activity when people use technology (Tikhomirov, 1999). Using computers can result in "a qualitative transformation of goal formation processes, manifested in new properties of the object situation that are unapproachable without computers" (Tikhomirov, 1999, p. 353). Using activity theory, it is possible to study the changes both in the nature of the activity performed, and the activity itself. It also enables the researcher to identify the resources that are needed to enable successful completion of the capacity-building activity in a virtual environment.

4.1.3.6 Contextual setting of the partnership

As discussed in Chapter 2, capacity-building partnerships mostly assumed that building capacity at the individual level will spread to the rest of the organization. However, it is now generally agreed that capacity building is affected by, and needs to take place at, different levels, including the individual, organizational and the enabling environment. Activity theory assumes that activity systems are not solitary, but part of a network of activity systems in the broader context. Individuals participating in an activity system are not only part of that activity system, but are simultaneously also involved in other activity systems with different intentions (Jonassen, 2002). Activity Theory therefore acknowledges the role played by, and the influences coming from, the contextual setting in which an activity is situated.

4.1.3.7 Learning in, and development of the partnership

Activity theory can be used to track the history and capture the developmental cycles of a partnership. The concept of the historical development of an activity posits that the object of an activity is not static, but dynamic. As different individuals with different backgrounds and experiences work together, tensions and disagreements between their activity systems may manifest themselves as contradictions. In the process of trying to resolve and remove the contradictions occurring in the activity system, new innovative forms of activity with new objects or new cultural tools may be created (Engeström, 1987). If the new tools better facilitate the achievement of the desired object, they are eventually accepted as new cultural practices.

In order to understand how the process of capacity building is implemented and whether capacity building has indeed taken place, it is important to know how the project has evolved over the time, and whether new forms of practice has evolved. Activity theory provides the tools to do this. It also enables the new cultural practices developed as a result of participating in the activity to be incorporated into the activity system.

The key principles from activity theory that are crucial to this thesis are summarized in Table 4-2.

Table 4-2: Key principles derived from activity theory, that are crucial to this thesis

a) Analysis of the partnership must take into consideration the social and contextual setting in which activities are carried out;

b) The activities and actions are analysed based on the purpose and objective of the partnership

c) Various people with different roles and responsibilities are involved in the capacity-building process;

d) People use mediating artefacts to achieve the objectives of their activities;

e) The history of an activity, followed through time, represents the developmental cycles of the activity and the actual outcomes of performing those activities.

4.1.4 A reflection on the use of activity theory to analyse capacity-building partnerships

This section (Section 4.1) introduced activity theory and described the ways in which it is used in this thesis. Activity theory is used in Chapter 6 of this thesis to describe the activities of the SANTED Virtual Classroom Project, because it contains the basic minimum elements required to study the critical elements of partnerships and the tools to analyse the relationship between the different elements of the activity system. Activity theory emphasises the role of artefacts in an activity, and focuses on how the use of different tools changes people, as well as on how people‟s experiences may also change the tools used in activities. Activity theory was found to be an appropriate framework because it can also be used to investigate how institutional rules, relationships between participants, divisions of labour and the virtual environment mediated the capacity-building process.

The section argued that activity theory is appropriate to analyse activities that are mediated by cultural tools. The study in this thesis aims to determine the viability of a virtual

partnership for capacity-building purposes in the SADC region. This requires an understanding of the social and contextual setting of the region, as well as an examination of the everyday activity in the context of an implementation of such a partnership. In this study, the interest is also on the tools that people use to enable a partnership that facilitates capacity-building. As explained in Chapter 2, understanding capacity building requires one to identify the actual people that are involved in the partnership (particularly those who are building the capacity and those whose capacity is being built), the roles they play in the partnership, as well as the relationship between them. Activity theory provides the necessary constructs to understand all these requirements. These constructs are summarized in Table 4-3.

Table 4-3: Elements of activity theory that are used to analyse the implementation of the VCP

Element	Important aspects
Subject	Who are the participants engaged in carrying out the activities of the partnership?
Object	From the perspective of each (group of) participant, why was the partnership important?
Tools	What tools were used to enable the realization of objectives? How were they used?
Division of labour	Who performed the different actions of the partnership?
Community	Who else was involved to make the realization of the objective a success or a failure?
Rules	What constraints and rules are governed the implementation of the partnership?
Primary contradictions	What are the conflicting rules, interests of the participants, or differences in tools that may affect their full participation in the partnership?
Secondary contradictions	How do the subjects, the use of specific tools, rules, division of labour, objects and community affect one another in achieving the objectives of the partnership?
Tertiary contradictions	What is the effect of introducing a new tool, new rules, new objectives, new division of labour or a new community on the partnership?
Quaternary contradictions	How do decisions from other activity systems within the context of the institutions affect the partnership?
Historicity	How has the partnership evolved over time?
Expansive learning	What new forms of practice emerged from the partnership?

Although activity theory provides the constructs for analysing activities in context, its analysis of the relations between the participants in a capacity-building partnership is inadequate. As explained in Section 2.1, the need for capacity building inherently implies that participants have different levels of capacities. Activity theory does not have constructs to separate the different levels of knowledge between the participants in an activity; it does not

take cognizance of experts and novices. In addition, the constructs provided by activity theory are mainly limited to the rules between the different participants of the activity system, how the labour is divided between them, as well as their use of the tools to achieve the objective of the partnership. It is therefore difficult to evaluate the professional growth that individuals experience as a result of their participation in the activity system, although one may argue that this can be derived from the historical analysis of the changing object of the activity.

There was therefore a need to introduce another analytical framework that caters for these two shortfalls. Community of practice is one such framework that differentiates between experts and novices. The concepts of community of practice allows one explore how participants in the partnership gradually deepen their knowledge and expertise as a result of their continued participation in and engagements with the community of practitioners. In addition, the notion of communities of practice provides a conceptual framework through which the meaning of learning in a capacity-building partnership can be explored. In this light, the next section will introduces the notion of Communities of Practice, describing it as a more appropriate framework for analysing the relationships between, and changes in the participants of the virtual partnership.

4.2 Communities of Practices

Wenger (2006) defined communities of practice as "groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly". This definition is appropriate for the participants of the virtual classroom project, who are sharing a concern for the Computer Science education in the SADC region, and a passion for improving it by exploring ways that technology can be appropriated to meet their needs. Wenger (2006) further clarified that all communities are not automatically communities of practice. For it to be considered a community of practice, a community must have the following three fundamental characteristics: 1) a common *domain* of interest that defines what the community is all about, 2) the members who engage in joint activities of the *community*, and 3) the shared *practice* which is a repertoire of resources being developed by the community. In the case study of this research, the domain of interest is Computer Science education in the SADC region. Members of the community are those who belong to the two Computer Science departments including the lecturers, the students and support staff. The

shared practice is the professional development of the lecturers by ensuring that they have the required knowledge, competencies and expertise to offer the computer science courses and carry out research. The SANTED Virtual Classroom Project can therefore be described as a community of practice.

While all communities of practice have all three common elements, however, they all come in a variety of forms, shapes and sizes (Wenger, 2006). In the research literature, the notion of communities of practice seems to be largely associated with communities in informal settings. This is probably because of the informal context (i.e. observations of different types of apprenticeships) from which Lave and Wenger (1998) originally developed the notion of community of practice. However, both small and large, local and distributed, face-to-face and virtual, intra-organizational and inter-organizational, and formal and informal communities that have a domain of interest, are composed of several members of a community who share a practice, can generally be classified as communities of practice (Wenger, 2006).

The theory of community of practice is heavily influenced by the work of Lave and Wenger (1991). A central concept of Lave and Wenger"s work is that of situated learning, which posits that learning cannot be divorced from the context in which it occurs. In their research, Lave and Wenger studied a number of apprenticeships in order to identify how newcomers learned (or acquired the required competencies) from the old-timers (or the experts). They discovered that in all cases, newcomers learned by observing old-timers at work, and they gradually acquired the skills required by participating in everyday activities. The old-timers used tools and methods that are supported by their cultures. Interaction between the participants is an important component in this process. Their observations led them to conclude that learning is situated in social and cultural contexts, because it can only take place through the daily interactions with the people and artefacts that are available in that context. This therefore highlights the importance of situating the virtual partnerships in the context of use. It allows us to take into consideration the social factors, the technological resources and organizational constraints that may affect the use of partnerships.

Closely related to situated learning is another concept, called Legitimate Peripheral Participation (LPP). Lave and Wenger (1991) used LPP to demonstrate how newcomers gradually move from being new members to becoming full participants (or old-timers) of a community of practice. Initially, newcomers start by observing old-timers at work.

Eventually, they get involved in performing simple tasks related to the practice. Gradually, they penetrate deeper and deeper in the tasks of the practice, until such a time that they themselves are able to perform the tasks without supervision. This idea is related to the ideas of Bandura (1977) who suggested that people learn through observing others. "From observing others, one forms an idea of how new behaviours are performed, and on later occasions this coded information serves as a guide for action" (Bandura, 1977, p. 22). As Lave and Wenger (1991) stressed, however, learning in this case does not happen by replicating the performances of others, or by transmitting knowledge from one person to another; it occurs when members participate in the practice of the community. This is the same spirit in which capacity building in the partnership under study is conducted: that of learning from one another, by observing the "experts" and participating in the partnership. Legitimate peripheral participation therefore enables us to conceptualize the idea of different levels of learning, as well as learning from one another.

Lave and Wenger"s work (1991) has been criticized, however, for disregarding cognitive processes of learning. They clearly stated that their concepts did not cater for abstract knowledge that learners acquired, but that they were only interested in finding out the skills that the learners acquire by participating in actual social practices. Other researchers such as Vygotsky (1978) have also done a lot of experimental work that demonstrated that learning involves cognitive processes of an individual, and that the context with all its resources mediates that learning. In the educational sphere where the virtual classroom case study is situated, cognitive processes of individuals are perceived to be significant to learning. While the study does not aim to explain and detail the cognitive processes that are involved the process of capacity building, it nevertheless examines the conceptual structures that were involved in the process.

The essence of a community of practice is learning: learning to do, learning to be, learning to belong, and learning to experience (Wenger, 1998). Wenger described learning as a "process of being an active participant in the practices of social communities and constructing identities in relation to these communities" (Wenger, 1998, p. 4). This definition is especially appropriate in our case study, where capacity building is perceived to be a transformation process that happens when a more experienced member of a community interacts with less experienced members, with the sole purpose of moving them to full participation. The notion

of communities of practice allows us to understand how individuals construct their identity by being active participants in the practices of social communities. We are interested in seeing how individuals create and experience their shared identity as a result of their participation in the virtual partnership project. To do that, we use the following characteristics of the notion of legitimate peripheral participation: organization of access, levels of participation, structuring resources for learning, discourse, generation of identity and motivation, contradictions and conflicts in learning, and transformation of practice. Each of these characteristics is briefly discussed below.

4.2.1   Basic principles of communities of practice

4.2.1.1   Organization of access: Transparency and sequestration

Lave and Wenger's (1991) main arguments about learning taking place through participation in a community of practice assumes that the participants have access to such communities of practice. Their definition of access seems to refer both to the contact and right of entry to the community's activities, members, resources, information and opportunities for participation. They argued that access gives "legitimate peripherality an ambivalent", because the outcomes of legitimate peripherality (i.e. either promoting or preventing participation) depends on how access is organized (Lave & Wenger, 1991, p. 103). In their opinion, legitimate access enables the participants to see all the other participants that are involved in the practice, what they do, their daily routines (including how they talk, walk and generally conduct their lives) and their interactions with other people who are not necessarily part of the community. Although the new participants may not be actively involved while observing the old-timers, they get the essence of the competencies that they will need to develop and acquire in order to become full practitioners in their community. They can only acquire these, however, if they have some form of access, or membership, in the community.

4.2.1.2   Levels of participation

Participation in a community of practice is seen as a way of absorbing or being absorbed in a culture of practice (Lave & Wenger, 1991). According to Lave and Wenger (1991), learners can only participate if they have the opportunity to engage in the practice.

In legitimate peripheral participation, there are different levels of participation. New participants enter the community as newcomers, and they start from a peripheral perspective of the practice. Initially, they may be mere observers of the experts as they practice. Eventually, they get involved in partial, peripheral and trivial activities such as delivering messages, arranging for students to come to class, etc. As time progresses, they participate in ever greater and more complex activities of the practice. The more they participate, the more these activities will take on new meaning. Their gradual involvement in the activities of practice will eventually enable them to become full participants in the practice.

Similar to the model of Dreyfus and Dreyfus (1986, cited in (Eraut, 2009)), Lave and Wenger (1991) also argued that the changing levels of participations are not defined by expert/newcomer relations. Rather, changing participation can be achieved through division of labour, where the newcomer is gradually entrusted with new roles and responsibilities as they master and demonstrate competencies in certain activities. This is well articulated by Hanks (1991, p. 23):

> "*Apprentices engage by simultaneously performing in several roles – status subordinate, learning practitioner, sole responsible agent in minor parts of the performance, aspiring expert and so forth.*"

Their involvement in specific activities also leads to changing relations to on-going community practices, as the activities take on new meaning and significance in their world. This in turn will lead to a change in relations between them and the other members of the community. Levels of participation in a community of practice therefore change as the participants gradually get involved in the activities of the practice.

4.2.1.3 *Structuring resources for learning*

Lave and Wenger (1991) suggested that the learning possibilities in a community of practice are defined by the resources available to the community as well as the process followed during learning. According to them, the available resources change the perspective on what is known, as well as what is done and how it is done in the community of practice.

Lave and Wenger (1991) also suggested strongly that resources for learning must be structured from a variety of sources and not only from pedagogical activities. According to their observations, the opportunities for learning were given structure by work practices

rather than a prescribed curriculum. They also observed that apprentices learn most in relation with other apprentices, leading them to recommend that the newcomers should be given a space of "benign community neglect" which will allow them to "configure" their own relations with other apprentices. They observed that when a community of practice is organized to foster learning, there is evidence that learning spreads exceedingly rapidly. They also observed that learning is most effective when there is a circulation of knowledge among peers and near peers.

The recommendation to structure resources for learning has serious implications for organizing capacity-building partnerships. It requires the partnership to be consciously organized around the activities of the „learners" as well as the required competencies that they need to learn to become full practitioners in the community. It also requires a deliberate arrangement of different resources in a way that would gradually transform the understanding and involvement of the new comers in the practice.

4.2.1.4 Discourse of practice

Although Lave and Wenger (1991) challenged the idea that instructions are superior to engagement, Hanks (1991, p. 22) clearly explained that they did not insinuate that the inverse claim is more natural.

> *"The notion that demonstration is context specific and explanation is context independent is based on an impoverished notion of both .... This critique might appear to treat language as a code for talking about the world ... and speech ... as a means of acting in the world... language use entails multiple participatory skills, and is one of the most basic modes of access to interaction in social life"*

Although they observed that teaching is not central to the identity of the practice or to learning, they promoted the use of discourse in the practice. At least one of their case studies implied that stories are a powerful means for the reconstruction of identities. In their Alcoholics Anonymous case study, they showed that the process of becoming a non-alcoholic was achieved merely through the process of constructing personal stories and hearing of the past and future actions of other participants. In their case of Yucatec midwives, they reported that one way that the children of midwives learned was from hearing the stories of difficult cases and miraculous outcomes during the process of giving birth. They therefore suggested

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that learning to become a participant also involves learning how to talk in the manner of full participants, how to sketch problems and how to tell stories of performances. The also observed that way participants describe these events is directly related to their current level of participation in the practice; first they may not know the terms and vocabulary of the practice, but as their level of participation changes, they gradually move towards the full model of the practice.

However, Lave and Wenger (1991, p. 85) stressed that merely talking about the practice is not enough.

> "...talk is a central medium of transformation. Whether activity or language
> is the central issue, the important point concerning learning is one of access
> to practice as a resource for learning, rather than instruction"

According to them, there is a difference between someone who talks about the practice from outside and someone who talks from within the practice. Although both forms result in a new linguistic practice, they emphasized the need for cognition and communication to be situated in the historical development of the on-going activity in and with the social world in the theory of practice.

4.2.1.5 Generation of identity and motivation

In communities of practice, identity is defined in terms of the practice of the community. Identity refers to the experience that people have, which consequently results in the meaning that they attach to the social world. In describing the identity of a person in a community of practice, Wenger (1998) used their experiences in a practice, how they interpret what they do, what they understand about what they do, what they know, what they don"t know and what they don"t try to know, as some of the factors that may be used with relation to identity. As he clearly pointed out, however, these are not simply individual choices, and they are not merely a result of being involved in a specific social practice. Rather, they are negotiated in the course of doing the job and in interacting with others.

Identity is determined by many factors, such as which community of practice the person belongs to, how they engage in the practice, how they identify with the community and how they negotiate their meaning (Wenger, 1998). Wenger (1998) explained that building an identity entails negotiating the meaning of experience of membership in a community.

Generation of identity and motivation enables us to understand how the participants make sense of the partnership and how they construct meaning in the practices of the activities. It also enables us to how the participants create meaning for themselves, and how they go about taking advantage of the situation to develop their own capacity. We also want to see what the participants are doing when they engage in the activity, how they solve their problems, and the significance that they attach to their participation. This will enable us to better understand their individual perceptions of their role and how they acted and performed in the partnership depending on this perception.

4.2.1.6   *Transformation of practice*

Lave and Wenger (1991) argued that the multiple viewpoints that characterize old-timers and newcomers can either establish and maintain identities in a community of practice, or they may result in conflicts and generate competing or new views on practice. They explained the dilemma that newcomers often have: on the one hand, they have to engage in an existing practice which has existed over time by understanding it, participating in it and becoming full members of that practice. On the other hand, however, they come with their own viewpoints, and they also have to develop by establishing their identities. This notion will therefore enable us to understand how the participants used their existing experiences and their experiences in the partnership to develop knowledge and skills required in the practice.

4.2.2   Section summary

All the six basic principles of communities of practice introduced in Section 4.2.1 are used in this thesis to analyse how the process of capacity building took place. The notion of CoP provides the lens to focus on the stages of the capacity-building process, as well as the actual activities that are planned for each stage in order to ensure learning. It also enables one to examine how individuals participate at each stage, and to explore their meaning of participation. The notion of CoP also enables one to trace the development of capacity in the process, starting with what participants know before the process, and ending with what they eventually become (i.e. what capacity building enables them to do after participating).

4.3 Conclusion

This chapter has described how a combination of Activity Theory and Communities of Practices are used as an analytical framework for this thesis. It described the development of activity theory, focusing mainly on the concepts that are used later in this thesis. The five basic principles of Activity Theory were also highlighted, and a discussion is provided on how Communities of Practice through the notion of Legitimate Peripheral Participation may be used to address the main concerns of capacity-building partnerships. The combination of the above theories is described as appropriate for studying virtual partnerships for capacity-building purposes. Section 5.4 in the next chapter will highlight how this combination is used for analysis purposes in this thesis.

CHAPTER 5: THE RESEARCH PROCESS

This chapter explains the research process followed, and methods used in this thesis. Firstly, the research methodology used is presented, and the core elements of the chosen research design are justified in the context of the research problem. It then describes the specific methods that were used to collect data and explains how the collected data was organized for analysis. The last section describes how the chosen analytical framework was used to analyse the specific aspects of the research.

5.1 Research Method

As explained in Section 1.6, the implementation of a virtual partnership is studied using a qualitative, embedded case study design that focuses on the activities of the SANTED virtual classroom project. At the time that the project commenced in 2008, it was difficult to find literature on existing virtual partnerships in general, let alone virtual partnerships that are aimed at building capacity in tertiary educational institutions. At the beginning of the study therefore, it was essential to adopt a research approach that did not restrict the researcher to a specific research methodology that is not necessarily applicable to the case under study, but one that allows the researcher to observe the implementation of the partnership as it unfolded, as well as to synthesize and interpret the actions, intentions, interactions and behaviours in the case study.

The processes involved in the execution of the project activities adhered closely to the action research approach. Since there was no available framework to guide the implementation at the commencement of the SANTED VCP, it was clear from the onset that the implementation would adopt a trial-and-error approach. In this interventionist approach, problems facing the project are analysed as they emerge, possible solutions are identified and implemented, and a reflection on the implemented solution is made to determine whether to continue with that solution, or adopt other solutions. This is the basic principle underlying action research, where participants work together to identify and implement appropriate solutions in their social contexts. As summarized by Kemmis and Wilkinson (1998), action research involves a spiral of the following three self-reflective cycles:

1) planning a change;

2) acting and observing the process of change;

3) reflection on the processes and the consequences.

Many researchers have recommended the use of action research and reflective methods in educational research (Altrichter, Posch, & Somekh, 1995; Kemmis & Wilkinson, 1998). According to Altrichter, Posch and Somekh (1995), action research enables educators to reflect upon their practice by enabling them to analyse the functioning, strengths and weaknesses of their institutions, develop and translate actions and structures for the future, and monitor their impact in real settings. They therefore argued that action research enables educators to implement innovation in a reflective way, while at the same time developing their knowledge and professional competency. This, according to them, is the motive for action research: to improve the quality of teaching and learning by supporting educators in dealing with the everyday problems and challenges of education.

The second method used is that of grounded theory, which has been widely used for the discovery and development of theory in qualitative research. In the mid-1960s, Glaser and Strauss observed that the traditional scientific methods focused only on the verification of theory, encouraging researchers to first identify a theoretical framework, and then apply it to the phenomenon under study in order to test the theory (Glaser & Strauss, 1967). They argued, however, that this ideal situation is only applicable if all required theories have already been discovered, and researchers are only required to test the theories by using scientific procedures (Goulding, 2002). They therefore advocated grounded theory, which enables researchers to generate more theories that are applicable and relevant to their research. As a result, grounded theory is widely used today both for purposes of generating theory in new fields of research, as well as to provide alternative perspectives on existing knowledge about social phenomena (Goulding, 2002).

The grounded theory methodology places an emphasis on the discovery of new theory, and therefore restricts the researcher‟s explorations and dispositions prior to the research (Goulding, 2002). This is done to ensure that the developed theory is grounded in the behaviour, actions and experiences of the context under study, but at the same time to ensure that existing work does not influence the findings and perceptions of the researcher (Goulding, 2002; Glaser & Strauss, 1967). Goulding (2002) therefore recommended that the

researcher should enter the field at an early stage of the research, collecting data using multiple sources in whatever format they deem appropriate, and start analysing the data as soon as possible for all possible interpretations. After using particular coding procedures, the researcher will then develop units of data, and as the theory starts to develop, new instances and new data may be required for new patterns and themes. When no further evidence emerges from the data, the researcher would then finally develop the theory from the concrete instances found in the data. Goulding (2002) suggested that it is also only at this time that existing theory may be used to sensitize the researcher to the significance and relevance of theory or to give new perspectives to existing theories.

Against this background, grounded theory was one of the methods used in the research study. Data from multiple sources such as interviews with the participants, observations, recordings of the activities of the partnership and experiences of the users was captured and analysed as described in Section 5.4 to develop the important concepts of virtual partnerships for capacity-building purposes. A comprehensive literature review of existing capacity-building partnerships in general, partnerships between educational institutions, and virtual collaboration was also done. A comparative study done from the findings of the implementation and the literature study led to the re-discovery of some concepts and categories that already exist in the literature of capacity building and collaborative partnerships. While some may view this as no new addition of knowledge to the field, and may be tempted to think that a review of literature on traditional capacity-building partnerships would have sufficed, it was essential in this study to establish that these are indeed applicable to virtual partnerships. This research process also supports Goulding"s (2002) recommendation that even if the researcher enters the field with existing research knowledge, the researcher should "ignore" this knowledge until the end of the analytical process, at which time, a comparative analysis can then be done. Once the categories were established in the study, however, and the comparative analysis of the results revealed an association with the relevant existing theories as required by grounded theory, it became easier to determine the appropriate frameworks for analysis of data collected from the case study.

5.2 Research Design

5.2.1 Site and participants

As explained in Section 1.5, the case for this research is the SANTED Virtual Classroom Project, in which the Department of Computer Science at Rhodes University worked together with the Department of Computer Science at UNAM with the purpose of building capacity in the department at UNAM. Capacity building was to be done through the implementation of new curriculum modules at UNAM, which were to be taught by the lecturers based at RU. Other capacity-building activities were also conducted in the project, including registration of staff members for PhD studies, co-supervision of Masters" research, and joint research and publications. The site of the data collection in this project was therefore the SANTED Virtual Classroom Project, where data was collected both from the site and participants based at both RU and UNAM.

The data collection process started right at the beginning of the project in January 2008, and the last data were collected during December 2010. Throughout the duration of the project, the researcher was involved as a project coordinator from the UNAM side, and worked together with the overall Project Coordinator based at Rhodes University. Since the researcher was based at UNAM, there was daily face-to-face contact with the facilitating lecturers at UNAM, as well as the students that participated in the project. Communication with lecturers and the coordinator at RU was mostly done via emails and telephone calls, and web conferencing when necessary. Visits to RU were also periodically scheduled for the duration of the project.

5.2.1.1 Students

The project targeted final-year Computer Science students at UNAM. In each year of the duration of the project, ideal candidates were the five top performing students who would be willing to join UNAM as academics upon successful completion of their studies. Student participation in the project was, however, voluntary. The number was limited to five because of several reasons: 1) the SANTED bursaries could only be extended to five students per year; 2) the venue and resources allocated to the SANTED project were limited, and could accommodate a maximum of five students; 3) the project is a pilot of the new single-major degree and could not be rolled out to all fourth-year students at once.

The fast-tracking process was aimed at implementing the harder part of the new BSc curriculum at UNAM. Because the students did not have sufficient background to do the course of the new curriculum, it was important to enrol top performing students of the fourth-year class, as they are expected to work harder than their peers when the full implementation of the new curriculum is in force. At the early stages of the project, however, several implementation challenges were noted from UNAM side. UNAM had difficulty in accepting changes in their degree structure, without having gone through the appropriate approving structures such as the Faculty, the Senate, the Council and the Namibia National Qualifications Authority (NQA). The only way that students could be allowed to register for these modules without approval is if they took the modules for non-degree purposes, where the modules would be taken over and above the standard courses of the fourth year. This meant, however, that the modules would not bear any credit for UNAM students. As discussed in Chapter 6, this imposed a constraint on the choice of students, because the best students were not interested in registering for additional modules that did not bear credit for their degree qualifications. As a result, the choice was limited to students who were either ahead in the course completion of one of their majors (e.g. students that had completed a Statistics major but not a Computer Science major), in order for them not to be overwhelmed by the amount of work. The offer was also extended to students who had already completed the fourth-year programme, including the tutors in the department who had already obtained their first degree. This limited choice, however, also limited the possibility of finding capable students to participate in the project.

Another factor that constrained the choice of students was UNAM's affirmative policy. Since the chosen students were potential staff members of the department after completing their MSc studies at RU, the recruitment of students would have to be done in accordance with Affirmative Action (Employment) Act No. 29 of 1998 which provides for the achievement of equal opportunity for employment for all citizens of the country. Among other things, the Act prescribes that there should be no racial or gender discrimination in the recruitment process of staff members in the work place. At the beginning of the project, the project coordinators did not perceive the implications of the choice of students on the Affirmative Action policy. This was impressed on the project by the UNAM management in the second year of study, however, introducing another constraint in the choice of students. In addition to striving for best students, therefore, the selection process had to also consider all genders and all races of

the Namibian population that were represented among the students of the department. Table 5-1 shows the different races that were represented by the students that participated in the project.

Table 5-1: Student races represented in the Virtual Classroom Project

Tribes	2008	2009	2010
Oshiwambo	4	2	2
Kavango	0	1	0
Damara/Nama	1	0	0
Caprivian	0	2	0
Coloured	0	0	1

5.2.1.2 Lecturers

The lecturers who participated in the project are those who had taught the module to RU students in the previous years. Each module had at least one lecturer, with the exception of Real Time Multimedia, which is usually taught by two lecturers at RU. No requirements for teaching in an online environment prior to participating in the project were specified, but all, but one lecturer had extensive experience in teaching using virtual classroom solutions, especially video-conferencing. In addition to teaching the module courses, the lecturers" responsibilities also included developing the required competencies in the facilitators at UNAM. The lecturer also acted as a link to forging a stronger collaborative link between the RU and UNAM departments.

5.2.1.3 Facilitators

The facilitators are the lecturers who had previously taught BSc courses at UNAM. Because the modules delivered through the course would be handed over to UNAM upon the completion of the SANTED project, facilitators were chosen based on the interest they had shown in the course, as well as their interest in taking over the courses once they are handed over to UNAM. Each course was expected to have at least one facilitator per year. In addition, the same lecturer that facilitated a course was expected to do it for the duration of the project, and to take it over for teaching immediately after the termination of the project. In

this way, the modules would be properly handed over to the facilitators from the RU lecturers, while at the same time ensuring sustainability in the teaching.

5.2.2 Modules taught in the project

As explained in Section 3.3.3, five modules were initially selected for implementation at the beginning of the project. These five modules were: Research Project Management, Computer Networks, Distributed Parallel Processing, Data Warehousing and Mining, and Real Time Multimedia. The modules were chosen because of the expertise available at RU, and the identified lack of expertise at UNAM. In July 2008, however, a new lecturer with expertise in Data Warehousing and Data Mining became available at UNAM. It was also agreed that since Distributed and Parallel Processing is not a compulsory module in the fourth year curriculum, it would be better if a compulsory module was chosen. Replacements for these two modules were therefore done, and in the end, Enterprise Java and Human Computer Interaction were chosen as the appropriate modules for replacement.

As explained in Section 3.3.3, the implementation of the project spanned three years. The implementation of the capacity building closely followed the staged capacity-building model discussed in Section 2.2.2, where the success of the capacity-building process is reflected by a successful transition of roles of the participants from being dependent, to being guided, to being assisted and finally independent. In the first year of implementation, therefore, the lecturers at UNAM were in the dependent stage of the capacity building, where all the modules were taught from RU and all the decisions about the module contents and delivery details were made by the lecturers at RU, with the lecturer at UNAM taking on a facilitator (or really an observer) role. In the second year of implementation, they moved to the guided stage, where all modules were still taught from RU, but some of the lectures were delegated to the facilitators based at UNAM, but closely supervised and critically observed by the lecturer RU. In the third year of implementation, the facilitators at UNAM took prime responsibility for all the modules presented in the project, only asking for assistance from the lecturers from RU on specific topics when it was required. In 2011, which is outside the implementation of the project, the lecturers at UNAM transitioned to the independent stage, with lecturers at Rhodes having no involvement whatsoever in the implementation of the modules. Because of the fewer modules that were facilitated from RU in the third year of implementation (2010), the availability of funding, and the identified need to strengthen the

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postgraduate-taught Masters at UNAM, it was agreed that the implementation should shift to Masters Modules in the third year. Existing and new lecturers were identified to teach these new courses. All the modules taught in the project are summarized in Table 5-2 and their full descriptions are presented in Appendix A.

Table 5-2: Modules taught in the SANTED VCP

Module	2008	2009	2010
Real Time Multimedia	Yes	Yes	No
Computer Networks	Yes	Yes	Yes
Java Enterprise	Yes	Yes	Yes
Human Computer Interaction	Yes	Yes	Yes
Operating Systems	N/A	N/A	Yes
Advanced Computer Networks	N/A	N/A	Yes
Network Security	N/A	N/A	Yes
Computer Graphics	N/A	N/A	Yes

5.2.3   The process of selecting a virtual classroom solution

The process of selecting a virtual classroom solution appropriate for the SANTED virtual classroom project conformed to Wenger *et al.*"s (2005) cycle of inventiveness. The cycle of inventiveness posits that in the process of determining what technology to use in a community of practice, certain participants (which they referred to as technology stewards) would use the following three moments of inventiveness to determine the appropriate technology for the community: inventiveness of the technology market, inventiveness of serving the community and inventiveness of use.

5.2.3.1 *Inventiveness of the technology market*

In the first stage of determining the appropriate technology, the project coordinators explored the market for possible technologies available for use in the project. Understanding the technology market is particularly important because the number and availability of virtual classroom technologies is continually evolving, providing more tools and specialized configurations targeted at specific audiences. At the beginning of 2008, for example, the following virtual classroom solutions offering a series of integrated tools seemed to have

been widely used: Wimba Virtual Classroom, Elluminate, Adobe Connect Pro, WebEx and DimDim. All of these solutions seemed to be targeting educational institutions with a distance education orientation, but their classroom size and pricing limitations tacitly defined their real targets. Wenger *et al.* (2005) observed that two taxonomies have been widely used to determine the appropriateness of technologies: the first typically looks at the time and space limitations, classifying the tools into four different quadrants: time / same place; different time / same place; different time / different place; and same time / different place. The second looks at functional capabilities of the tool: e.g. enabling delivery of PowerPoint presentations, recording and playback functions of classroom activities, etc. Because of the complexies of the range of activities and the continuously evolving needs of the participants in a community of practice, however, it is difficult to strictly stick to these two taxonomies. The project therefore adopted the following recommended framework for analysis of community technology (Wenger, White, Smith, & Rowe, 2005):

1) Identification of the configuration of technologies that a community and its members will use. (e.g. presentation of PowerPoint slides, email, and chat functionality)

2) The community of the virtual classroom project would primarily use the virtual classroom solution for presentation of lecture sessions. In some cases, the virtual classroom would also be used for discussions between facilitators and lecturers, as well as the supervisors of postgraduate studies based at Rhodes University. The identified functionalities in this case included the ability to present lectures (e.g. to upload and present slides and other documents), the ability to interact using both audio and video, and the ability to share applications and documents. An exhaustive list of all the functionalities is given in Section 6.2.

3) The platforms into which vendors and developers package technology (e.g., web-based solutions with integrated tools that can be accessed by anyone with access to internet, or a specialized functionality which requires specialized equipment)

4) The majority of the integrated virtual classroom solutions available at the time were marketed as either a complete collaborative suite that could be installed and maintained locally or as a subscribed service where the institutions subscribe for a specified period of time to get access to the use of a virtual classroom with a predetermined number of licenses equating to on-line participants within their virtual room. Due to the prohibitively

expensive pricing options and the lack of technical expertise to configure and maintain integrated collaborative suites, the project leaders recommended the use of a subscribed service for the first year of implementation, while testing to see if different options could not be implemented in subsequent years.

5) The tools that support specific activities (e.g., document sharing or uploading), or bridge between types of activities (e.g., recording and playback functionality that makes it possible for students who were not present at a lecture to catch up).

6) The features of tools and platforms that make them usable or differentiate one offering from another (e.g., a hand-raising with a chime functionality to alert the lecturer that a student has raised their hand, an archiving functionality with an interface consistent with the presentation interface to allow easy navigation)

5.2.3.2 *Inventiveness of serving the community*

After the identification of the appropriate virtual classroom solution for the project, the Horizon Wimba technology (http://www.wimba.com) was deployed to enable the inventiveness of serving the community perspective. In this cycle, the potential technology is presented to the real, actual communities. Wenger *et al*. (2005) stressed the importance of this step, emphasizing the different institutional and environments that the communities live in, which could influence the adoption of the technology. In the SANTED Virtual Classroom Project, the community is situated in a low-bandwidth environment, which requires a proper testing of the virtual environment in this configuration. There are also limitations of funds provided for the acquisition of a virtual classroom, which limits the choice of the solution to tools that are either cheaply available or are provided free of charge.

Because of its unique features and completeness of solution, Wimba Collaborative Suite, a full suite package that can be locally installed would have made the perfect solution for the virtual classroom. Pricing options, and lack of expertise to install and monitor the server, however, acted as a prohibitive factor in this case, rather forcing the community to choose Wimba‟s Application Service Provider (ASP) Services, which hosts the service, and where participants have to log into a server using a web browser.

5.2.3.3 Inventiveness of use

Initially, the project community was satisfied and had adopted the technology which was successfully used in the teaching of the first module. The final stage of inventiveness, which is inventiveness of use, acknowledges that users" needs will change, which may require changes in the technology. In the SANTED Virtual Classroom Project, continuous changes in the technology and the evolving needs of the users were identified as some of the reasons that might necessitate new change and new offerings (Wenger, White, Smith, & Rowe, 2005). This was mainly attributed to the instability of technology and the unavailability of the Wimba Virtual Classroom. Although the community initially adopted the technology and even seemed to like it, continuous disruptions in the lecturing sessions prevented them going further with the technology, and they rather reinvented themselves through the adoption of new artefacts and new practices in the virtual classroom. A full explanation of this is given in Chapter 6.

5.3 Data Collection

All capacity-building activities of the project (including all the modules taught) were studied in each of the three years of the duration of the project). This enabled the researcher to gather insights on the different aspects of the activities and the individual modules, as well as to identify the different cultures cultivated in each of the modules. It also enabled the researcher to isolate how the different factors such as module content and objectives, technologies used, lecturers and facilitators could influence the implementation process of a virtual partnership. In the end, the results are related to the case study as a whole.

To study the implementation of a virtual partnership in the SANTED Virtual Classroom Project required access to all activities of the project. It was necessary for the researcher to have access to all students, lecturers, facilitators, the content and all the lectures and other activities that were part of the everyday situations of the project. In addition, it was also necessary to have access to archived versions of the completed activities for analysis purposes. Various data collection methods from a variety of sources were used, and the results were triangulated during the data analysis stage.

5.3.1 Document analysis

Document analysis is one of the main methods used to collect data in this thesis. In addition to the documents used for literature review, documents reviewed included those that were specifically developed for the collaboration between the two institutions, and those that in general provided a framework for the implementation of decisions in the institutions. Documents specific to the collaboration included the signed Memorandum of Understanding and Letter of Intention to Collaborate, workshop reports to the funders that were prepared on a semester basis, and letters to the senior management of the institutions requesting authorization on issues pertinent to the implementation of the project. In addition, an analysis of the video and audio recordings of lectures both on the virtual classroom, the Digital Versatile Disks and live lectures was also included as part of the documents reviewed. The specific types of documents reviewed and their number are shown in Table 5-3.

Table 5-3: Types of documents that were reviewed in the project

Document Type	Number of Documents
Memorandum of Understanding	1
Letter of Intention	1
Workshop reports	8
Letters	1
Lecture recordings	63

5.3.2 Field notes

Patton (1987) postulates that although what people say, whether verbally or written is a major source of quantitative data, direct participation and observation of the programme activities, participants and processes is one of the best methods to understand the complexities of a programme situation. In order to better understand the case being studied, therefore, the observer tried to be personally present at all the activities that took place in the project. Detailed field notes describing the activities that were undertaken, the processes that were followed, the people that participated in those activities, the relationships and interactions between the participants, and the meaning of what was observed to the participants were taken in accordance with Patton‟s suggestions for recording field-based observations (Patton, 1987).

Because of the personal contact with all the participants directly involved in the implementation of the SANTED Virtual Classroom Project and the role of Project Coordinator, it was extremely difficult to completely separate the researcher from every activity as merely an observer. The extent of my participation varied from activity to activity and time to time. In some extreme cases, for example, I would interrupt the presentation of a lecture, because of the drop in the quality of the video, to suggest that students gather around a single computer to be able to follow the lecture. In other cases, I would completely ignore the events of the activities and observe how the participants would deal with them. Whether I was engaged or detached from the activities, however, I would at the end of each of these activities record my observations, impressions, reflections, insights and interpretations of the activities and events that had just occurred in my personal research notebook.

It is a well-known fact that the role and impact of the observer in the field and on the participants can lead to bias and non-objectivity (Patton, 1987). Patton (1987) however argued that without personal encounters, observers cannot fully claim to understand human behaviours. He therefore suggested that rather than completely distancing one‟s self from the involvement of what is being observed, the observer should provide the participants with the descriptions and analyses of what has been studied, and include their reactions on these as part of a verification process. Informal discussions on what has been observed were therefore often conducted with the participants, and their reactions were also recorded as field notes for analysis purposes.

5.3.3   Interviews

A number of participants in the case study were interviewed to develop an in-depth account of their experiences and perceptions of the implementation of virtual partnerships in the SADC region. Patton (1987) identified the informal conversational interview, the general interview guide approach and the standardized open-ended interview as the three main approaches to the design of interviews. The informal conversational interview follows a natural flow of interaction, with questions spontaneously generated during the on-going process of participant observation. This method was thus frequently used in this study to complement the method of participant observation. The general interview guide generates a

set of interview questions or discussion topics that will be discussed with each respondent, although the respondents will not necessarily have to answer them in a specific order. The standardized open-ended interview has a set of pre-set questions that each respondent must answer in a defined sequence. Because of the flexibility, focus and level of depth that are associated with each type of interview approach, each of the three approaches were used for different purposes in the course of this study. The structured interview schedule is shown in Appendix B.

All interviews that followed the general interview guide that could be recorded (some students did not want to be recorded) were tape-recorded and transcribed for the purposes of analysis. For interviews that were not recorded, comprehensive notes which captured actual quotations were taken, to increase the accuracy of the data collection. For each of the comprehensive notes taken, the quotations were read back to the users to ensure that what was captured is really what was said. In some cases, some participants did not feel comfortable with answering the questions, and rather requested that the questions be given as a print out which they could fill in by themselves. If there were follow-up questions that arose as a result of filling in a questionnaire, the researcher went back for a further discussion with the participants.

General guide interviews were most of the time conducted at the beginning of a module, end of a module, or end of the year. The aim of the interview was to ask the participants to reflect on the module or year that has just ended, and to give their experiences and perceptions of the activities that had just taken place. Informal conversation interviews were randomly conducted with students at the end of the lectures, especially when a special activity or event had taken place in the classroom (e.g. where the lecturer asks the students a question and none of them respond, which could be a confusing thing to the lecturer on the remote site). These informal interviews were often not transcribed word for word, but were rather recorded as events in the fieldwork notebook.

In total, 50 interviews were conducted during the data collection process, and of these, only 10 were directly recorded and transcribed. The type and number of people interviewed is summarized in Table 5-4.

Table 5-4: Number of interviews conducted in the project

Role in the project	Number of Interviews
Facilitators	4
Lecturers	4
Students	40
Project Coordinator at RU	1
Head of Department	1

5.3.4   Data from emails

As a Project Coordinator at UNAM, the researcher was fortunate to have access to all the email communications that were exchanged in the project. When a lecturer was communicating with a student, for example, or if there was a need for administrative assistance to come from UNAM, the Project Coordinator was carbon copied in all the communications. As of December 2010, the researcher's Inbox had 1,304 emails that were directly related to the activities of the SANTED Virtual Classroom Project. Some emails were communications between the lecturers and their students, requesting submissions of assignments, rescheduling of classes, and even requesting an explanation as to why nobody was present in the virtual classroom during the scheduled times. Other emails related to administrative activities such as the need to prepare a quarterly report for SANTED, proof that a student had met the minimum requirements to graduate from UNAM, and admission and lodging arrangements for students admitted at Rhodes University. The emails were sorted according to the three categories: administrative, teaching and research, and are summarized in Table 5-5 below.

Table 5-5: Number of emails related to each category

Category	Number of emails
Administrative	254
Research	50
Teaching	850
Other	150

5.4 Data Analysis

Studying virtual partnership implementation was not simply a question of having access to and participating in the teaching of the modules. It also required an understanding of the

culture of the working environment in each of the modules, and an understanding of the interplay of the learning context, the objectives of the project, the division of labour, the technologies used, the different people involved in the project and the relationships between them. The data generated through the data collection methods explained in Section 5.3 was voluminous, sometime inconsistent, and needed to be triangulated and verified with the sources. As explained in Chapter 4, analysis of data was based on a sociocultural perspective, and was achieved using the activity theory analytical framework and Lave and Wenger's (1991) concept of legitimate peripheral participation. Using these two analytical tools made it possible to understand the virtual partnership as a complex phenomenon that is affected by all the components of the activity system.

This section uses the reporting style adopted from Netteland (2007), to explain how the data analysis and interpretation was done to answer the research questions. As explained in Section 1.4, the main research question aims to find out if the institutional structures and infrastructures are ready to support the implementation of capacity building in the SADC region. In order to answer that question, three subsidiary questions were defined for the study. The first question aimed to identify the problems that arose in the implementation of virtual partnerships for capacity building in tertiary education institutions. To answer this research question, the grounded theory's concept of open coding was used to codify and categorize data gathered from interviews and observational data into categories of problems identified in the study. The categories were further analysed using activity theory perspectives to uncover underlying tensions and potential contradictions in the categories. The results were then compared with the relevant literature presented in Section 2.3. The results of this analysis are presented in Chapter 7 of this thesis.

The second question aims at describing how the virtual environment was harnessed to better support capacity-building initiatives. Reporting on the technologies used and how they were used is reported in Chapter 6 of this study.

The last question of the research aimed at understanding how the activities of the partnership were organized to facilitate capacity building. Lave and Wenger's (1991) concept of legitimate peripheral participation was used to analyse how participants in the virtual classroom project moved from being newcomers to being full participants, and how their changing identities and motivation led to the transformation of practice.

5.5 Ethical Considerations

The research carried out in this thesis adhered to the ethical guidelines of Rhodes University, which stipulates the acceptable standards of research practice for all activities that involves human subjects. The guidelines outlines the principles used to protect the rights of human subjects, to ensure that the research is conducted in a fair and nonobligatory manner, and that it maintains anonymity and confidentiality of human subjects. Adherence to the guidelines was ensured by employing the following principles:

a) Voluntary participation: All involved human subjects volunteered to participate in the project. During the different stages of the research study, participants were reminded of their right to participate in the interviews and questionnaires, and were advised of the right to withdraw their comments, documents, and participation for their own comfort at any time, even after consenting to participate.

b) Information to Subjects: the purpose and usefulness of the research was explained to all the participants. The research project, expectations from participants, anticipated outcomes and benefits of participation and project risks were explained to all participants, as well as given in a form of a printed booklet to all participants.

c) Informed Consent to participate in the research: All participants gave consent to participate in interviews and questionnaires. Recorded interviews and transcribed texts were made available for review by the participants.

d) Privacy of Subjects: Participants were informed that their anonymity and record of participation will be protected. The researcher has tried to keep participants information as confidential as possible, and tried not to invade the privacy of the participants.

e) Anonymity and confidentiality: The researcher has tried to ensure that the reporting maintains anonymity and ensures confidentiality. Where possible, pictures used in the thesis were blurred to prevent recognition and identification of individuals, and extracts and direct quotes were not attributed to individuals. In addition, the researcher does not intend to make public exposure of the pictures that form part of this thesis. All recorded materials will be erased to the satisfaction of the supervisors, three years after the research thesis is completed (in case there is a need for follow-up research).

5.6 Conclusion

This chapter has explained how the data for the study was collected and how the analysis was done to transform the data into findings. The researcher did not have control over the research site, participants, the modules taught, or the virtual classroom solution used in the project. However the researcher attended the scheduled classroom sessions with the participant, had access to all participants and artefacts used in the project, and used several methods such as interviews, field notes and emails to gather data necessary for the project. Since this is an exploratory study of a specific project that was not under the direct control of the researcher, the thesis findings are mostly recommendations emanating from this single case study, and should be interpreted within its proper context.

CHAPTER 6: LOOKING AT THE SANTED VCP CHRONOLOGY THROUGH THE LENS OF ACTIVITY THEORY

This chapter describes the chronology of the implementation of the activities of the SANTED VCP using activity theory and the capacity-building transition stages introduced in Section 2.1.2. The chapter explains how the staged capacity building was implemented in the project, with each of the three years of implementation described as a transition stage as described in Section 2.1.2. As explained in Sections 4.1.3 and 4.1.4, activity theory has the constructs that can be used to describe the capacity-building initiative explored in this thesis. The activities that took place during each stage are therefore narrated using the components of activity theory introduced in Section 4.1. As explained in Chapter 5, however, the project has been a living organism where participants were continually striving to identify remedial practice. This made it difficult to enforce the exact execution of all the steps and stages suggested in Chapter 2.

6.1 Introduction

The main purpose of the SANTED VCP was to build teaching and research capacity in the Department of Computer Science at UNAM. This was to be achieved through collaborative teaching of four fourth-year modules of the new Bachelor of Science in Computer Science curriculum. As explained in Chapter 3, the implementation of the new curriculum at UNAM was planned to commence with the first and second year of study in 2008. The third and fourth years of study would only be implemented in 2009 and 2010 respectively. In the VCP, however, four of the new curriculum modules would be piloted directly in 2008 and 2009. Teaching of these modules would be done by the lecturers based at RU.

In each year of implementation, five UNAM students and four UNAM lecturers (one for each module) were chosen to participate in the VCP. In the first year, the UNAM lecturers assumed the mentee role, participating mainly as facilitators of communication between the lecturer and the students. These facilitators had face-to-face contact with the students, and are familiar with the contextual setting of the students. In the second year of study, the facilitators were expected to co-present some of the lectures with their colleagues at RU. In the final year of implementation, all the modules were supposed to be presented by the facilitators (UNAM lecturers), with the lecturers at RU acting as observers in those modules.

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It was anticipated that at the end of the project, the lecturers from RU would no longer be directly involved in the teaching of the modules, apart from providing guidance when requested by the UNAM lecturers.

The process of capacity building followed in the case study also involved a transition of stages discussed in Section 2.1.2. The stages define successive transition points that are believed to increase the capabilities of the lecturers (and eventually, the department) to the required level of capacities. According to the staged capacity-building process, facilitators that participate as observers in the first year of study are actually dependent on the RU lecturers (who have the subject knowledge expertise) to prepare and present lecture sessions during that year. From year one to year two, a transition occurs, where the facilitators are no longer dependent, but move to another stage called guided. During the second year of implementation, the facilitators would take over some of the load in the classroom, but still under the direct supervision of the lecturer. In the third year of implementation, the lecturers transit from the guided to the assisted stage, where they are now in control of the class, and they consult the lecturers at RU only to assist them where necessary. At the end of the project, the lecturers from RU would no longer be involved in the project, and the lecturers at UNAM would take over the modules, upon which they are now in the independent stage.

The focus of this thesis is on how technology is used to facilitate the capacity-building process. The critical issue and hence the unit of analysis in this thesis, is the transition from one stage of the capacity-building process to the next stage. The transition stages and anticipated involvement of the lecturers from each department is shown in Figure 6-1.
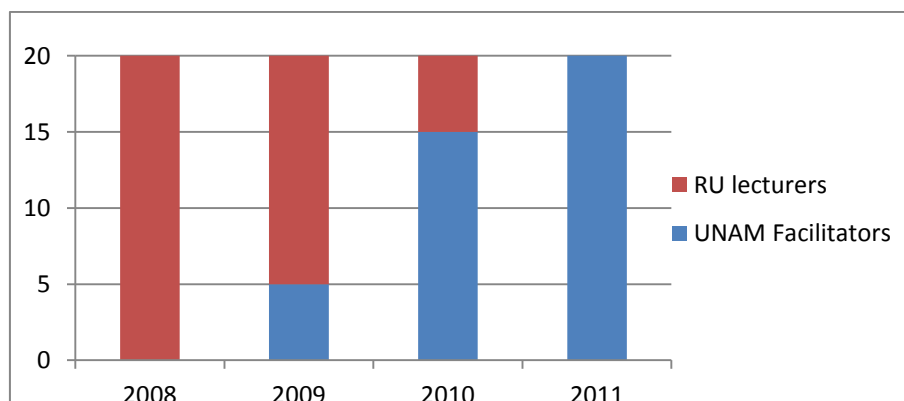
Figure 6-1: Expected number of lectures to be presented by the lecturers and facilitators in each year of the project

6.2 Choosing a virtual classroom solution

As explained in Section 5.1, the execution of the project activities closely adhered to the action research approach. This subsection reports on the activities corresponding to the Planning stage of action research. Prior to the SANTED Virtual Classroom Project, all Computer Science modules at the UNAM were taught using face-to-face delivery. This means that all students transitioning from the old curriculum to the new curriculum were all taught using the face-to-face pedagogical approach. In this approach, students and lecturers meet in a common lecture room at a common time for lecture sessions. During the presentation of the lectures, lecturers would normally use presentation software, such as Microsoft PowerPoint. Depending on the module that is being taught, they may demonstrate how certain software works to students. The lecturer may also use other tools such as the blackboard to further describe concepts and draw pictures that are not included in the presentation slides. The students themselves are not passive learners that simply sit and listen in order to accumulate all the content that the lecturer is presenting; they would actively participate in the lecture by asking questions, answering questions, taking part in polls, and providing further feedback to the lecturer.

The two departments initially aimed at identifying a solution that would offer the same face-to-face experiences that the students and lecturers were accustomed to. The ideal and appropriate virtual classroom would provide a functionality that closely matched the face-to-face approach currently used at UNAM. In Ramsden‟s (2003, p. 167) words, it should enable the lecturer to "make lecturing less like a lecture (passive, rigid, routine knowledge transmission)". Wenger (2001) argued that the success of a community of practice is firstly dependent on social, cultural and organizational issues, and only secondly on technological issues. In choosing a virtual classroom that supports a community of practice, therefore, he suggested that the requirements should first aim at addressing the social, cultural and organizational issues affecting the community, and only then focus on the specific features of the technological solution. In the VCP, the chosen solution would simulate the existing daily experiences of the lecturers and students in presenting lectures. The appropriate virtual classroom solution would not only need to support a pedagogical approach adapted in the case study, but it should match the technological realities and limitations of the implementation context.

6.2.1   Minimum requirements of the virtual classroom solution

What constitutes an appropriate virtual classroom environment depends on the context and purpose of use (Wenger, White, Smith, & Rowe, 2005). Determining appropriate virtual classroom solutions is further complicated by the continuous invention as well as evolution of existing virtual classroom tools (Schullo, Hilbelink, Venable, & Barron, 2007). As explained in Section 5.2.3, the process of choosing a virtual classroom solution appropriate for the VCP followed the cycle of inventiveness. The two project coordinators, one based at RU and the other at UNAM, performed the role of technology stewards, and were responsible for identifying the appropriate technology. They consulted with the lecturers at both institutions, and identified the minimum requirements of the virtual classroom solution (Thinyane H. , Mufeti, Terzoli, & Wright, 2010), which are discussed below.

6.2.1.1   Audio interactions between the participants

Voice interaction is the most important component of a synchronous virtual classroom (Schullo, Hilbelink, Venable, & Barron, 2007). The lecturer should be able to present the lecture by talking to the students, while at the same time the students should be able to interact by answering the lecturer"s questions, asking their own questions, or commenting on what the lecturer has just presented. Since the lecturers" pedagogical approach does not assume that the learners are passive listeners to be filled with knowledge (Ramsden, 2003), the virtual classroom solution should aim at maximizing opportunities for the learners to be active participants in the classroom. Two-way audio communication was therefore deemed an indispensable component of the virtual classroom solution appropriate for the VCP.

6.2.1.2   Video interactions of the remote sites

The ideal situation is for both ends of the communication to be able to view one another (i.e. the lecture can see all the students present in the classroom and the students can all see the lecturer). This enables the lecturer to get a feel of the presence of the students, as he/she can see who is attending the class, what they are doing and whether they are following the lecture or not. Even in this ideal case, however, Wainfain and Davies (2004) warned of the loss of non-verbal cues as a result of the use of technology. The transmission of video streams in a virtual classroom requires sufficient bandwidth, which is not always available or guaranteed in developing contexts (Lagebo, 2011).

6.2.1.3   Electronic whiteboard

McGreal and Elliott (2004) defined a whiteboard as a shared workspace which allows participants to create, manipulate and share graphical information in real time, while participating in a lecture or discussion. Bower and Richards (2005) argued that virtual classroom are appropriate for Computer Science education, which requires learners to develop not only subject understanding but also the procedural capacity to implement it. During a lecture session, participants can annotate on the whiteboard using various methods such as writing and drawing, and the whiteboard provides a synchronous view of the changes made to the space to all participants. In a lecture presented using PowerPoint for example, a lecturer may use a whiteboard to scribble, draw or demonstrate functionality that could not be directly done on PowerPoint. A whiteboard is a bandwidth intensive feature, however, and lecturers can still manage to teach without it. It is therefore only a nice-to-have feature in the context of the VCP.

6.2.1.4   Recording and playback features

Most lecture rooms at UNAM have lecture recording systems that enable lecturers to record live lecture sessions and make them available to students to download. In a typical lecture session, the system captures PowerPoint slides, writings on a whiteboard, and the lecturer's voice. After the lecture session, the recording is saved onto a desktop system, where the students are free to download it for review purposes. To ensure consistency with the current trend at UNAM, the record and playback functionality was therefore an important component. It is especially important in a virtual classroom because of the reported difficulty of concentrating in virtual environments (Halse, 2007). Recordings enable students to catch up on what they missed in class, to revisit new and complex concepts, and can be used for revision for tests and examinations (McNeill, et al., 2007). The recording functions that enable all students to play back the lecture whenever necessary was therefore also considered an important feature of the virtual classroom project.

6.2.1.5   Alternative ways of synchronous communication

A virtual classroom that offers alternative ways of communication that are not bandwidth intensive is crucial in the SADC context where bandwidth is currently considered insufficient (Twinomugisha, 2010). Alternative ways of communication are especially important to

ensure that when the bandwidth is not available to guarantee the minimum components of the virtual classroom, the participants can still communicate and are not left wondering about what is happening to the other participants. In this context, features such as chat rooms, where the participants can alert each other of breakdowns in communication, are essential.

6.2.1.6   Document and screen sharing

Document sharing enables the participants in remote locations to load and share common documents, while screen sharing enables the participants to share all or part of their desktops with one another, in real time. In the context of a lecture session, sharing of documents and desktops is important to enable the lecturer to use presentation software for the lectures, and in the case of programming modules, to demonstrate how to run a code segment and to enable the students to see the results of such executions. If the students are struggling with coding, they can also share their desktops with the lecturer to get assistance in real time. Screen and document sharing was therefore another feature considered critical for the VCP. It was essential to enable the lecturer to control the view and pace at which the lecture slides are browsed. Participants agreed that without this feature, it would be difficult for students that arrive late for lecture sessions to locate the correct slide in the lecture.

6.2.2   Product evaluation

At the time that the evaluation for an appropriate virtual classroom solution in the context of SANTED was carried out, several real-time synchronous tools were available. Many of these tools required the clients to subscribe to the classroom for a fixed period of time, and they had a fixed number of participants that can synchronously login to the virtual room. Systems that enabled local installation and management were prohibitively expensive. As discussed in Chapter 3, participants had originally planned to use video-conferencing as a solution, and did not have sufficient time to carry out extensive research on the available products before the commencement of the project. What was clear from the initial searches, however, is the paucity of empirically-grounded investigations or longitudinal studies aimed at identifying the feasibility of using specific virtual classroom solutions in developing contexts. The investigation leading to the appropriate solution was thus strongly influenced by the need to get on with the teaching. Five products that topped the Google search for the term "virtual classroom" at the time were selected for evaluation. These were: Elluminate, Wimba,

DimDim, WebEx and Adobe Connect. The project coordinators evaluated the five products on whether they met the minimum requirements of the features described in Section 6.2.1. In addition to the minimum requirements described above, the cost and possible configurations of the products were discussed with the suppliers. The features comparison and cost narrowed down the evaluation to three products that were within the budget of the VCP: Elluminate, Wimba and DimDim. In addition, system demonstrations were arranged with the suppliers and attendees distributed around the globe, as briefly described for each product below:

6.2.2.1 Elluminate

Elluminate offered a virtual room (Vroom) which is freely available for up to 3 concurrent users, with each additional participant requiring the purchase of a license. The Vroom provided synchronous video, and the main presenter could determine who has video access. During the system demonstration with the suppliers, the researchers were informed that Vroom allowed file transferring but did not allow a session to be recorded (as it later turned out, Vroom seems to have had a recording capability). According to the minimum requirements available at the time, Vroom required a minimum bandwidth of 28.8 Kbps for a low quality audio, which the existing infrastructure at both institutions could easily support. The required bandwidth for high quality audio and video was, however, more than the 512 Kbps that department at UNAM could afford.

Several trial sessions for Elluminate were conducted with participants in Grahamstown and Namibia. Each session was completed successfully, with reliable audio and slightly less reliable video. Like Schullo *et. al.* (2007), the most striking feature of Elluminate is the low bandwidth provision for contexts such as the one of the VCP, which allows automatic audio buffering when a video session is interrupted. When the connection is available again, it automatically speeds up to re-establish synchronous communication, and the participants catch up on all that they missed during the period that they were disconnected. Elluminate was not chosen, however, because it did not offer the recording and playback features considered essential in the context of the VCP.

6.2.2.2 Wimba

Wimba had all the minimum features required for the SANTED VCP. In addition, Wimba also had the following features:

- Follow-the-speaker detection switching, which automatically switches video to whoever is talking at the time;

- A telephone dial-in service for remote users to participate in a session (audio only); and

- An archiving feature, which enables the whole presentation session to be captured and archived, and replayed at a later date.

System demonstration by the Wimba suppliers involved participants located in four different countries: Holland, North England, the Project Leaders at RU (South Africa) and UNAM (Namibia) respectively. The Wimba server used for the demonstration was based in New York, but the feature set at the time proved to be richer than Elluminate and the tool worked reliably. The pricing of Wimba, however, was considered expensive in the context of the VCP, as it was outside the budgeted amount indicated in Appendix B.

6.2.2.3 DimDim

DimDim offered four different versions of its virtual classroom: free, professional, enterprise and open source. The free version offered audio conferencing for up to 20 participants and did not include any video connectivity. The professional version had video connectivity, and could be used for up to 100 simultaneous participants and was billed per participant. The enterprise version of Dimdim, the most expensive offering of the software, builds on the professional feature set, and was intended for larger institutions for local installations.

Testing for DimDim however did not work from the RU side. DimDim seemed to require participating computers to have direct, non-proxy server internet access. The participants at UNAM could connect and logon to DimDim, presumably because the internet connection there had no proxy restrictions. It could not be accessed from RU, preventing a similar comparison to be performed with RU. It was therefore deemed not usable under the configurations of the VCP.

6.2.3 Wimba as the appropriate virtual classroom solution

All three products evaluated met nearly all of the requirements described in Section 6.2.1 (see Table 6-1), apart from the recording and playback feature. Apart from the features, other factors, including the type of presentation done during the evaluation as well as the number and location of audiences participating in the virtual classroom, seem to have influenced the

outcome of the choice. At the time, what distinguished Wimba among the three products was its ability to support typical classroom activities planned in the SANTED Virtual Classroom Project in one integrated solution and it was the only virtual classroom software that could offer the recording and playback functionality required in this context. Both Elluminate and Wimba were considered good products but the team responsible for evaluation concluded that Wimba provided the best results and was the most feature rich. While the pricing of Wimba appeared to be at a premium compared to Elluminate, a pricing concession made Wimba the choice for the virtual classroom to be used in the project.

Table 6-1: Summary of comparison of features of the three virtual classroom solutions

Factor	Elluminate	DimDim	Wimba
Audio interactions	X	X	X
Video interactions	X	X	X
Document sharing	X	X	X
Screen sharing	X	X	X
Whiteboard	X		X
Alternative ways of communication	X	X	X
Recording and playback			X

6.3 First Stage of the Project: From Dependent to Guided Individuals

This section (corresponding to the acting and observing processes of action research approach) describes the activities of the VCP in the first year of implementation (the period from February 2008 to December 2008). As mentioned in Section 3.2, the implementation of the VCP was preceded by a planning process that began in 2007, which eventually resulted into a joint business plan between UNAM, RU and SANTED. Preparations for the implementation of the VCP commenced in January 2008 with the process of acquiring the required infrastructural equipment, including: securing of a dedicated broadband line for the project, recruiting project participants, securing a venue for the delivery of lectures and the activity of selecting a virtual classroom solution. Video-conferencing was considered as a delivery mechanism because it has already been widely used in other geographically dispersed institutions and it was available both at UNAM and at RU. (The video-conferencing system at UNAM was, however, only based on Integrated Services Digital Network (ISDN) standard, while the system at RU offered a converged Internet Protocol (IP) environment.) UNAM had a centralized video-conferencing venue that required booking for

every lecture session, and its availability was not guaranteed for the activities of the SANTED VCP. The video-conferencing system at RU, on the other hand, was exclusively used for the activities of the Department of Computer Science. Both departments had also decided against the purchasing and installation of new video-conferencing systems because of the Cost of Ownership involved in their acquisition. Because the lecturers and students were coming from different institutions, it was expected that the lecturing timetable would require continuous negotiations among the participants. It was thus necessary to ensure that the chosen technological solution is available at any time of the day that they were available for a session. It was also necessary to select a technology that would minimize total Cost of Ownership, while maximizing flexibility and promoting greater interactions between the participants in a virtual classroom. The choice of a dedicated computer laboratory equipped with facilities that enable Computer-Mediated Communications (CMC) therefore became a favourable choice for delivering lecturers in the project. These facilities included a connection to the internet, as well as multimedia computers with a camera, a microphone and a set of headphones (see Figure 6-2).

Figure 6-2: A typical computer setup for use in the delivery of lectures

In accordance with the rules and regulations of SANTED, half of the funds earmarked for the project for the year were disbursed to RU in March 2008. As discussed in Section 3.2.3, SANTED transfers all the funds to the lead institution, which was RU in this case, and the other beneficiary institution (which is UNAM in this case) can get access to the funds by putting in a formal request invoice through their institution‟s Finance Department. To enable this process, it was essential for both institutions to create project accounts with their institutions. Creating the project account at UNAM initially took longer than expected, and in the month of April, the two departments agreed to start the process of equipment acquisition

directly by RU from South Africa to Namibia. This process however resulted in even more delays in the fulfilment of computer equipment orders, where the suppliers failed to process the correct documentation that would allow exportation of the equipment to Namibia. This resulted in customs hold-ups with couriers at the South African-Namibian border, resulting in late acquisition (only in the month of June) of the computer equipment at UNAM.

The project was officially launched in July 2008 in Namibia, at an event that was attended by the Director of SANTED, the senior management of the UNAM and the Coordinator of the Telkom CoE at RU. At the same occasion, a Memorandum of Understanding between the two universities (and not simply the Departments of Computer Science) was signed to enable the two institutions to collaborate in teaching and research. Teaching of the first module commenced a day after the project was launched.

6.3.1 Activity systems for the first stage

This section uses activity theoretical concepts to model the activity systems for the first year of implementation. As mentioned in Section 4.1, activity systems are modelled from the point of view of the subjects. There were four main subjects (groups of participants) in the project for the first stage: students, lecturers, facilitators and the project coordinators. The activity systems are modelled from the perspective of these groups of participants.

The first activity system (Figure 6-3) is modelled from the perspective of the students. Each student"s ultimate aim is to pass the course with good marks that will enable them to qualify for MSc registration at RU, and eventually, to become a lecturer at UNAM. They achieve this objective by attending classes delivered by the lecturer, and by working to satisfy the module requirements. They have different tools that will enable them to reach their objective including the lecturer who teaches, the facilitator who provides them with pedagogical assistance, the virtual classroom (which has the content), the lecture notes, books and the recorded DVDs that they use to achieve their objectives. Their community includes the other students, their lecturers, the project coordinators, and their facilitators. They are also governed by UNAM rules and regulations, as well as the SANTED project rules.

Tools
Lecturer,   Facilitator,   Virtual
Classroom, recorded DVDs

Subjects
Individual Students

Object
Pass courses with
good marks

Outcome
Register for MSc at
RU

Rules
UNAM and RU Rules
Project rules

Community
Other students, Lecturer, Facilitator,
Project coordinator

Division of Labour
Student attends classes
Lecturer teaches class
Facilitator assists student

Figure 6-3 : Individual student's activity system in 2008

The second activity system is modelled from the point of view of lecturers and is shown in Figure 6-4. The objective of the lecturer is to teach the module to registered students, while at the same time, supporting the professional growth of the facilitators through teaching and mentoring. The lecturer uses the virtual environment, the course content that they have prepared, the different teaching techniques and communication tools to achieve their objective. They prepare the lectures, assess the students, have discussions with the facilitators regarding the course content and the students, and assess the capacity-building process. In addition, they observe the lecturing time table, and other institutional rules and the rules of the project. At the end of the year, the intended outcome is to have students that have passed their module, and instructors that have gained the required competencies to present at least two topics the following year.

Tools

Facilitator, Virtual Classroom, recorded DVDs

Object

Build capacity

Outcome

Students Pass Courses
Facilitators able to teach courses

Subjects

Lectures

Division of Labour

Lecturer delivers class and mentors
Facilitator assists students
Students attend to module requirements
Project coordinator manages project

Rules

Lecturing schedule
Institutional rules

Community

Lecturer, Facilitator, Project coordinator, Funders

Figure 6-4: Lecturer's activity system in 2008

The third activity system is that of the facilitators, and is modelled in Figure 6-5. The facilitators act as a link between the students and the lecturers, but their main objective is to acquire the required knowledge and competencies to enable them to teach the new topics by the beginning of the following year. The facilitators assist the students with their assignments, ensure that the students and the lecturers have an agreed timetable, that the students are in the venue at the time of class, that the class takes place as planned, and inform the students or the lecturer if there is anything preventing the class from taking place. In addition, the facilitators also ensure that assessment of the students is done according to the agreed rules and regulations. All the other duties of the facilitators before, during and after the class session are shown in the facilitator's expectations presented in Appendix D.

Tools

Other Facilitators, Virtual
Classroom, recorded DVDs

Object

Subjects

Facilitators

Attend all
sessions

Outcome

Developed   some
competencies

Division of Labour

Rules

Keep lecture Times

Hand in work on time

Community

Other   Facilitators,   Lecturers,

students, Project coordinators

Facilitator links student & lecturers
Lecturer delivers class
Students attend class

Figure 6-5: Facilitator's activity system in 2008

The activity system for the Project Coordinator for the first year of implementation is modelled in Figure 6-6. The ultimate aim of the Project Coordinator is to ensure that all the project requirements as described in the approved business plan, as well as all the institutional requirements for RU and UNAM are met. The desired outcome is for all students to pass all their modules for 2008, and that at least two of the students would qualify for registration with RU at the end of 2008. It is also the Project Coordinator's hope that all the modules will be taught and implemented smoothly, that the facilitators would attend all the lecture sessions, and that the lecturers would teach all their scheduled sessions using the virtual classroom by the end of the year.

Tools

Virtual Classroom,
recorded DVDs

Object

Meet project
Requirements

Subjects

Project Coordinators

Outcome

Students qualify to register
at RU
All courses taught
Facilitators attend sessions

Division of Labour

Lecture present courses
Student attend classes
Facilitator manage project

Rules

Project Implementation Plan
Institutional Rules

Community

Students, Lecturers, Facilitators

Figure 6-6: Project Coordinator's activity system in 2008

6.3.2 Subjects of the activity system

As explained in Section 6.3.1, there were four main types of participants in the project in 2008: the students, the facilitators, the lecturers, and the project coordinators. All students in their final year of studies as well as the tutors in the department at UNAM were informed of the project, and were requested to formally indicate their interest in participating as students in the project. From the many that applied, five students were selected to participate in the project. Of the five, three were final-year students in Computer Science, while two were employed as Computer Literacy staff members in the department at UNAM. Neither staff member had their first degree in Computer Science: one had a background in Electrical Engineering while the other had a Bachelor of Science in Information Systems. The three students, on the other hand, were chosen from the final-year students, preferring students who had already completed their Computer Science major, and each having fewer than 5 modules left to complete their BSc Degree with UNAM.

The four modules were presented by five lecturers from RU, with one of the modules, Real Time Multimedia, shared between two lecturers. All the lecturers had presented the same modules to students based at RU over the previous few years. All but one of the lecturers had also taught using a virtual classroom environment before, with most of them having worked

for the CoE to deliver modules to students at the University of Fort Hare using video-conferencing. In the sessions with Fort Hare, the lecturers had contact with up to 15 participants in a single session.

Before the modules commenced, an email was sent to all five of the lecturers in the department at UNAM to indicate their interest in participating in the project as facilitators, as well as the modules that they would like to facilitate. Only four lecturers indicated their interest in facilitation. Apart from the networking module, the facilitators indicated that they did not have previous experiences in the three other modules, which were only now introduced as part of the new curriculum. All of them also indicated that they had not facilitated an online module before. An in-house induction session was therefore held with the facilitators to explain their roles, responsibilities and expectations in the module.

As explained in Section 3.4, SANTED required one project coordinator to be nominated from each institution to oversee the implementation of the project. The coordinators were selected from the team that drafted the initial proposal for funding to SANTED. They were responsible for managing the project activities, engaging the critical people required to make the project a success, as well as monitoring the day-to-day logistics of the project.

6.3.3   Objectives and desired outcomes of the activity system

The objectives and desired outcomes of the activity system are different, depending from whose perspective the activity system is viewed (Engeström, 1996). As explained in Section 4.1.1.2, examining the individual tasks or activity systems of different subjects will not necessarily reveal the collective motive of the activity system; it may, in fact, make it to appear contradictory to the collective motive. This is often the case, because individuals participating in the activity system have their own motives and intentions. For the lecturers, the motive was to enable the students and the facilitators to learn through the presentation of lectures. For the students, the aim was to pass the modules so that they could be given an opportunity to continue their Master of Science degree at RU and later to join UNAM as staff members. For the facilitators, the aim was to transform their understanding of the subject to enable them to gradually take over the modules after the project. Given these three different perspectives, then, the summary of the collective motive for this period was to commence with the capacity-building process in a virtual environment, to ensure that at the end of the

year, at least two of the students that participated in the project are given an opportunity to pursue their Master of Science degree at RU, and that the facilitators get an initial understanding of the content and are exposed to the different presentation styles of these modules.

6.3.4   Rules and division of labour

As explained in Section 4.1.1.2, rules are an important component of the activity system, because they define the expectations, regulations and conventions that guide the actions and interactions among the participants. Having clear rules clarifies the partners" expectations of one another, and it also garners their willingness to enact and adhere to the objective of the partnership (Huxham & Vangen, 2005). During this stage of the project, however, there were no formal rules distributed among the participants of the activity system, apart from the expectations highlighted in the funding proposal. Rather, the rules were agreed mostly verbally, or by email, whenever it became necessary.

Division of labour is also crucial because it clarifies why different individuals are involved in the activity system by delineating the roles and responsibilities of each subject working together to achieve the objective. From the onset, the participants agreed on maintaining the traditional didactic approach to learning: the lecturers would prepare the contents of the lectures and present the lectures to the students at an agreed time. In addition to attending each session of the module, the facilitators would ensure that the students and the lecturers agreed on a common time for lectures and other discussion sessions, and assist the students with the technological setups in the classroom, submission of questions and discussion topics to the lecturers when necessary, and act as a communication link between the lecturers and the students when there was a change in the scheduled time of the sessions (which could be necessitated by connectivity failures or general cancellations). The students on the other hand were expected to show up for lectures on time, inform at least the facilitator if they would not be able to make it for a session, and to submit their assignments and tests to the facilitator on time (a typical session is shown in Figure 6-7). As discussed in Chapter 7, these rules were not adhered to all the time by all the participants, sometimes causing tension and conflicts among the participants.

Figure 6-7: Typical session in the virtual classroom

6.3.5   Tools and artefacts used

As described in Section 3.4, the initial implementation plan envisaged the use of a single virtual classroom solution in the project. Due to the unavailability of the virtual classroom solution, however, it was not possible to adhere to the implementation plan. As a result, the lecturers experimented with the different technologies and teaching methodologies, in order to identify the ones that best support or are aligned with their model of teaching and learning, as well as the structure and activities in their modules. As a result, the tools and artefacts used were different for each module. For each module, this section will therefore describe the technologies used and how they were used, and the students" and facilitators" experiences of using such technologies.

6.3.5.1   Real Time Multimedia

The delivery of the first lecture in the first module of the VCP, Real Time Multimedia, coincided with the launch of the project in July 2008. The lecturer for this module was also in Windhoek to attend the project launch. The lecturer took advantage of his physical presence in Windhoek to deliver 3 face-to-face lectures, while the rest of the lectures were delivered using the Wimba Virtual Classroom, which at the time, was the solution recommended by the team responsible for selecting the virtual classroom. A sample picture of Wimba is shown in Figure 6-8.
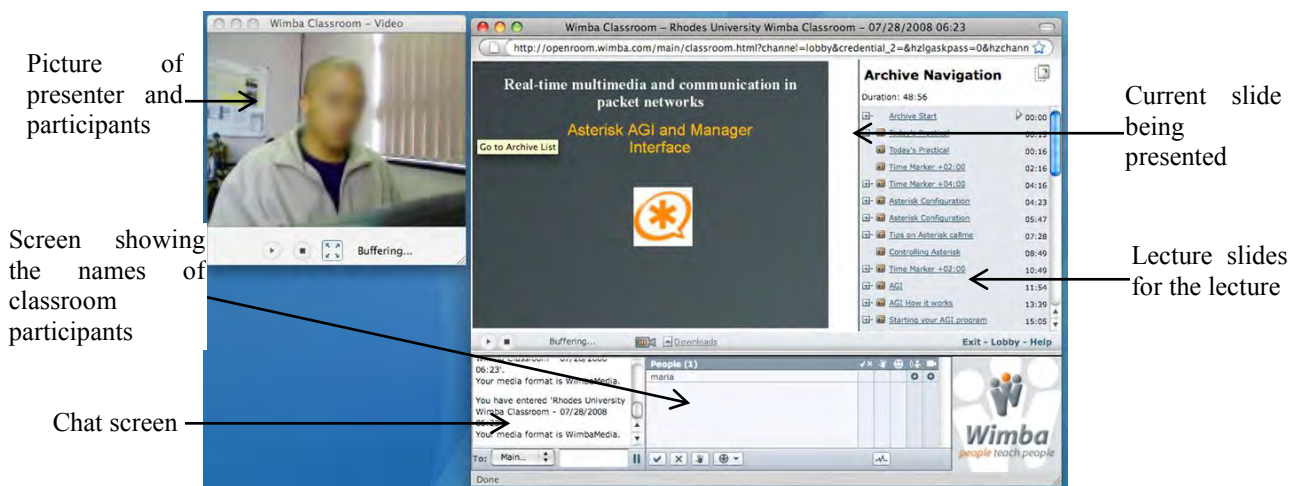
Figure 6-8: Screenshot of Wimba Virtual Classroom

During the lecture sessions, the lecturer uploads a PowerPoint presentation into Wimba, which is then shared between the students and the lecturer. Wimba allows the lecturer to control the order of the presentation, which automatically switches to the next slide for all the participants once the lecturer has moved to the next slide. In addition, the lecturer can share a web page and a whiteboard, and use the polling functions to ask students questions. Wimba also provides multi-way video interactions between the lecturer and the students. When a participant‟s video camera is broadcasting, the video icon next to their name blinks to indicate who is talking, which is an essential feature for the lecturers to be able to refer to the students‟ names. In addition, Wimba has a Follow-the-speaker feature, which enables the video to automatically switch to show the person who is talking. Wimba enables recording, archiving and playback of the lectures.

Despite the dedicated 2048 Kbps line acquired specifically for the virtual classroom project, however, it was not uncommon to find disruptions in the connectivity of the application. Out of the 28 sessions delivered for the module, at least five sessions were interrupted. Participants in a virtual partnership depend only on technology for communications, which makes disruptions in connectivity, even if it is just in one session, unacceptable. Disruptions in this case brought the activities of the collaborative session to a halt – one of the students compared it to coming to a physical building to a lecture session, where both the lecturer and the students are present, but the meeting place has a series of problems which prevent participants from seeing or hearing each other. From the observations made and the questionnaires distributed to the students, these disruptions included the system freezing, necessitating all participants to disconnect and then reconnect. The lecturer further expressed

concern that the virtual environment did not enable free experimentation. Students could not concurrently participate in the virtual classroom while running a different program on the same computer, without running the risk of disconnecting from a session.

6.3.5.2 Computer Networks

This module was delivered using a blended model of lecture delivery. The blended model uses a combination of online delivery with face-to-face contact time (Pallot & Pratt, 2007). The first five lectures were delivered using the Wimba Virtual Classroom solution, although technical problems experienced. After the delivery of these lectures, however, tension began building up among the participants as a result of connectivity problems. In some sessions, the lecture session would start reliably but as time elapsed, the voice and video quality would degrade, leading to a breakdown in communications. Eventually, the participants agreed to gather around a single computer with a single microphone and speakers, a configuration which temporarily seemed to work for both the lecturer and the students. When further problems regarding bandwidth instability were experienced in this new configuration, however, the lecturer resorted to lecture recording, where 8 hours of lectures were recorded on a DVD and couriered to the students at UNAM. Included in the DVDs were "screen-shot-with-commentary" sessions used to demonstrate and provide walkthroughs to assist students with their practical work. At the end of the module, seven hours of face-to-face lectures were delivered at UNAM over three days. In addition, all the lectures that were presented using the recordings on a DVD were supplemented with virtual classroom time (using Skype) for discussion and questions around the recorded lectures.

For this course, only the first three lectures were successfully delivered using Wimba. In subsequent lectures (the two other lectures that were delivered using Wimba), a session would start reliably but as time elapsed, the connectivity would completely drop, hindering interaction between the participants. In some occasions, the video and audio quality degraded, necessitating a restart of the system. The system also seemed to work more reliably during certain hours of the day (e.g. better in the morning than in the afternoons), as well as when there was only one stream instead of five video streams entering the UNAM network. To ensure that participants spent less time worrying about connectivity and dropped sessions, Skype was eventually used for discussion purposes, after the students had watched the recorded lectures.

6.3.5.3 Java Enterprise

This module was also taught using a blended model of lecture delivery. All the lectures were delivered and recorded using the Wimba Virtual Classroom solution. As explained in Section 6.3.5.2 however, however, bandwidth instability was experienced at UNAM on a daily basis, by the time this module was delivered, making it impractical and impossible to have all students connected to Wimba from their own computers. In some lecture sessions, the lecturer logged in at RU and pre-recorded the lecture session for the students. The students would then access the lecture through the archive, and discussions about the lecture would be held at the next live session. To access the archive, students would, during lecture times, assemble around a single computer connected to a big screen with speakers that was later installed in the lecture room.

In addition to focusing on the principles of the Java programming language, the lecturer wanted to demonstrate programme behaviour in written code. The lecturer wanted to be able to share the screen with the students. The application sharing component of Wimba was very slow, however, that it could not be used during lecture sessions. Although no other tools were investigated, the lecturer together with the students, agreed to use VMware freeware to virtualize the desktop. VMware was used on a separate computer to demonstrate programming code. Shifting between the two computers was at times cumbersome for students. The lecturer nevertheless indicated that they managed to demonstrate the programming principles using this method.

6.3.5.4 Human Computer Interaction

Human Computer Interaction was the last module presented in 2008. The lecturers that presented the previous three modules had shared their stories with the lecturer for this module, and she decided against it even before she started. The lecturer indicated that she did not want interruptions in her modules, and rather opted to pre-record all her lectures on a DVD and courier them to the students before the module began.

Two weeks after the students were given the content, discussion sessions were arranged with the lecturer over Wimba. Three sessions were arranged in total, and none of them were successful due to the inability to connect to the Wimba virtual classroom. The lecturer travelled to Namibia instead, and where face-to-face discussions were held with the students.

6.3.6   Outcomes of Stage 1

This subsection reflects on the processes and consequences of the first year of the project implementation (corresponding to the reflection stage of action research approach). By the end of the first year, both institutions had partly integrated the SANTED VCP project into their institutional operations. Each institution had created a separate budgetary account for the project, and the technological infrastructure required for the project was procured and set up. A dedicated 2048 Kbps ADSL line was acquired at UNAM before the modules started. A dedicated computer lab for the delivery of SANTED VCP modules was set up at UNAM, while the lecturers at RU continued using their offices for the delivery of the lectures.

Five students were registered for the four modules offered in the project. Two of the students (who were both staff members at UNAM) indicated their intention to discontinue with project, citing the challenges associated with online learning experiences. Ramsden (2003) has argued that switching from familiar to new teaching and learning environments can change the dynamics of learning. The real reason, could however, be that they faced challenges in devoting sufficient time to the project, since they were working fulltime. Section 2.3.5 has shown literature to support that employment and work conflicts can negatively affect online students (Schrum & Hong, 2002). As explained in Section 6.3.2 also, both of these students did not have a background in Computer Science. These two students dropped out by the time that the presentation of the third module commenced.

All four modules were presented by the lecturers at RU to the students at UNAM, using different technological tools for presentation. Initial relationships between the facilitators and lecturers had started to develop, and two facilitators indicated their interest in starting joint research and possible registration for PhD research in Human Computer Interaction and Networks with the lecturers at RU. At least one staff member at UNAM was registered for a PhD in Information Systems with RU at the end of Stage 1, with the PhD thesis (this thesis) focusing on determining how similar interventions linking universities across Africa, using recent developments in telecommunication may be used to reduce the problem of distance.

6.3.7   Implementation discrepancies

This section discusses four discrepancies in the implementation plan, experienced in the first year of implementation.

6.3.7.1 Single-major BSc registration

At the early stages of the project, it became apparent that the Computer Science department at UNAM did not follow the necessary procedures for enabling the students to participate in the project. Although the project was supported by the management of both universities from the onset, registering final-year students for a single-major degree in 2008 needed additional approval. At the commencement of the project, the department at UNAM was not aware that it needed to seek special permission to exempt it from the new curriculum implementation plan from the UNAM Senate and Council, as this could not simply be approved at the management level. This realization temporarily brought the project to a halt, as the immediate aim of the project was exactly that: to enable students to graduate with a single-major degree that is equivalent to a Bachelor of Science Honours, so that they could proceed to register for a Master of Science qualification. UNAM Management was adamant, however, that registration requirements could not be changed without having followed the correct procedures. It was however possible for the students to register for additional modules in the project for non-degree purposes, if they can do so above their normal work load of a BSc degree.

Huxham and Vangen (2005) have argued that disagreements in the early stages of collaborative projects can lead to suspicions and mistrust between partners. They suggested that the partners need to nurture the partnership, and to ensure that they do not make decisions that jeopardise the outcome of collaboration. In order to enable the continuation of the project, the two departments agreed to change the requirements for participating in the project. Both departments agreed that allowing students to register for both the modules of the double major and the modules offered in the project would make the students" workload unbearable. The target group was therefore changed to cater for this new constraint imposed on the project. The project targeted students that had a lighter load to carry in their final year of studies. A lighter load in the final year for students at UNAM is possible only under two circumstances: if a student has passed some of their final-year modules but failed to pass other modules, or if a student has changed their majors in their second year of study, enabling them to be ahead of completion with one major. While this requirement enabled the students to participate in the project, it forced a compromise on the choice of best students that were initially required for the project.

UNAM"s inability to offer the single-major BSc in Computer Science degree as originally agreed in the implementation plan had another negative effect on the commitment of the students. Students had varying workloads depending on their situation and progress with their other major. Students with a lot of modules did not always attend to the activities planned for their modules in the VCP. If the students had a test in one of their credit-bearing modules, for example, they would not attend classes for that day, as they would need to use the extra time to dedicate to their credit-bearing modules. This is consonant with the findings of Andreassen (2000) and Hiltz and Wellman (1997), where students were reported likely to miss classes offered through a virtual environment if they had more "important" tasks to attend to.

6.3.7.2 *Using the Wimba Virtual Classroom solution*

The interviews held with the participants as well as the questionnaires handed out to the participants revealed that the chosen technological solution, the Wimba Virtual Classroom, did not meet the expectations of the participants in terms of availability or accessibility. Initially, the students and the lecturers used the virtual environment with enthusiasm, and described it as being "great". While Wimba worked well for the first modules, however, its availability and quality of presentation gradually decreased, to the disappointment and frustration of the participants. As a result, the lecturers were forced to innovate and find more appropriate ways of delivering lectures. As reported in Section 6.3.5, some lecturers resorted to using asynchronous modes of delivery due to the unavailability of Wimba. In the modules where the students had to gather around a single screen and the video was turned off, the lecturers reported that they felt the technological tools did not give a sense of presence. Wimba showed only the picture of a person talking to all the members of a group, enabling the students to see the lecturer but not allowing the lecturer to see the students. The lecturers also indicated during interviews that they often did not know who was present in the class and who was not.

6.3.7.3 *Participation of facilitators in lecture sessions*

It was assumed that facilitators would attend all the lecture sessions in their modules for capacity-building purposes. The project coordinators initially felt that since UNAM was the direct beneficiary for the project, the facilitators should not be paid for attending the sessions, and their payment was excluded from the project budget. Observations revealed, however, that not all facilitators attended all the sessions. During the interviews, the facilitators

indicated that they still carried their full workload with the department, and their other commitments did not leave them with enough time to fully engage with the project. As a result, the lecturers in some sessions worked directly with the project coordinator because of the absence of the facilitators. A discussion in one of the meetings with the funders, however, identified one more possible reason for the lack of commitment from the facilitators: there was no direct benefit attached to the participation in the project.

6.3.7.4 Students' participation in lecture sessions

It was assumed that all students would attend the scheduled lecture and discussion sessions, and that they would work hard to meet all the module requirements. The project coordinators, the facilitators and the lecturers had assumed this because of the following reasons: 1) students had volunteered to participate in the project; 2) students were given funding for the year to complete their studies; 3) students had an opportunity to further their studies at RU once they successfully complete all their modules and meet the MSc admission requirements at RU; and 4) students had an opportunity to secure guaranteed employment with UNAM once they complete their studies. These four reasons did not, however, serve as a good motivation for the students to actively participate in the project and to complete their modules. Participation was good in the first two modules, but slowly started declining by the time the third module was completed. At the end of the year, two of the five students had completely dropped out of the project.

6.3.7.5 Students registration at RU

At the end of the first year of the project, at least two students should have qualified for registration for MSc degree at RU. At the end of 2008, however, none of the five students that were registered in the project had qualified to graduate with a Bachelor of Science, which was a requirement for registration at RU. Although the three students that completed all the project modules had passed all their Computer Science modules required for BSc, and some had performed reasonably well in the modules offered through the project, they had failed modules from their second major and could not be awarded a degree. As a result, the project failed to meet the initial requirement of sending at least two students to RU by the end of the first year.

6.4 Second Stage of the Project: From Guided to Assisted Individuals

This section presents the activities of the second cycle of implementation of the Virtual Classroom Project, the period from January to December 2009. In accordance with the action research approach, the participants from the two departments met to discuss their experiences, problems and challenges encountered in the first year of implementation. It was these challenges and experiences that were used to set the direction and priorities for 2009.

One of the problems raised by the lecturers and students during the structured interview process as well as in the questionnaire (see Appendix C) in 2008 was the insufficient time to complete the activities planned for that year. Students claimed that the four modules presented consecutively over a period of four months at their busiest time of the year adversely affected their performance in the project. The module schedule was therefore changed and spread over the year of 2009 to ensure that students and lecturers had sufficient time to cover the content of the modules. Instead of having four consecutive modules presented over a period of four weeks each, the schedule was spread, with breaks in between, as shown in Table 6-2.

Table 6-2: Module Schedule for 2009

Dates	Module
2 March–29 March	Enterprise Java
4 May–30 May	Computer Networks
27 July–23 August	Real Time Multimedia
14 September–11 October	Human Computer Interaction

Another concern raised was the selection process of student participants in the project. Firstly, racial imbalances were noted in the Department of Computer Science at UNAM in 2008, where all Namibian staff members in the department were descendants of one tribe. There was therefore a need to ensure that other tribes and races that are represented among the students were not discriminated against during the selection process. Secondly, due to poor student retention rates and poor performance in the modules experienced in the previous year, the lecturers at both institutions agreed that the students" workload outside of the project should not exceed a total of three modules per year.

Another issue of concern from 2008 was that of the commitment of the facilitators. Facilitators sometimes missed the lecture sessions for the project, citing clashes with their existing timetables and their existing workloads that made it difficult to devote sufficient time to the project. Kezar (2005) suggested developing rewards to provide incentives and enforce accountability. The goal for 2009 was also to ensure that there were incentives for the facilitators to participate in the project. This was done using two methods: firstly, the department at UNAM agreed to recruit part-time lecturers to ensure that they had at least one module less of the full workload (as approved by UNAM) thus enabling them to attend to the needs of the project; secondly, an honorarium was introduced as a financial incentive for all participating facilitators; thirdly, personal development of individual lecturers focused not only on improving knowledge and skills, but more time would be devoted to activities that would facilitate acquisition of new qualifications (personal development is believed to be more important than financial rewards in academic environments (Kezar, 2005)). In addition, the project coordinators also developed a facilitator and a student manual, highlighting the expectations, roles and responsibilities of all parties as well as the objectives of the project. A sample of the facilitator‟s expectations is shown in Appendix D.

One of the challenges facing the students in 2008 was poor programming skills. The two departments jointly agreed that the students should get a programming crash course at the beginning of the year, before they even began with the lectures in the project. They also agreed that modules with the programming component should be offered in Java, rather than C#, which was used in the previous year. This was done because the students had used Java programming in their previous years of study at UNAM.

The two institutions also jointly decided to pursue the attempt to make the modules credit-bearing for both institutions. The lecturers felt that as long as the modules were not credit-bearing, the students would not feel obliged to attend the lectures offered in the project. The modules were bearing credit at RU, since students that successfully complete the project would be allowed to register directly for MSc studies, without having to do the Honours degree first. Passing a module through the project, however, did not add any benefit to the students‟ academic record, as far as UNAM was concerned. As a corrective action for the second stage of implementation, the two departments decided to jointly pursue the process of making the modules credit bearing at UNAM.

6.4.1 Activity systems for Stage 2

This section uses activity theoretical concepts to model the activity systems for the second year of implementation. Like the first year, the second year also had four main subjects (groups of participants) in the project: students, lecturers, facilitator and the project coordinators. In addition, the funders also played a critical role in setting the direction of the project. The activity systems are modelled from the perspective of these groups of participants.

The first activity system is modelled from the perspective of the students. As in 2008, each student‟s ultimate aim in 2009 is to pass the course with good marks that will enable them to qualify for MSc registration at RU, and eventually, to become a lecturer at UNAM. They achieve this objective by ensuring that they attend classes delivered by the lecturer, and satisfy all the module requirements. They have different tools that will enable them to reach their objective including the lecturer who teaches, the facilitator who provides them with pedagogical assistance, the virtual classroom (which has the content), the lecture notes, books and the recorded DVDs that they use to achieve their objectives. They are also governed by rules such as the class timetable, examination timetable, and all the other project rules as well as UNAM rules and regulations. The activity system for the students is similar to the one shown in Figure 6-3, and is thus not shown again in this section.

The second activity system is modelled from the point of view of lecturers (see Figure 6-9). The objective of the lecturers in 2009 is to teach the modules to registered students, while at the same time, ensuring that the facilitators are acquiring the required competencies to teach the modules once the project has come to an end. In addition to the roles and functions played in 2008, the lectures were also expected to monitor the professional growth of the facilitators. They were expected to give a chance to the facilitators to present at least two lectures in their module, and to engage and involve them in the preparation, presentation and assessment of the course content, which can facilitate learning and motivation (Ramsden, 2003). At the end of the year, the intended outcome is to have students that have passed their module, and facilitators that have gained the required competencies to present the full modules by the following year.

Tools

Facilitator,   Virtual
Classroom, recorded DVDs

Object

Teach modules

Monitor capacity

Outcome

Students Pass modules
Facilitators able to teach
modules

Subjects

Lectures

Division of Labour

Lecturer delivers class and mentors
Facilitator assists students
Students   attend   to   module
requirements
Project coordinator manages project

Rules

Lecturing schedule
Institutional rules

Community

Lecturer,   Facilitator,   Project
coordinators, Funders

Figure 6-9: Lecturer's activity system in 2009

The third activity system is that of the facilitators, and is modelled in Figure 6-10. In the second year, the facilitators" aim was still to act as a link between the students and the lecturers, but their main objective was to demonstrate that they are in the process of acquiring the required knowledge and competencies to enable them to teach the new topics by the beginning of the following year. The facilitator continued to assist the students with their assignments, and to ensure that the participants had an agreed timetable, were in the venue at the time of class, and to inform participants of changes in the daily routines. An additional object of the facilitator for the second year was the co-presentation of at least two lectures with the main lecturer.

Tools

Other Facilitators, Virtual
Classroom, recorded DVDs

Subjects

Facilitators

Object

Attend all sessions
Present five lectures

Outcome

Developed some
competencies

Division of Labour

Facilitator links student & lecturers
Lecturer delivers class
Students attend class

Rules

Keep lecture Times

Hand in work on time

Community

Other Facilitators, Lecturers,

students, Project coordinators

Figure 6-10: Facilitator's activity system in 2009

The next activity system is for the project coordinator, and is shown in Figure 6-11. As described already in Section 6.3.1, the ultimate aim of the Project Coordinator was to ensure that all the project requirements as described in the approved business plan, as well as all the institutional requirements for RU and UNAM were met. For the year 2009, however, the project coordinator was also supposed to ensure that the goals set for the year (including making the modules credit-bearing and ensuring that all participants are engaged in the project) are achieved. Ultimately, the project coordinator's wish was for all students to pass all their modules, for at least two students to qualify for registration with RU at the end of 2009, and for the lecturers to demonstrate that they were able to co-teach some of the topics presented in 2008.
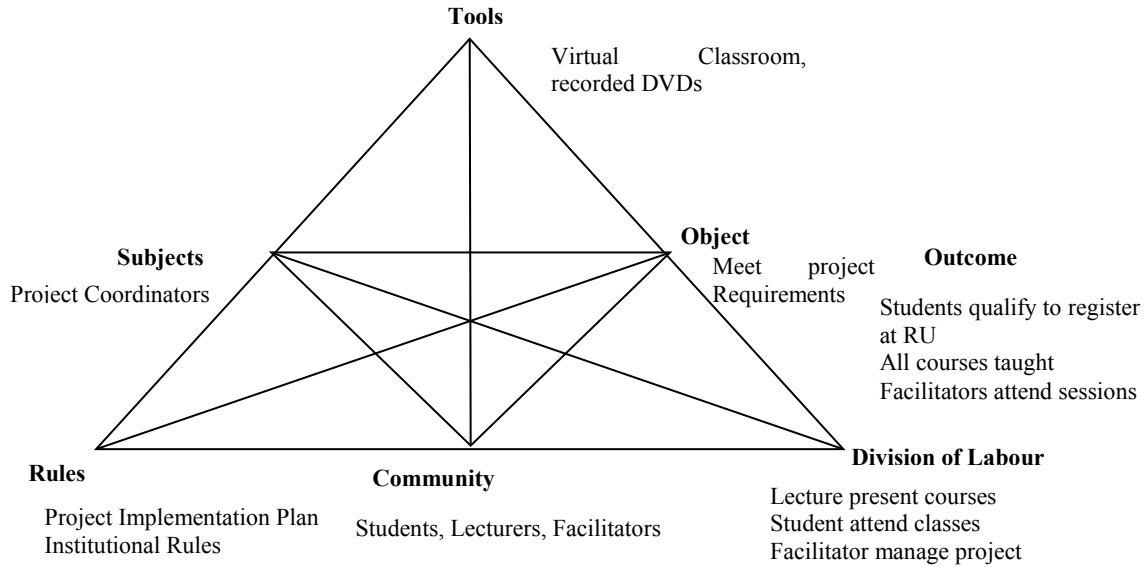
Figure 6-11: Project Coordinator's activity system in 2009

6.4.2 Subjects of the activity system

All four lecturers that offered the module from RU in 2008 volunteered to do the same in 2009. Due to the heavy workload, however, the project coordinator at RU could no longer participate, and a new project coordinator was appointed. The project coordinator at UNAM and all the facilitators that participated in 2008 were retained for 2009, because of the planning for Stage 2 which required all participating facilitators to take over some of the lectures presented in 2008, in 2009.

As per the requirement of the UNAM management, the student population was more representative in 2009. Among the five students selected for the project, two were Oshiwambo-speaking, one Kavango-speaking and two Caprivian-speaking students as shown in Table 5-1. Of these, three were female students and two were male. Three of the students had two modules outstanding outside of Computer Science, one had a single module in Computer Science and the other had a first-year Biology module that they needed to complete in order to meet the requirements for a BSc at UNAM. This was in line with the requirements for 2009, to ensure that the students" workload did not prohibit them from attending lectures.

6.4.3   Objectives and desired outcomes

The objectives for the students in 2009 remained the same as in 2008. The students" immediate goal was to ensure that they pass all their modules, while the medium term was to ensure that they graduate from UNAM and get admission at RU, and the long term was to become a staff member in the department of computer science after completing their M.Sc.

For the lecturers, the goal was to enable learning both for the students and the facilitators. For the students, they wanted to make sure that the students understood the lecture content well enough to complete their assignments and pass their exams. For the facilitators, they wanted to hand over at least four lectures from each module to be taught from UNAM, with the lecturer at RU acting as an observer in those modules, and giving constructive feedback on the presentation afterwards.

The facilitators had three main goals for 2009. Firstly, they wanted to continue learning and exchanging ideas on the presentation of the modules with the lecturers. Secondly, each wanted to identify a topic of interest that they could pursue together with the lecturers to enable them to register for a higher degree at RU in 2010. In addition, the facilitators wanted to ensure that the students perform well in 2009 to meet the project targets for the year.

6.4.4   Rules and division of labour

Unlike the first and second year of study, the roles and responsibilities for the facilitators and students were clearly stipulated in a SANTED Lab Guide that was developed by the coordinators and circulated to all participants in 2009. For each of the participants, the guide described what was expected of them before class, during class, and after class. A sample of these responsibilities is shown in Appendix D.

An important component of the staged capacity-building process for this year was the presentation of selected lectures by the facilitators. Out of the 20 lecture sessions that were presented in each module, at least two, but preferably four, of these lectures should be presented by the facilitator at UNAM. The facilitators were given a choice of which lectures topics they were comfortable with, as well as the duration of their presentation. They were also given the opportunity to co-present with the lecturer if they so wished.

Because of the difficulties that the facilitators sometimes experienced in rounding up the students for their lectures, a class representative was chosen among the 5 students. The representative was responsible for mediating between the students and the facilitators.

6.4.5 Tools and artefacts used

The tools and artefacts used in 2009 were again different, depending on the lecturers" experiences and choices. These are presented per module in this section.

6.4.5.1 Enterprise Java

After an unsuccessful attempt with Wimba for the first two lectures, the lecturer and facilitators jointly agreed to try a different solution that would enable them to conduct PowerPoint lecture sessions. Because of the smooth experiences with using Skype in the Networking module, Skype was naturally the choice in this module. At this time however, Skype was not yet able to support simultaneous presentation of documents such as PowerPoint files. All the participants had been communicating with Google Mail, making it easy to use Google Documents at the same time. Participants therefore jointly agreed to use Google Documents and Skype for the presentation of the lectures. Using this solution, the lecturer first creates a document, such as a PowerPoint presentation in Google Documents, and shares it with other students and the facilitator by inviting them as collaborators in the document by sending them an email. Just before the lecture begins, the student would have to open the document on their screens. The lecturer would have to inform all the students to click on button "View together" to enable the lecturer to control the order of the presentation of the slides. During the lecture, both the lecturer and the student would need to be logged in on Skype.

At the time that this study was conducted, Skype did not allow video calls to be made to multiple participants at a time. This therefore forced the students to gather around one computer with speakers and a single microphone during the lecture session. In some instances, the class opted to use the voice only configuration, which enabled them to follow the lecture from their own computers. When there was a disruption in the virtual classroom session, the lecturer was able to use text-based communication to establish the problem and re-schedule another session whenever necessary.

6.4.5.2   Computer Networks

Because of the experiences that the lecturer for this module had had with pre-recorded lectures in the previous year, all lectures were again recorded on DVD for the students in 2009. Some of the lectures presented in 2008 were reused in 2009; others were recorded in the lecturer"s office at RU; while the others were recorded from a live session with the students during the lecturer"s visit in Namibia in 2009. The lecturer indicated that even in cases where two lectures were recorded on the same day, he made sure that he used different clothing, and shot them from different positions in his office in order for the students to visualize a change of the lecture from the presentation environment.

From the experiences of the previous year, the lecturer was against using live video streams in his lecture in 2009. Skype was used for voice connection and for chatting. In the Skype session, the class used mostly voice and chatting functionalities. The sessions were less disruptive in 2009 than in 2008, with a problem experienced only once when there was a power outage in Namibia. However, the lecturer indicated another problem of session synchronization with the students. This problem, however, was caused by the students arriving late at lectures, and not by the virtual solution used to present the lectures. In addition to the tools already mentioned, the lecturer also set up a Wikimedia chat facility (hosted at (http://netserv.ict.ru.ac.za/mediawiki/index.php/UNAM_Networking) to enable the students to collaborate and discuss interesting topics related to the module.

6.4.5.3   Real Time Multimedia

At the time that this class was presented at UNAM, the lecturer was also presenting the same module to students at RU, and decided to combine the two classes to avoid duplication of efforts. The class at RU was offered to approximately 25 full-time students, who would normally gather in a single venue for lecture sessions. To enable participants at both ends to be able to see each other and communicate more effectively, a video-conferencing solution was considered appropriate for this configuration. Amongst other things, both institutions have video-conferencing facilities located in venues that are large enough to accommodate the VCP participants. The venues are fitted with speakers, microphones, cameras and screen that enable video participation of remote sites. The video-conferencing facility used at UNAM does not belong to the Computer Science Department, and required a reservation to be made prior to using it. Initially, the hope was to use the internet to transport the sessions,

but that proved impossible because of the extremely high latency on the routes connecting the two universities. Instead an Integrated Services Digital Network (ISDN) line which supports simultaneous digital transmission of multimedia data over traditional circuits of the public switched telephone network, had to be used. The ISDN line at UNAM has a maximum capacity of 512 kbps in both upstream and downstream directions, but for the duration of project it was only able to reliably transport the traffic at 128 kbps. A typical class session in this setting is shown in Figure 6-12.

Figure 6-12: Students and the screen used in the video-conferencing session

6.4.5.4 Human Computer Interaction

The Human Computer Interaction module was presented at the same time with the third-year module called "Human Computer Interaction and Computer Ethics" at UNAM. The facilitators for the module requested that the SANTED class and the third-years be combined for efficiency. Because of the smaller size of the computer laboratory where the VCP lecture sessions are held, students registered for the module met in the multimedia room at UNAM with a seating capacity of 60, a big screen with speakers and sufficient microphones (see Figure 6-13 for the setup). The lecturer and facilitator for the module had heard of the success of using Google Documents and Google Talk in the previous module (i.e. Java Enterprise) and decided to also adopt the same tools for the virtual classroom for this class.

Figure 6-13: A view of the setup of the multimedia room at UNAM

Before a typical session started, the lecturer would prepare the lecture and upload it in Google Documents. The lecturer would then invite the facilitator as a collaborator in the document. At the scheduled lecture time, both the lecturer and the facilitator would login. As soon as the class was ready to commence, the facilitator would arrange the slides on one screen, and Gtalk with the lecturer"s face on another screen. This setup, however, did not allow the use of the microphones and cameras already available in the multimedia room. Whenever a student wished to communicate with the lecturer at RU, they had to come to the front where the computer with the camera and microphone was located.

The session was very interactive and involved a lot of collaborative work. Since it was a mixture of fourth and third-year students, some of the work such as assignments and practicals had to be separated to cater for the level of difficulty that is expected at each year of study. In addition, the lecture also visited UNAM for a period of one week, and spent much more time with the fourth-year students, covering the practical side of the module.

6.4.6   Actual outcomes of Stage 2

Due to the slow internet connection at RU, alternative service providers were contacted to provide an uncapped and unshaped ADSL solution dedicated to the activities of the virtual classroom. A 512Kbps link was provided in this regard. Although slower than the UNAM

2Mbps link, the link at Rhodes proved to be stable and sufficiently met the need for video-conferencing lectures from RU required in the project.

Although several precautions were taken to ensure the success of the students for 2009, the performance of the students did not match the required expectations. One of the students was not able to continue with the modules after the second module due to personal reasons. Two students who managed to pass all their modules of the VCP did not pass all their other modules required for the BSc degree at UNAM and could thus not be admitted to RU. One student lost a close relative towards the end of the year, and was no longer interested in continuing with his studies. As a result, only one student qualified for MSc registration at RU for 2010.

The joint presentation of the lectures with the facilitators went as planned only for two modules. In Real Time Multimedia, the facilitator felt that she had not acquired the required competencies to present any of the topics and asked for more time to prepare and research the topic on her own. She also recommended that someone else should do the facilitation for 2009, in case she would not be ready to present the topic for 2010. In Networking, all the lectures were pre-recorded on a DVD. The facilitator had arranged numerous discussion sessions with the students. In Java, the facilitators presented two lectures. The lecturer commended the two facilitators for the effort and additional research that enhanced the work that they presented. In addition, the facilitators had additional exercises and tests for students on a periodical basis. In HCI, at least 4 lectures were presented by the facilitator, and 2 were co-taught by both the facilitator and the lecturer. Because of the separation of the classes, the two also worked together in designing the assessment part of the module.

6.5 Third Stage of the Project: From Assisted to Independent Individuals

This section covers the activities of the virtual classroom project in the third year of implementation (from January to December 2010). Prior to the commencement of the project activities in 2010, all departments at UNAM were required to review their postgraduate module curriculum in line with Namibia"s NQF. Since the Department of Computer Science offers a Master of Science in Information Technology using both coursework and research

methods, it also had to review this qualification. During the review process, UNAM management raised a concern of staff members with MSc qualifications offering modules to postgraduate students. It was therefore made clear that departments with insufficient number of PhD holders should suspend their postgraduate programmes until such as time that they have the capacity to offer them. The Department of Computer Science was one such department that did not meet the requirements because it only had a single staff member with a PhD qualification.

In the VCP, the expertise of PhD holders and experienced professors was made available to the department at UNAM. In the third year of implementation, the facilitators were in transit from the guided to the assisted stage, where they were expected to take over all the modules that were offered over the past two years from RU, and consult only with the lecturers when necessary. As a result of the decrease in the workload of the lecturers, the departments jointly agreed that the focus should now change from offering Honours-level modules to assist the department at UNAM in the offering of graduate modules. This would enable the PhD holder at UNAM to offer two modules of the MSc degree. The modules offered by the lecturers based at RU are shown in Table 6-3. At the same time, registration of staff members at UNAM for higher degree qualifications with RU was also made a priority to ensure sustainability of the programmes once the staff members at RU stop teaching the modules.

Table 6-3: Additional Modules presented by RU lecturers in 2010

Dates	Module / Activity
1 March–26 March	Advanced Operating Systems
17 April–7 May	Cryptography and Network Security
26 July–20 August	Advanced Computer Networks
4 October–29 October	Computer Graphics

The rules and division of labour, the community and activity system for the students were the same as those introduced in Stage 1 (Section 6.2). For this reason, this section only presents the subjects, objects and desired outcomes, tools and artefacts and the actual outcomes of Stage 3.

6.5.1   Activity systems for Stage 3

The first activity system is modelled from the perspective of the students. There were two types of students associated with the project in 2010: those that were registered for final-year BSc studies at UNAM and were taught the modules developed through the project in 2008 and 2009, and the new intake of MSc students for 2010. The students" ultimate aim in 2010 was to pass their modules with good marks to enable them to meet their degree requirements. They achieve this objective by ensuring that they attend classes delivered by the lecturer, and satisfy all the module requirements. They have different tools that will enable them to reach their objective including the lecturer who teaches, the facilitator who provides them with pedagogical assistance, the virtual classroom (which archives the content), the lecture notes, books and the recorded DVDs that they use to achieve their objectives. They are also governed by rules such as the class timetable, examination timetable, and all the other project rules as well as UNAM rules and regulations. The activity system for the students is similar to the one shown in Figure 6-3, and is thus not drawn in this section.

The second activity system is modelled from the point of view of lecturers (see Figure 6-9). In 2010, the lecturers had two objectives: to teach MSc modules to registered students, while at the same time, monitoring the implementation of the modules taught by previous facilitators in 2008 and 2009. In this stage (where the facilitators are transitioning from assisted to independent stages), it is also not uncommon for the facilitators from the previous stage to arrange special sessions with the lecturers for additional assistance. The responsibilities of the lecturers at RU had therefore increased in the third year.

Apart from the objectives, all other components of the lecturers" activity system are similar to the ones shown in Figure 6-9, and is therefore not illustrated in this section.

The third activity system is that of the facilitators. Since the facilitators" roles had changed in 2010, their activity system is similar to the lecturers" activity system modelled in Figure 6-4. The facilitators" were responsible for the full teaching of all the modules previously taught in the project. In addition, they were also still responsible for facilitating the new MSc courses introduced in 2010, assuming their original roles as facilitators in these modules, as described in Section 6.3.1. The activity system for facilitators is shown in Figure 6-14.
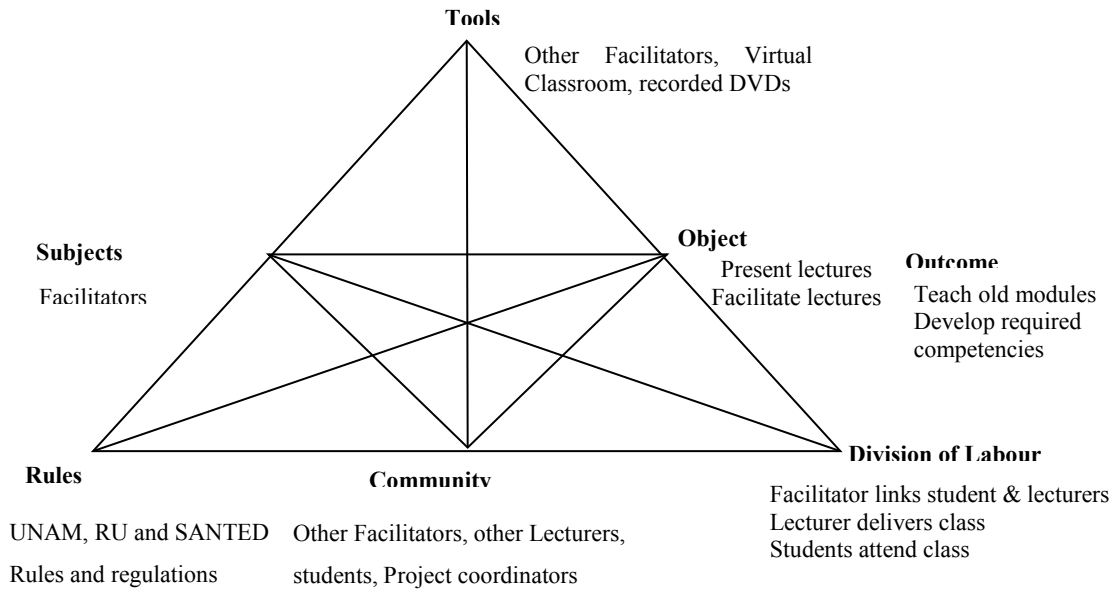
Figure 6-14: Facilitator's activity system in 2010

The last activity system is for the project coordinator, which remains similar to the one shown in Figure 6-11. The aim of the project coordinator remains to ensure that all the project requirements as described in the approved business plan, as well as all the institutional requirements for RU and UNAM are met.

6.5.2 Subjects of the activity system

The third stage of implementation involved two types of students: those registered for their final-year single-major BSc studies, and those registered for their MSc studies. Unlike students from the previous two years, students participating in these modules were not directly selected by the departments involved in the VCP. Students had to apply using the normal procedures of the UNAM application and selection process, and they followed the general progression rules for the Faculty of Science at UNAM. According the requirements, these MSc students must have a BSc qualification at NQF Level 8, with a minimum pass mark of 65%. Although SANTED was willing to sponsor up to five students for 2010, only three students were admitted to the MSc programme in 2010. Among these three students were two staff members from departments at UNAM who are employed as tutors, and one student from industry.

Two of the lecturers that had previously participated in the project from the department at RU were involved in the teaching of the modules in 2010. Two new lecturers were also appointed to the project, one to teach Computer Graphics, and the other Cryptography and Network Security. Both lecturers had already taught these modules to RU postgraduate students in previous years. The same lecturers from UNAM that had participated as facilitators of the modules in the previous years participated again in 2010.

6.5.3   Objectives and desired outcomes

The overall objective for 2010 was to hand over the modules taught from RU in the previous years to the UNAM lecturers that facilitated those modules in 2008 and 2009. The RU lecturers would not be required to attend the presentations of the modules on a day-to-day basis, but they may be required to offer assistance and mentoring during the presentation of specific topics. The lecturers from RU were, however, involved in the teaching of the four Masters-level modules to students at UNAM, with the UNAM lecturers again acting as facilitators in these modules to enable them to take over the modules once the project has come to an end.

Another major objective for 2010 was to ensure the sustainability of the programme. The SANTED funding would come to an end in 2010, and the two departments wanted to keep the collaboration going long after the funding has stopped. Since the collaboration was only possible through the funding provided by SANTED, there was a need to identify alternative funding mechanisms after the SANTED project was completed.

6.5.4   Rules and division of labour

The roles and responsibilities for the students remained the same as in 2008 and 2009. In the MSc modules, the roles and responsibilities for the facilitators and lecturers were the same as in 2008 (i.e. the lecturer presents the lectures and ensures capacity building while the facilitator acts as a link between the students and the lecturers, and at the same time, develops the required competencies). For the BSc modules however, the roles and responsibilities of lecturers and facilitators were switched: the facilitators were now responsible for the presentation of all the lectures, while the original lecturers were responsible for monitoring the teaching of those lectures. Although communication between the facilitators and lecturers was expected, in was not mandatory for 2010, as they could consult only when necessary.

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6.5.5 Tools and artefacts used

Like implementation in the previous two years, the tools and artefacts used in 2010 were different for each module. This section will therefore elaborate on the use of the tools per module.

6.5.5.1 Advanced Operating Systems

The lecturer that taught Advanced Operation Systems had participated in the project in the previous two year. Initially, the lecturer used Skype and Google Docs for presenting the modules. The students were constantly coming late to class, often delaying the start of the lecture session. Late coming to lecture sessions seems to be an acceptable norm in the Namibian context, and it is not perceived as rude or unprofessional as it may be in other cultures (Fendler & Winschiers-Theophilus, 2010). In order to avoid lost time, the lecturer resorted to the solution of pre-recording lecturers. The recorded lectures in this module were not shipped to students on a DVD as in previous years. Rather, the lectures were stored on a central server at RU, and one of the students would download to a sharable folder accessible to all students in the lab. The students were expected to go through the lecturer in the first hour of the lecture, rather than letting them go through the content in their own time. Since the facilitator was also present during this first hour, this ensured that the students had gone through the content before they met with their lecturer. In the second hour of the lecture, the participants in the module met in a virtual classroom using Skype. In the Skype session, tutorial-style discussions were held to enable the lecturer and the students to discuss the module contents in greater detail.

6.5.5.2 Cryptography and Network

This module was initially delivered using Skype video and Google Documents. Due to connectivity problems continuously experienced during the delivery of module, the lecturer decided to record the lectures and upload them on the server, were they were downloaded by the students. After going through the lecture recordings, discussions on the lecture content were held with the students using Skype audio. Although the participants reported persistent poor connectivity experienced during the lecture sessions as their biggest technical challenge, the lecturer for this course singled out the inability to actively engage students during the presentation of the lecture as a critical hindrance to the success of the virtual classroom.

6.5.5.3 Advanced Computer Networks

This module was presented using iLanga, a video and voice over IP system developed from the Asterisk softswitch at RU. The system is currently configured for use with standard Rhodes PBX extensions, and is widely used in the department at RU for communication purposes. Each student at UNAM was given an iLanga extension and they installed the XLite video user agent because of its compatibility with iLanga (see Figure 6-15). Using these standard extensions, the students could contact their lecturer without any special arrangements. The lecturer's extension was configured to forward unanswered calls directly to the lecturer's cellphone, increasing his availability to his students more than any other lecturer in the module.
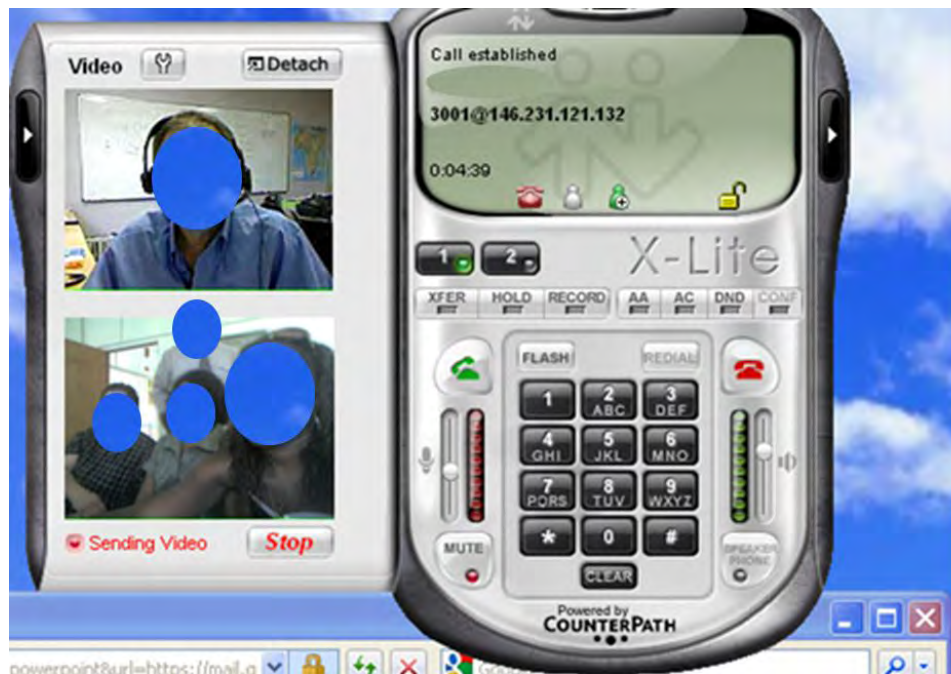
Figure 6-15: XLite powered by iLanga

Before the start of the module, the lecturer prescribed a textbook for use in the module, and each student was given their own personal copy of the book, courtesy of the project. Before each lecture, the lecturer would prescribe readings from specific chapters of the prescribed book, and ask the students to go through them before the next session. During the scheduled sessions, the lecturer used presentations that came with the book to guide the discussions with the students. These presentations were usually sent to the students ahead of time (at least a day before), or presented using Google Documents (see Figure 6-16 for a typical screenshot). In addition, the lecturer also gave some hands-on experiments on topics that the students had

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gone through. In some experiments, it was necessary to see what was happening on the computers machines at UNAM as the students ran their experiments. During the presentation of this module, the lecturer decided to use TeamViewer (www.teamviewer.com), which enables participants to share their computers with one another. The tool enabled the lecturer to see was happening as the students executed computer programs on their computers.
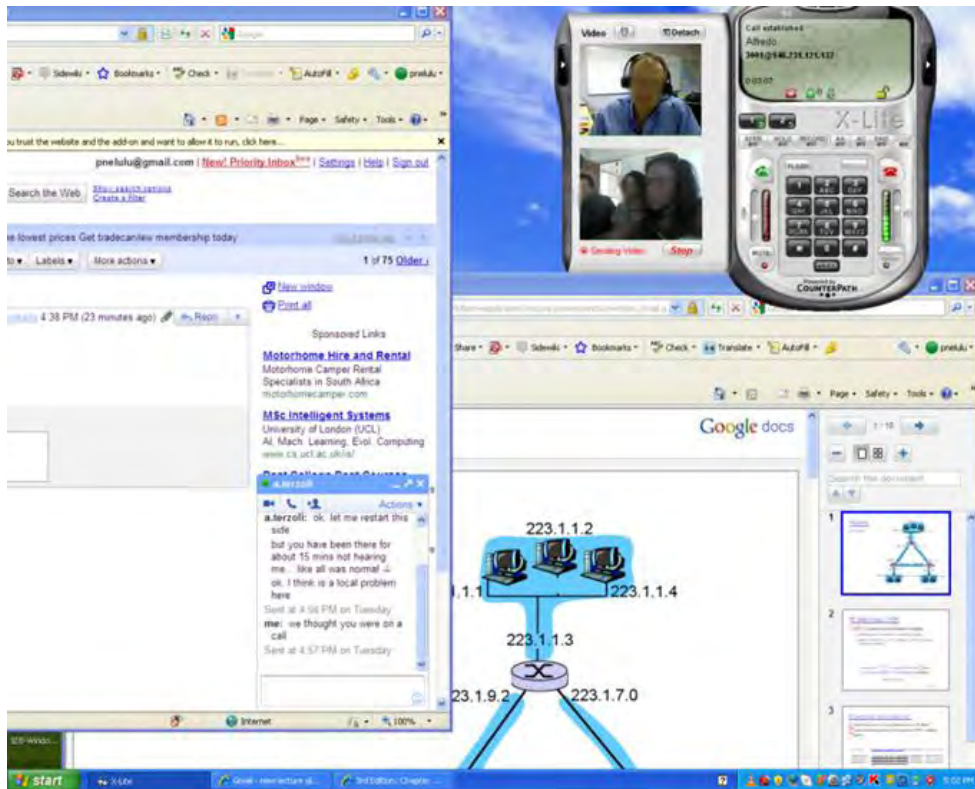
Figure 6-16: Typical screen during the Xlite and Google Document session

6.5.5.4 *Computer Graphics*

The Computer Graphics module was presented using Skype as the virtual classroom solution. In a typical lecture, the lecturer wanted to show how two-dimensional images could be generated and manipulated, as well as the rendering and animation of three-dimensional images. Apart from presenting the slides, therefore, the lecturer also wanted to use the OpenGL development package that can produce and manipulate 2D and 3D computer graphics. In a typical lecture, all students would gather around a single computer and open the PowerPoint presentations forwarded to them before a typical lecture. This was necessary because Skype only allows two participants in a video call, and it was important for this lecturer to see the students at the remote site. Using Skype, the participants would then

initiate a video call, with the lecturer switching between showing his video, showing the code that he was programming on openGL(see Figure 6-17) and the outcomes of running the code on his computer (see Figure 6-18).
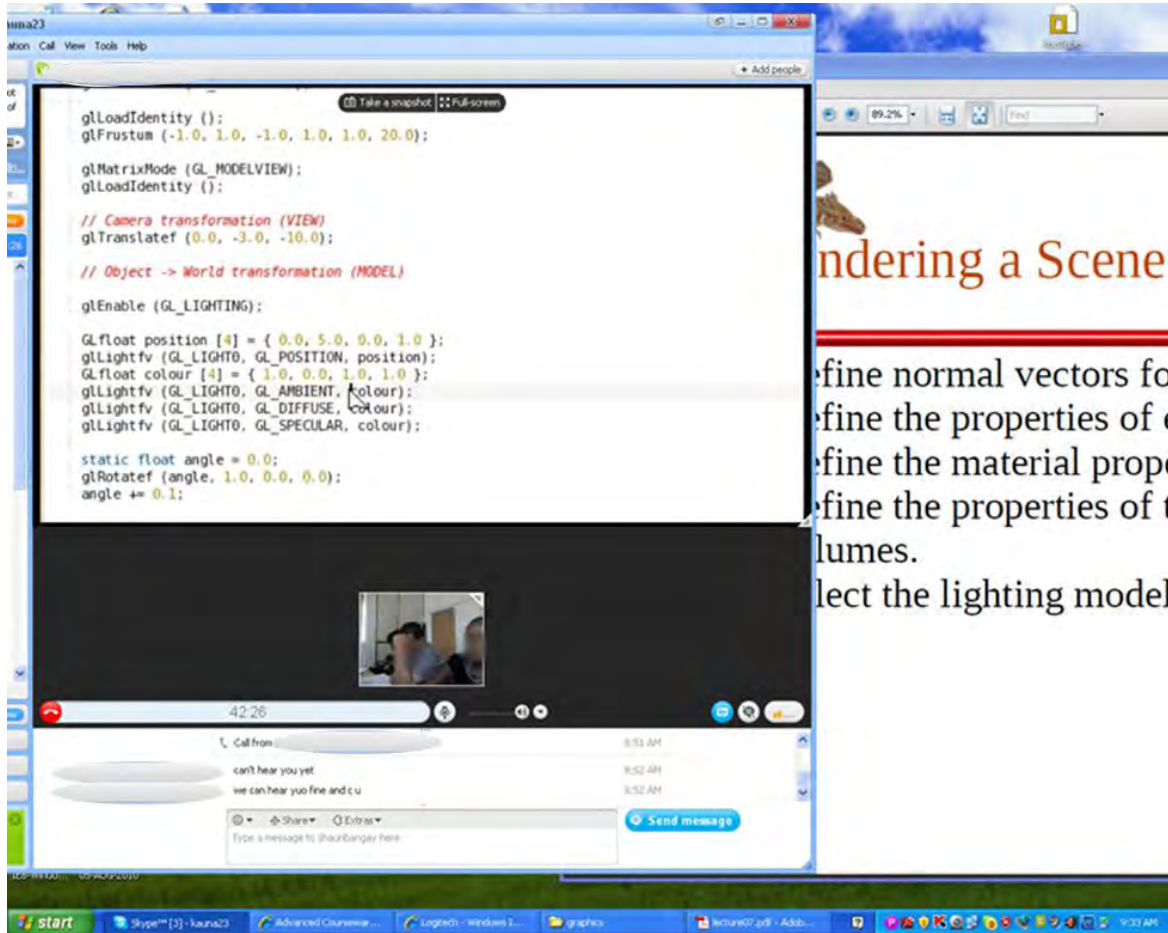
Figure 6-17: Screen showing the OpenGL code on Skype
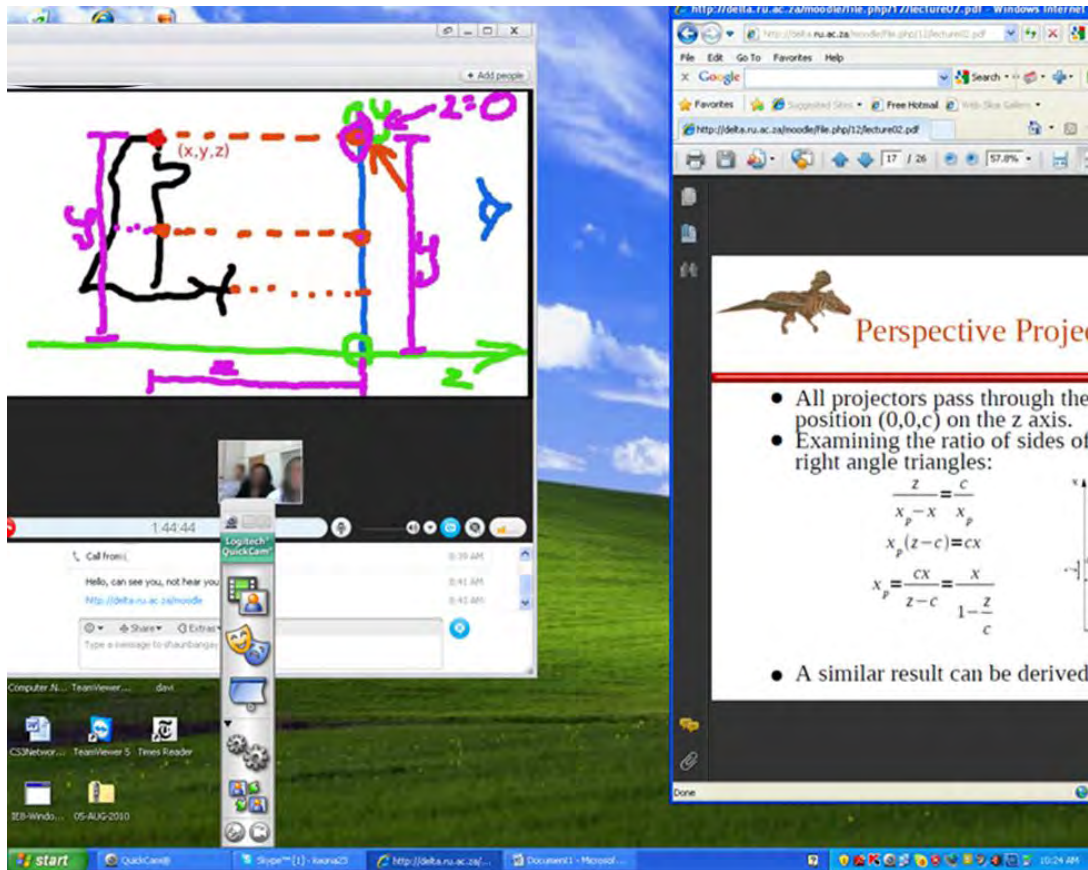
Figure 6-18: Screen showing the outcome of running OpenGL code on Skype

6.5.6   Actual outcomes of Stage 3

As explained in Section 6.4.2, the main objective for the year 2010 was to hand over the four modules taught in 2008 and 2009 to the UNAM lecturers in 2010. Although none of the RU lecturers were directly involved in the teaching of these modules in 2010, the hand-over process did not go as smoothly as expected. Firstly, all but one of UNAM lecturers that participated in the facilitation process in the previous two years distanced themselves from the modules in 2010, rather opting to assign them to part-time lecturers that had not participated in the project. Secondly, making the mentoring and consulting role of RU lecturers non-compulsory resulted in lack of communication between the UNAM lecturers presenting the modules and the lecturers who designed the module contents at RU. As soon as this was observed, the Project Coordinator at RU sent a formal request to both the Project Coordinator and the Head of Department at UNAM to request all facilitators participate in at least two of the lectures in each module that was handed over. Although the lecturers concerned were informed, this request was never granted.

The teaching of the Masters" modules was completed as planned. The two lecturers who participated in the project in the previous two years both reported an improvement in the incidents of technical problems experienced, although poor connectivity was still experienced, especially during the presentation of some modules. Organizational problems were also experienced in one of the modules, mainly due to the transition to the new curriculum for the existing students that had outstanding modules in their second year of study. Students did not always manage to hand in their module assignments on time, and in some cases, plagiarized copies of the assignments were handed in. UNAM provides two periods annually in which students may write their exams: those are First Opportunity Exams and Second Opportunity Exams. First Opportunity exams are in June and November for the first and second semesters respectively. Second Opportunity exams are for students who for some reason did not get an opportunity to write the First Opportunity examinations. In all modules presented in 2010, only one student opted to write their exams at the first opportunity, while the other two opted either for the second opportunity or not to write the exams at all.

Regarding the second aim of 2010 highlighted in Section 6.4.2, the two departments continued pursing the establishment of the Telecom Namibia CoE at UNAM for the purposes of sustaining the partnership. The two departments also emphasized research collaboration, with three staff members from each institution having visited the other institution in 2010. In addition, several research papers that are directly related to the project were co-authored by lecturers and students from both departments and presented at peer reviewed conferences in 2010.

CHAPTER 7: PROBLEMS ENCOUNTERED AND THEIR ROOT CAUSES: ANALYSIS OF TENSIONS AND CONTRADICTIONS IN THE SANTED VCP

This chapter describes the tensions and contradictions that arose during the implementation of the SANTED VCP. The methodology used to identify and analyse these tensions was adopted from used by Netteland (2007). Netteland (2007) used grounded theory to identify problems that were prominent in the implementation of eLearning in a large organization, and used activity theory to analyse in the specific contexts, how, and why the different categories of problems appeared, and the degree to which the problems in the actual category represented a barrier for the local implementation process. This chapter also uses grounded theory˝s concept of open coding to codify and categorize data gathered from interviews and observational data into categories of problems and challenges identified in the study. It then uses Activity Theory perspectives to uncover underlying tensions and potential contradictions in the categories. In the final section, it discusses the implications of these challenges to the SADC region.

7.1 Categories of Challenges

The categories of problems and challenges facing the partnership were developed using the grounded theory methods. In each year of implementation, the project did not meet all the objectives set out in the proposal submitted for funding. Because there were no prior research done in similar contexts, it was important to identify the sources of the problems and challenges, as well as to understand why the project could not meet the original targets set out by the departments.

Data was collected directly from the interviews, questionnaires, and observations done during the live virtual sessions. As mentioned in Section 5.3.3, all voice interviews were transcribed for analysis purposes, and observations were recorded in the personal research notebook. At the end of the presentation of each module, the researcher analysed all the available data sources pertaining to that module for possible codes. Apart from the field notes, answers were also derived from the several questions specifically aimed at finding out the problems and

challenges experienced by the participants (see for example questions 7-20 in Appendix B and questions 14-23 of the staff questionnaire in Appendix C). Analysis looked at the different parts of data that represented problems and challenges, and focused on identifying relations, similarities, causals and repetitive patterns (Charmaz, 2006). A unique code was then derived for each of the problems identified. Finally, the codes were grouped under categories based on their common properties (Charmaz, 2006). The categories are presented in Section 7.1. Section 7.2.1 presents the different activity systems of the virtual classroom, and the unique codes are presented in Sections 7.2.2 – 7.2.3 as a subsumption of the main categories. Sections 7.2.2 – 7.2.3 also explain how each of these challenges affected the different activity systems.

7.1.1 Infrastructural problems

Infrastructural problems are those that are directly related to the technical infrastructure available to support virtuality at both institutions. Because capacity building was done in a virtual environment, there was a need to acquire appropriate software, hardware and internet connectivity to support the activities of the virtual classroom project. Once the appropriate infrastructure was acquired, it was also essential to ensure its availability when needed by the participants. During a lecture session, for example, it was important to ensure that the virtual classroom solution was accessible to all participants, and that the participants could smoothly communicate using the different features offered by the virtual environment. However, the participants experienced technical problems such as disconnections from the virtual classrooms (unavailability of the virtual classroom), problems with internet connectivity, changes in the format of prepared content, etc.

7.1.2 Institutional support problems

Institutional problems refer to the interruptions and procedural requirements that hampered the implementation of the project as planned in the original proposal submitted for funding to SANTED. Although the proposal was jointly prepared by both institutions, and management support from both institutions was a precondition for the granting of the funding, several subsequent obstacles from the institutions prevented the implementation of the proposal as originally planned. These included, for example, UNAM management‟s realization that

enabling students to graduate with a single-major BSc directly in 2008 contravened the institution"s rules requiring all qualifications to be approved by the Council. They also included the restrictions placed on the selection process of the students that could participate in the project, the support rendered to participating staff members (in terms of incentives to participate), and institutional involvement in the project. In the end, these changes drastically affected the participants in the project, and had an impact on the overall outcomes of the project.

7.1.3   Cultural issues

Problems related to cultural issues arose as a result of differences between the participants" cultural backgrounds. Being tertiary educational institutions, the staff members at UNAM and RU and the students who participated in the project came from different countries and cultural backgrounds, although the students were all Namibian students with an age range of 22 to 45 years old. Challenges highlighted by the lecturers and facilitators that participated in the project include: lack of feedback and interaction with the students, different teaching styles, lack of participation in activities, lack of preparation of work that needed to be completed before the lectures, and a different concept of time.

7.1.4   Individual expectations

Individual expectations in this case refer to the hopes and anticipations that the individual participants had both for the implementation and as an outcome of the implementation of the project. These expectations include individual support from management, support from other colleagues, recognition of the work that individuals are doing, integration of their current work with their existing workload, and personal professional development. It also includes expectations of and from other participants.

7.2 Analysing the Problems Experienced in the Partnership

Some lecturers felt that the students were not well prepared for the modules. Although the time for the lectures was agreed to in advance, the students did not always arrive on time for the sessions. In modules with programming components, the lecturers found that the students

had poor programming skills. The virtual classroom was therefore not appropriate for teaching these students because they needed more preparation to complete their programming exercises outside the virtual classroom. In the lectures with pre-recorded videos especially, the students did not engage proactively with the content before the lecture and discussion sessions as expected by their lecturers.

Problems and challenges experienced in the virtual partnership are analysed using the concept of contradictions described in Section 4.1.2.4. Contradictions are tensions between and among activity systems that arise from the division of labour. These changes are usually sparked by external influences from other activity systems.

7.2.1 The activity systems involved in the implementation

From the discussions of the activities of the staged capacity-building process presented in Chapter 6, five activity systems can be identified: the Teaching Activity System, the Learning Activity System, the Facilitation Activity System, the Project Coordination Activity System and the Management Activity System. In Chapter 6, the presentation of each of the activity systems was different for each year of implementation. A holistic analysis of each of the activity system is briefly presented below.

7.2.1.1 The Teaching Activity System

The first activity system presented is the Teaching Activity System (TAS). The object of TAS was to enable students to learn (Ramsden, 2003), taking into considerations the objectives, the exit learning outcomes and the curriculum defined for the module. The subjects of TAS are the RU lecturers, who had the responsibility for teaching the modules in the project. The lecturers were expected to develop the module content, plan their delivery, coordinate their delivery and assess and evaluate the learning activities of the students. In addition, the lecturers also had to ensure that they built capacity in the department at UNAM. The expectations or outcomes from this activity system therefore are: quality teaching and learning, development of professional skills and teaching competence as well as assessment of performance.

In conducting their lecturing and capacity-building activities, the lecturers use the virtual tools for delivery and the prescribed curriculum for determining the content to be presented as tools of the activity system. The community of this activity system is represented by the students, the facilitators, other lecturers and the Project Coordinator, who is responsible for troubleshooting and ensuring that the participants do not have any technical problems during their sessions. The division of labour is done according to the implementation rules of the project, as well as the institutional rules at UNAM.

7.2.1.2   The Learning Activity System

The Learning Activity System (LAS) is presented from the perspective of the students, and has the students as the Subjects of the activity system. As discussed in Chapter 6, the ultimate object of students is to learn and pass their examinations, in order to qualify for the staff development status at UNAM. The tools available to the students include the lecture materials, including the materials captured and stored in the virtual classroom, the DVD recordings and the textbooks that they use. The students are involved in different activities such as attending lectures, doing assignments and studying, and their intended outcome is to pass their modules in order to qualify for registration. The rules governing their participation are the institutional rules, including class attendance rules, examination rules and the timetable. They also have the same community and division of labour as LAS.

7.2.1.3   The Project Coordination Activity System

The Project Coordination Activity System (PCAS) has the Project Coordinators as the subject. The objective of a Project Coordinator is to organize and coordinate the implementation of the activities outlined in the proposal for funding. The community for PCAS includes the students, the lecturers from both UNAM and RU, the funders and the management of institutions. The Project Coordinator assigns the roles and responsibilities to the different participants as shown in the Division of Labour, and ensures that the institutional and implementation rules are adhered to. The Project Coordinator is also responsible for drawing up the implementation schedule, selection of an appropriate virtual classroom solution and ensuring that the project meets the its targets set for each year.

7.2.1.4 The Facilitation Activity System

The Facilitation Activity System (FAS) has development of personal competencies as its object. The subjects of FAS are the UNAM lecturers, who had the responsibility for facilitating the modules taught in the project. As explained in Chapter 6, the facilitators were expected to be the link between the students and the lecturers. Their expected outcomes were to acquire the required competencies in the delivery of the module contents once the project has ended, and to register for their PhD at RU. The tools, division of labour, rules and tools for FAS are similar to those of TAS.

7.2.1.5 The Management Activity System

As shown in Figure 7-1, the funders are the subject of the Management Activity System (MAS). The funders are interested in the efficient implementation of the project plan, and are using the approved business plan and institutional requirements as the rules. The Project Coordinators, students, lecturers and the senior management at both institutions form the community of this activity system.

Tools
Business plans
Periodical reports

Object
Efficient Implementation of Project Plan

Subject
Funders

Rules
Approved business rules
Institutional requirements

Community
Project coordinators, students, lecturers, institutional managers

Division of Labour
PC coordinates at each institution
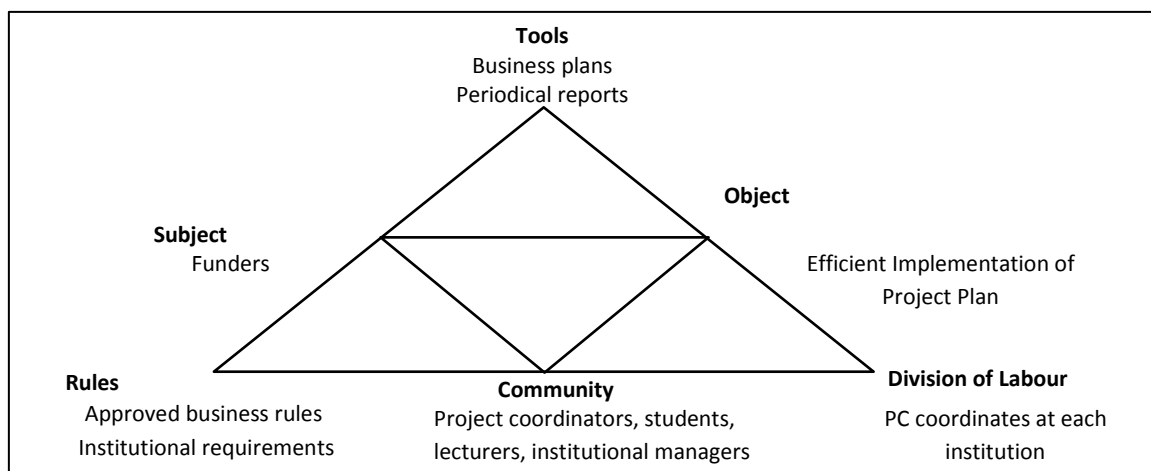
Figure 7-1: The Management Activity System

7.2.2 Infrastructural problems

This section discusses the infrastructural problems experienced in the project. Although there are five activity systems that were identified for the project, only four of these were directly affected by the infrastructural problems. The section therefore only reports on the problems experienced from TAS, SAS, FAS and PCAS.

Acquisition of hardware and software resources

As explained in Chapter 6, the first problem that delayed the commencement of the project was the process of acquisition and delivery of the required virtual classroom equipment in Namibia. Although the participants were identified and they were ready to commence the implementation of the project, the delayed delivery of multimedia enabled computers to UNAM hindered the commencement of the implementation of the project until July 2008, when the commencement of classes finally coincided with the launching of the project. This problem affected the commencement of teaching (i.e. the TAS, FAS and SAS) which was entirely dependent on the hardware. The PCAS in the meantime utilized that time to test the available virtual classroom solutions and to identify the appropriate solution to be used in the project.

There were also delays experienced in the slow fulfilment of orders for server equipment in 2009. The equipment was needed for the setup of a firewall and gateway system in the lab at UNAM in order to improve the reliability of the network between the two institutions. Although the equipment was ordered in June 2009, it was only delivered at UNAM in April 2010. The late delivery of the equipment did not directly affect the teaching of modules (or TAS, FAS and SAS) in 2009. However, connectivity problems between the two institutions persisted. It was also not possible to directly manage connectivity through the ADSL routers installed by the service providers, until the firewall and gateway system was installed at UNAM (affecting PCAS).

Problems accessing the Wimba Virtual Classroom

The selected virtual classroom solution was not always accessible when needed by the participants. At times, the system would take very long to connect during the login process, or it would only allow some of the participants to connect and kept the others waiting. As a consequence, participants were often frustrated by the unavailability of the system which often also delayed the start of classes. At other times, the system would connect all the participants, but some disruptions would be experienced during the session. This often necessitated a system restart, delaying the progress of the class again as the participants wait for their colleagues to reconnect.

Disruptions in internet connectivity

Because ADSL was still a relatively new broadband solution in Namibia in 2008, the internet connectivity was not very stable in the first year of the implementation. Participants from UNAM would occasionally experience unanticipated disconnections from the internet. Some of these disruptions were easily resolved by restarting the ADSL router. Others unfortunately necessitated a visit from a technician from the service provider. This exercise could take up to three days to resolve the problems. It often led to the cancellation of classes for days until the problem was resolved by the service provider. In such cases, the participants at UNAM would send a message to their colleagues at RU notifying them of the problem. Once the problem has been resolved, they would send another mail to re-arrange for the lost sessions. This often disrupted the schedule of presentation of classes, especially in the first year of implementation were the schedule was very tight due to the late commencement of the project activities.

Unguaranteed bandwidth

Due to the inherent nature of the ADSL technology which does not guarantee the provided bandwidth, the internet connection in the SANTED lab at UNAM was often at a reduced speed than the advertised 2Mbps, often causing connection failures between the two institutions. This often forced the participants to degrade the medium of communication (i.e. changing from video to voice communications only, or changing from using individual computers to gathering around one computer only). Since interactivity was a major requirement for the virtual classroom solution chosen, the unguaranteed bandwidth often presented major obstacles to the activities in the project. This was reflected by one of the lecturers in the excerpt below:

> *"I think that until our telecommunication infrastructure matches the infrastructure available in Europe, etc., what we are trying it is not suitable: It is very bandwidth intensive. "*

Another lecturer commented as follows:

> *"If we could have a more lightweight, point-to-point virtual classroom solution that can still work when then bandwidth that we have is very low, it would be great."*

Inability of participants to use all features of the Virtual Classroom

Although the selected Wimba virtual classroom had all the required features identified at the beginning of the project, lecturers could not use all the features of the virtual classroom project. One of the features available in Wimba that would have been really useful in this contextual setting enables the presenter of a session to choose the bandwidth available in their context and the classroom is supposed to automatically adjust itself to the chosen configuration. This feature however never worked in the project. Other build in features such as screen/desktop sharing also seemed to be bandwidth intensive as they took very long to load and refresh, rather wasting the time of the participants in a session. Lecturers also reported their dissatisfaction with their prepared content in PowerPoint, were automatic changes in the format of the slides was done by the virtual classroom, upon loading the slides for presentation. Other dissatisfactions with the use of the features are indicated in Table 7-1.

Table 7-1: Lecturers' comments on the ability to use all the features of a virtual classroom

Lecturer 1: *"My reservation is with the software. It does not seem appropriate for how we use it. It doesn't seem to support our uses (demonstrations as well as slide shows, etc.)"*
Lecturer 2: *"When I was talking, the system would block out any audio from the other side to ensure that there was no feedback / echoes. The problem was that because you don't hear the students, or even see video feeds or static images of them, you don't know if they're still there / if the connection is still working, etc. I found this very unhelpful. The reason we would use a virtual classroom is to get a sense of presence (otherwise we could just use a standard telephone call if all we were going to hear is ourselves talking). The Wimba programme shows a picture of the person who is talking to all members of the group – this means I got a video feed of myself talking. If I wanted to see myself, then I could just put a mirror next to my computer. I think that if we can have a constant feed (even if at a very low frame rate) from the remote site, then this would be helpful."*
Lecturer 3: *"I experienced some technical problems, and Wimba wasn't really generating the interaction we needed. Too much of the interaction was around the technical problems ("we've lost the sound" / "could you repeat that") rather than interaction around the course content."*
Lecturer 4: *"The system has a poor way of alerting the lecturer that he/she has lost the students. It does not do well in error handling and notifying".*

Lack of technical expertise to deal with technical issues

This was another problem observed at UNAM. Due to the slow traffic across the 2MB line in the SANTED lab, the departments wanted to be able to perform any necessary shaping on network traffic directly to prioritize video calls on the network. One of the problems identified however was the lack of a publicly addressable IP address on the ADSL link which the service provider could not provide . The IP address space of the devices at UNAM were hidden behind another public address space, making it difficult to directly access any of these devices. Although there is a workaround for this solution, the required expertise was not available at UNAM to implement it.

7.2.2.1 Actions taken to minimize problems

In order to minimize the infrastructural problems experienced in the project, the following actions were taken:

Ordering of hardware from South Africa

The delay in the ordering and acquisition of equipment at UNAM was caused by the delay experienced in opening a project account at UNAM. In order to speed up the process, the two departments jointly decided to purchase the equipment directly from South Africa, and have the supplier deliver them in Namibia.

Troubleshooting internet connections

The first step in trying to resolve the internet connection problems was troubleshooting. This often involved tests done between the two departments, as well as tests done with Telecom Namibia. Table 7-2 shows an email exchange between the project coordinators in the early stages of the project. As can be seen from the email, the suggested approach here was to first establish the causes of the problem within the UNAM network.

<div align="center">

Table 7-2: Email extract from the Project Coordinator at RU to the Project Coordinator at UNAM

</div>

I am trying to get to the bottom of our disappointing results with Wimba . Have you got a way of determining how much bandwidth you currently have available at a given point in time? When the performance goes down, we need to determine whether you guys have reached your cap and are now in some kind of delay poo, or the network is so saturated that this is also impacting the use of WIMBA. Once we have done that, whether there are external factors impacting the performance of the tool for our lectures. Can you also confirm that the computers in your lab are correctly configured?. It is really difficult to determine where the problem may lie.

Each lecturer was given the freedom to use their own solutions

Due to the numerous problems experienced both with the network and the Virtual Classroom solution, it became difficult to oblige the lecturers to continue using Wimba for the presentation of the lecturers. Rather, each lecturer was given an opportunity to use whatever solution seemed appropriate for them. As shown in Table 5-1, the lecturers that presented the last two modules in the first year of implementation pre-recorded their lectures on DVDs, and used Wimba and face-to-face methods only for discussion. In the second year of study, however, different lecturers used different solutions that enabled interactivity during presentations. This allowed us to experiment with different low-bandwidth solutions, and serves as a good guide to which solutions can be adopted as working models for online teaching in our context.

Table 7-3: Lecturers' justifications for choosing another solution

Lecturer 1: *"I was warned of the bandwidth problems that were being faced using Wimba, so I organised my course so that students had my lectures before the class, and my virtual classroom times were going to be used to discuss content covered in the videos."*
Lecturer 2: *"To adapt, I pre-recorded and canned some lectures using a video camera, and physically shipped DVDs to UNAM. Thereafter, the model was that students should first watch my presentation as often as they needed to, and we'd use Wimba more as a discussion forum and chat room."*

Alternative ways of communication

The need for alternative ways of communication was raised in 2008 with the problems experienced with the internet connection. The participants wanted to find ways of letting each other know what was happening at their departments if they were not able to connect to each other at the agreed time. In addition, students wanted to be able to reach their lecturers in their offices outside of the virtual classrooms. One of the affordable methods installed at UNAM was the VoIP hard phones that were directly connected to the iLanga PBX at RU. Each student was given an extension on iLanga. This not only provided an alternative way of communication between the lecturers and the students, but also made it easier for the participants to alert one another if there were problems with the virtual classroom solutions. In cases where the VoIP phones did not work, the participants resorted to sending each other cellphone messages from one institution to the other.

Installation of a DSL link at RU

In 2009, an uncapped 512 Kbps link was acquired for RU in order to have a similar setup at both institutions.

Installation of a Gateway/Firewall System in the SANTED Lab at UNAM

Two identical gateways were installed at both institutions to manage internet connectivity and provide a virtual private network (VPN) trunk between the institutions. Each gateway was directly connected to the ADSL line, with the purpose of enabling lecturers at RU to connect directly to the network and to the machines in the Lab at UNAM. The VPN provided better connectivity than was previously available in the lab, but it was not utilized to the maximum because its full configuration was only completed in 2010, when most of the modules that required direct site-to-site VPN were already completed.

Sending technicians from RU to deal with technical issues at UNAM

RU technical staff were sent to UNAM in 2009 and 2010 to assist with the configurations of servers, gateway and firewall that proved challenging for the staff at UNAM.

7.2.2.2 *An analysis of infrastructural problems*

The Project Coordinators‟ decision to order equipment directly from South Africa reflects a tension between the expectations of the funders and the practical situation that existed in following the bureaucratic procedures of the institutions. The funders had expected that the distribution of funds between the two institutions would be done as soon as possible to enable teaching to commence before the launch of the project in July 2008. The practical situation at the institutions however did not permit the opening of project accounts and the transfer of money between the institutions to be done immediately. Firstly, project accounts had to be opened at both institutions, a process which requires the creation of budget votes and approval by the Bursar of the institution. Secondly, the Finance Department at RU could not transfer the funds to UNAM before an invoice was raised against the exact expenditure items specified in the budget. Thirdly, the physical transfer of money between these accounts usually takes days to complete, and once the money was physically in the account, it first had to be cleared before it could be used in the project. As a result, the funder‟s implementation rules and expectations placed a heavy burden on the PCAS. The Project Coordinators‟

solution to this was to temporarily circumvent bureaucratic financial procedures by purchasing the equipment directly from RU, as long as the utilization of funds was still in compliance with the approved budget. In the end, however, this process further delayed the arrival of equipment at UNAM because of problems experienced with the customs offices at the border.

The actions of troubleshooting the network, allowing each lecturer to use their preferred solution, providing an alternative way of communication and the installation of a DSL link at RU in 2009 were all initiated as a result of a secondary contradiction between the rules and tools of the Teaching Activity System. The rule required the lectures to use the virtual classroom solution selected for the project, but the tool itself was not able to support the needs of the lecturers and the students. It further reveals a quaternary contradiction between the TAS, and the tool producing activity system, PCAS. In PCAS, the coordinators were expected to do a thorough testing of the available systems and acquire a stable internet connection that could enable the lecturers to teach online. As can been seen in Chapter 6, however, this tension was carried over throughout the duration of the project, with the Project Coordinators relinquishing the virtual classroom solution and encouraging the lecturers to use any other solutions that they felt comfortable with.

7.2.3 Institutional problems

Senge (1990) argued that people who are placed in the same system, no matter how different they are, would always produce the same results. He therefore suggested that when trying to understand problems in institutions, our focus should not be on personalities and events. Rather, he suggested that we must look at underlying structures in which the people function, because these structures shape individual actions and create conditions where observations are made. This section will therefore focus on the institutional tensions identified in the VCP, where several patterns and behaviours were observed in the process of implementation.

Lack of policies to support collaborative work

Although both institutions seem to have collaborated with quite a number of institutions both in the SADC and outside of the region, they seem not to have policies to support collaborative work. This was observed in the case where permission to co-teach the modules

had to be sought and granted for individual modules from the office of the PVC: AAR at UNAM, despite this being widely practiced in other courses of study at UNAM. Collaborations between institutions seems to be guided by the contractual agreements between the departments that are partnering, and although supported in general by the top management of the institutions, these agreements do not seem to cover important aspects of collaboration. In the SANTED VCP, there was no policy used to guide the different types of collaborations currently practiced by the institutions (such as co-teaching of modules, curriculum review, joint offering of degrees, etc.).

Lack of incentives to encourage staff to participate

The staff members from UNAM that participated in the project did not perceive the incentives for participating in project. In the first year of implementation, the budget did not cater for them because it was assumed that they would automatically participate because of their interest in the capacity-building process. Experience showed, however, that learning alone was not a strong enough incentive for the facilitators to participate in the project.

Lack of commitment to project agreements

Several agreements that the institutions had committed themselves to could not be executed in the project, despite the project proposal having been approved based on the support of the top management of the institutions. The first of these agreements in the project was the graduation of single-major BSc students directly in 2008. At the implementation, however, it became clear that proper procedures were not followed, and therefore the project could not be implemented as approved by the funders. The second example is the provision of funding to Masters" students to further their studies at RU once they complete their degrees at UNAM. Although this was approved at the highest level of the institution, the department at UNAM could not acquire funding for students from the staff development office during their first year of study.

Rigid administrative structures

Like Kezar (2005), our experiences in the project led us to believe that the rigid administrative structures in educational institutions are not conducive to collaboration. Kezar (2005) suggested that the processes of goal setting and performance management should be

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modified to support collaborative work. As explained in Chapter 6, rigidity in administrative procedures was experienced in three main ways in the SANTED VCP. Firstly, the finance departments at both institutions refused to change their mode of operations to accommodate the budgeting and reporting needs of the project. Secondly, the distribution of the workload in the departments could not be adjusted to cater for the new project (i.e. the project was not tightly integrated with the activities of the departments). Thirdly, approved modules of the new curriculum at UNAM were not officially recognized by UNAM, which proved difficult in facilitating cross-border accreditation.

In addition, UNAM still seems not to be ready to integrate the collaborative activities into the institutional framework, even after the SANTED VCP has proved successful. This is evident after the project funding has come to an ending. Even though RU lecturers are still ready to continue teaching the modules that are part of the approved curriculum (already accredited by UNAM), payment of lecturers that deliver their content using a virtual environment was not allowed in the department. As a result, the department at UNAM had to negotiate with Telecom Namibia for the possibility of sustaining the activities of the VCP through the Telecom Namibia Centre of Excellence.

7.2.3.1   *Actions taken to minimize problems*

With regard to the lack of policy and rigidity in the institutions, the Project Coordinators decided to formally request permissions to the offices concerned whenever implementations that were not guided by the existing institutional policies were executed. An example of this is the co-teaching of students in the Human Computer Interaction and Computer Ethics module in 2009, where the teaching was supposed to be shared between the lecturers in both departments. In this regard, a letter seeking approval for this arrangement was written to the office of the PVC: AAR at UNAM, and also copied to the office of the Registrar and the office of the Teaching and Learning Improvement Unit. Many other letters requesting authorizations and separation of jobs between the institutions (e.g. ratio of face-to-face vs. virtual classes, how assessment would be split between the institutions, etc.) were written by the Project Coordinators during the course of the project.

As explained already, payment of an honorarium was included in the budget of 2009 and 2010 in order to incentivize staff to participate in the project. A small token was therefore given to the facilitators for participation, taking into consideration that they would not be taking full responsibility for the modules in 2008 and 2009, and in 2010, the modules would have been integrated into the curriculum. The honorarium, however, still did not incentivize them to participate in the teaching activities of the project. Rather, the proactive approach taken to hasten their registration process at RU seemed to be much more attractive to the staff members than the payment.

Since the project proposal was already approved, changing the major agreements upon which the project was based proved really difficult for the Project Coordinators. As explained already, one of these agreements was the change of graduation of the students with the single-major BSc qualification in 2008 and 2009, where the Project Coordinators had to change the admission requirements to the project in order to cater for the new students. This in turn led to another problem of students not qualifying for registration at RU at the end of the year of implementation. The project coordinators had to work with the faculty officers to determine the fastest way that the students could complete their outstanding requirements in order to register at RU as soon as possible. Once the students qualified in the second semester, but the staff development office could not give them funding in the middle of the year. The department at UNAM therefore had to seek for funds from different sources to enable the registration of both students in their first year of study at RU.

7.2.3.2 *An analysis of institutional problems*

The Project Coordinators" decision to write letters of authorization to perform activities that were already approved in the implementation plan of the project is a reflection of a quaternary contradiction between the project"s objective and other concurrent, neighbouring activity systems of the context in which the project is located. This is the same contradiction that prompted the Project Coordinators to change admissions requirements and to seek funding from other sources despite the signed agreement between the institutions. In some cases, it was quite clear that the rules for the neighbouring activity system were not well defined. In other cases, however, the implementation plan had failed to take into consideration the existing institutional rules and the Project Coordinators had assumed that

approval by top management was sufficient to circumvent these rules. This in effect points to a gap and a failure to notice all activity systems that could have an impact on the project‟s activity system. The exclusion of the Office of the Registrar and the Staff Development Offices as important activity systems in the negotiation of the implementation plan severely affected the implementation of the project.

The Project Coordinator‟s decision to incentivize staff at UNAM to participate is an indication of a tension between the implementation rules and the object of the project. This tension arises from the rules and the implicit assumption that the facilitators would attend the lecturers in order to enhance their skills (i.e. assuming that it was for the benefit of the staff that they attend these modules). The experiences of the facilitators‟ participation, however, proved otherwise. This could further be viewed as a reflection of a potential secondary contradiction between the division of labour and the rules. With regard to this view, a written guide was developed, clearly explaining the roles and responsibilities of all participants in the partnership in case they were not clear. Even with these explanations and the remediation of payments, however, the facilitators‟ participation in the virtual classroom activities was still below the Project Coordinators‟ expectation. This seemed to manifest a profound tension between the facilitators‟ activity system as reflected in the project and their other activity systems outside the project. The project seemed to have disregarded the facilitators‟ current workloads, and their expectations and personal interests in the project when prioritizing the important activities and the order in which they would be performed in the project.

7.2.4   Cultural Issues

Different teaching and learning styles

Winschiers (2001) observed that Namibian students had difficulty in assimilating abstract computing concepts due to different backgrounds and their secondary education which influenced their learning habits. According to her, there was a culture of silence, avoiding complaints, and information hiding instilled in the Namibian students during the apartheid era, which prevents constructive criticism and hinders participation of the students in the teaching/learning environment. In the VCP, the lecturers emphasized lack of interactivity and lack of feedback from the students as one of the problems that they faced during the teaching

of their modules. Sometimes, a lecturer would ask questions and none of the students would attempt to answer. This seemed to be especially worse when students were seated in front of their own computers with their own microphones. As an observer in these sessions, I noticed several incidences where a lecturer asked a question in class, but the students would keep their eyes fixated on the screens without saying a word. This silence would persist for a few seconds, until the lecturer interjects again by asking "*are you still there?*", upon which one or two students would answer "*Yes*" before they would proceed with the lecture.

Time orientation

One of the differences between the two departments was in the orientation of time. Although the time for class was often arranged at least a day in advance, the lecturers were often disappointed by the late arrival of students (and facilitators) to classes, or some students not showing up at all for classes. This did not surprise the facilitators, however, as they are used to late students walking into their classes at any time. Hall and Hall (1990) described two variations in which people from different cultural backgrounds understand and use time: monochronic and polychronic. Monochronic are those who view time as if it is linear, and as such emphasize punctuality and keeping to schedules. Polychronic on the other hand, have flexible time schedules, and are not bothered by precise timetables in comparison to relationships with people. In a polychronic culture, the facilitator would opt to conclude her present class with „nomal‟ UNAM students rather than terminating it abruptly in order not to arrive late for her virtual classroom class. Hall and Hall (1990) observed that both orientations can be learned and unlearned. In a virtual environment, however, it seems much more preferable and logical if a monochronic orientation is adopted, not only to meet the expectations of others, but also ensure the efficient use of class time that seems to be limited in virtual environments.

Apart from being late or not showing up for classes, another common problem identified in the LAS is the late submission of work and assignments. Although a deadline was set for each of the assignments given, students did not seem to pay careful attention to these deadlines. Missing of assignment deadlines, however, seems not be unique to the VCP, as other researchers working in the Namibian context have reported a cross-cultural difference in the perception of time among Namibian students (Fendler & Winschiers-Theophilus,

2010). The timely submission of their work also seemed to be directly linked to the leniency of the lecturers. In all but two of the modules across all the three years, the students handed in their work late. Reasons given include the difficulty in understanding the work, and not knowing what was expected in terms of the answers required by the lecturers. Instead of discussing these problems with the lecturers and the coordinators, however, the students often opted not to submit their work.

Plagiarism

Plagiarism was another problem experienced in the LAS. In a number of modules, the lecturers reported clear cases of plagiarism in the work submitted by the students.

Not preparing for classes

Lack of preparation for classes was another problem observed all across the years of the implementation. In some of the modules, the lecturers had recommended readings prior to class. In other modules, the lectures were pre-recorded on DVDs and shipped to Namibia before the modules started. In both of these cases, the lecturers reported that the students came to class not having gone through the work. One of the lecturers commented that the problem she had was that "*students didn"t put much effort into*" her module. She also commented that she felt discouraged because she had put so much effort into preparing and recording the modules, but felt that the students did not appreciate her efforts.

7.2.4.1 Actions taken to minimize problems

The lecturers indicated that they had to adapt their teaching style to match, firstly, the online environment in which the module is now presented; and secondly, to match the background of the students. All the lecturers in the VCP expressed that they had initially designed their modules with a practical oriented presentation style, with examples and exercises given and set for the students in order to convey the principles. The students on the other hand found it difficult to adapt to this style of teaching, with all of them across the years indicating that they had difficulty adapting to the teaching style. The following are comments from the students:

> *"The theory was difficult to put in[to] practice."*

"The difficult aspect of this course was doing the practical[s]. It was difficult for me to figure out how they come into the course".

Two lecturers, on the other hand, commented:

"Although I had taught this course at Rhodes [University] before, I had to reform the existing slides for the course to make it more suitable. I had to modify the pracs [practical exercises] to make it more understandable to the students."

"I incorrectly assumed that they [the students] would have stronger programming skills. So while I do not think they needed more preparation for the virtual classroom, they needed more preparation to complete the work outside the virtual classroom."

Because of the limited schedules between the participants between the two institutions, it was important that both participants were in the virtual classroom at the agreed times, in order not to interfere with each other''s timetables. When the students were late, the lecturers would **often wait for a few minutes** and would start as soon as the first student had arrived in the class, while the rest of the class had to try to catch up with the lost work. In the cases where the students were extremely late, the lecturers decided to either **postpone the class to the next scheduled session, or to record the lecture and have the students go through it in their own time**. Table 7-4 shows sample emails from the lecturers describe the actions they took when the students did not show up or were extremely late for class.

Table 7-4: Sample emails from the lecturers related to disappointing turn-ups of students at the lecture sessions

> **Email 1:** *Morning, it's now nearly 10 minutes after the lecture was due to start, and I have received no notice of delays or any indication anyone is online. I am in the process of recording the lecture which I'll post online. Again, please confirm the time for tomorrow's lecture. Confirmation for 09h45 Namibian time today was received yesterday.*
>
> **Email 2:** *I was logged in to Skype since 7.10 in the morning. At one stage X[name withheld]'s profile went from offline to online and I tried to call her but it did not work. From 7.30 I tried calling you and all the other students but no one picked up. At 8am I logged off of Skype so that I could record the lecture to send to you.*
> *Let's put this down to a learning experience. What we need to do though is make sure everyone is in the right venue on time. Even yesterday students were 20 minutes late arriving. 20 minutes late is still too late. More than being worried for wasting my time, I am more worried what will happen if this lateness continues when the new lecturers start. They are not .... let me say they're not the most lenient people. And actually we shouldn't expect them to have to be. The students picked these times, so they should all be in the classroom and ready to start at the times they specified.*

Regarding plagiarism, the lecturers would often inform the students that they had plagiarized the assignment, and ask them to redo the assignment and submit it again. If the assignments were late, the lecturer would communicate to the facilitator, who would then encourage the students to hand in the assignments or to assist them if necessary. In two cases however, the students handed in the assignments late, and the assignments were all plagiarized. The lecturer responsible for this subject requested the department to take disciplinary action against the students (see the email in Table 7-5). The department could not take any action against the students, however, because the modules would not bear any credit towards the students" final qualification. Even if action was taken, the students would only be credited for participation in the course, and their actual marks are not reflected in their academic record.

Table 7-5: Lecturer's complaint about a late assignment and plagiarism

> *Morning*
> *This assignment is more than three weeks late, and no request was made for an extension. In addition it is almost completely plagiarized. total editing time on the document clearly shows a cut and paste job, and a poor one at that.*
> *Sources appear to be [X] assignment and [Y] (which was in turn plagiarised)*
> *This assignment gets a score of zero. I do not believe the student has engaged with the course material to a level that would give them a chance of success in the exam. I would strongly support any disciplinary action the department may take against the student for plagiarism.*

7.2.4.2 An analysis of the cultural problems

Lecturers" actions to change the teaching style to fit the online environment came as a result of a common secondary contradiction between the tools (i.e. the virtual classroom tool) and the object of TAS (i.e. to enable student learning). In technology-enhanced learning environments, it is widely acknowledged that the technology used does not define the quality of learning; rather, effectiveness in these environments is determined by module design (Anderson, 2008). Anderson (2008) argued that module design that results in the required level of learning by all participants in a virtual environment should be learning-centred, knowledge-centred, assessment-centred and community-centred. Since all but one of the lecturers were experienced in teaching online classes, they all deemed it necessary to change their existing module to make it suitable for online teaching.

In order to understand their backgrounds and what the students already knew about their modules, some lecturers gave their students pre-assessment work prior to the start of the module. This can be viewed as a quaternary contradiction in the activity system, where the lecturer is given as input, students to their activity system, but they do not really know how much these students already know about their modules. The pre-assessment often came in a form of a test or exam. Depending on how the students performed in this work, the lecturer would then adjust the level of the module. In some cases, the lecturers would also discuss with the facilitators and agree on the level of the presentation of the module, depending on how the students were experiencing the module. Adjusting the level of the module to suit the student"s needs can be viewed as a tertiary contradiction, where a new tool (new content) is introduced into the activity system, with the hope that it would better facilitate the achievement of the objective.

Lecturers" actions to record the lectures came as a result of a primary contradiction between the rules (i.e. both the student and the lecturer must be present in the class at the specified time vs. students devoting their time to other activity systems that they deem important during that time). The actual action of recording the lectures and expecting the students to go through them in their own time introduces a new tool to the module (a tertiary contradiction) with the hope that the participants would still achieve their objectives.

Lecturers" actions to request the department to take disciplinary action are an indication of a possible quaternary contradiction. The department"s inaction in taking disciplinary action which is within its reach is a result of a primary contradiction between the institutions" rules and the department"s noncompliance in carrying out a disciplinary hearing. The rules clearly authorize the department to do something about it. Since the department does not see the impact of performing that action, however, it opted to avoid taking action.

7.2.5   Individual expectations

Benefits of participating in the project not apparent

One of the challenges that the staff constantly struggled with prior to the commencement of the SANTED project is the publication of research papers and the registration for higher degrees in order to further their personal development. In the MoU between the two institutions, these two issues were identified as some of the collaboration areas that the institutions would focus on. The staff members at both institutions therefore had an expectation from one another, that this would happen as early as 2008. Disappointments with regard to these benefits were expressed in the interviews with the staff members at both institutions. Staff members at RU expected a proactive approach from UNAM staff members, where their expectation was for the individual members to approach them with their areas and topics of interest which they could then jointly work on to arrive at the PhD research topic. Staff members at UNAM, on the other hand, expected topics of interest to be circulated to them from RU, from which they could choose depending on their interests. The only progress with regard to these two benefits was experienced in 2010, however, towards the end of the project. The facilitators acknowledged during the interviews that this had affected their participation in the project.

No support for non-Namibian lecturers

All lecturers in the department expected support from the University through their participation in the project. Lecturers registering for higher degrees at UNAM are usually supported through the staff development office, which does not provide financial support to non-Namibian lecturers registered outside of UNAM. Through the project, the lecturers expected that support for registration for higher degrees could be funded through the project.

The funders, on the other hand, wanted UNAM to demonstrate the individual institution"s commitment to the project, part of which required the institutions to commit some funds the project activity. Because of the funding mechanism already provided by UNAM, it was much easier for UNAM to commit to funding staff members through the staff development office. In the process, however, this eliminated some eligible non-Namibian lectures who would have qualified for further studies at Rhodes should funding have been available.

Departmental indifference

Lecturers at RU expected UNAM"s support with the involvement of the lecturers and students. As shown in Table 7-5, a lecturer from RU requested the UNAM department"s intervention in solving a plagiarism case in one of the assignments that a student handed in, but no action was taken against the students. The lecturers at RU also indicated their disappointment with the indifference that the department had taken towards the facilitators that had not fulfilled their duties in the project. In one such module, Computer Graphics, the facilitator was paid in advance because the funders required all payments from the budget to be completed before a certain date in order to allow the auditing process of the project to commence. By that date, however, the module was not yet delivered to the students. In the end, the department had to act in faith by paying the facilitator, and trusting that the facilitator would perform the duties paid for in advance. As reported by the lecturer and observed by the researcher, however, the facilitator never attended a single session for the duration of the module.

7.2.5.1   *Actions taken to minimize problems*

After the lecturers at RU aired their concerns about the lack of involvement of the facilitators and students in some of the activities of the project, the Project Coordinators **developed a Students' and Facilitators' guide** highlighting the objectives of the project, the expectations from all participants, the contact details of all participants as well as the outlines of the modules. This guide was circulated among all the participants in the project. To maximize the benefits of participating in the project, **an honorarium was also given to each of the UNAM lecturers** that had facilitated the module from the second year of study. In addition, the **project coordinators became more involved with the search of PhD topics for the**

facilitators at UNAM, encouraging them to contact the lecturers at RU that are directly involved in the area of study and suggesting that they visit RU to do a preliminary survey of the topics that may interest them. When the facilitators visited RU, their area of research was identified and they were assigned to one person as a supervisor for their studies. They also immediately commenced the process of applying to RU for admission to study. In addition, it **was agreed that the left over funds from the project would be allocated to non-Namibian lectures to enable them to register for their studies at RU**.

Regarding the lack of involvement of the facilitators in Stage 3 of the implementation, the Project Coordinator at RU **requested the Head of Department at UNAM to intervene** by arranging sessions with the lecturers that had taken over the modules. This way, the Project Coordinator could ascertain whether the handover of the modules was successful, and determine the extent to which the content developed over the previous two years was integrated into the modules. Despite the Head of Departments" involvement, however, the Project Coordinator from RU was never invited to any of these lectures.

7.2.5.2 *An analysis of individual problems*

The Project Coordinators" action of producing a manual indicates a conflict between the rules in the implementation plan and the actual roles and responsibilities (division of labour) that were carried out by the participants in the project. In a way, this also demonstrated the Project Coordinators" limitations in coercing participants to engage in the activities of the project. This tension demonstrates that the project implementation plan assumed automatic participation of the students and facilitators, and **did not take into consideration the complexity and interplay of other factors that could affect their participation in the project**.

The decision to pay the facilitators was made in the second year of the implementation, as soon as it was found that the lack of involvement could also be attributed to the lack of benefits that the facilitators expected from the project. This again indicates a tension between the Project Coordinators" assumptions of what would motivate the facilitators, and the actual factors that motivated them to participate. In addition to the payment, **the Project Coordinators also facilitated the process of admission of the facilitators to RU**.

7.3 Conclusion

This chapter described the categories of problems experienced in the SANTED VCP. The problems were broadly classified as infrastructural, institutional and cultural issues and individual expectations, and the specific problems experienced and their causes were identified as summarized in Table 7-6. The chapter then used activity theory to analyse how each of the activity systems in the project was impacted by these problems, as well as to explore the contradictions indicated by the underlying tensions within and between different activity systems.

Table 7-6: Categories of challenges, the specific problems experienced and their causes as identified from the thesis

Category	Problems experienced	Causes
Infrastructural	Acquisition of infrastructure Unavailability of virtual classroom Disruptions in internet connectivity Unguaranteed bandwidth Unavailable features of classroom Lack of expertise	Problems with finance systems Late delivery of equipment Hosted solution Unstable networks
Institutional	Lack of support for collaborative work Poor participation of staff members Lack of commitment to project agreement Rigid administrative structures Inability to integrate collaborative activities into institutional activities	Lack of policies on collaboration Lack of incentives Lack of communication between decision makers and decision implementers
Cultural	Different teaching and learning styles Lack of interactivity and feedback Time orientation Late submission of assignments Plagiarism Lack of preparation for classes	Different educational backgrounds Monochronic vs. polychronic cultures
Individual	Delayed benefits of participating No support for non-Namibian lecturers Departmental indifference	Non-payment, incentives Affirmative action policy

CHAPTER 8: ANALYSIS OF BUILDING CAPACITY IN A COMMUNITY OF PRACTICE

As with the recommendations of Dall"Alba and Sandberg (2006), analysis of the capacity-building process must not focus only on the transition stages (i.e. how capacity is built), but also on the understanding of, and in practice (i.e. what capacities are built). The explanations of the activities of the case study presented in this thesis therefore look at both the transition process as well as the practice of the capacity-building partnership. This section discusses how Lave and Wenger"s (1991) concept of Legitimate Peripheral Participation (LPP) in a community of practice was used to analyse and interpret capacity-building initiatives in the research study. The methodology used is similar to that used by Lupele (2007), where he used Legitimate Peripheral Participation (LPP) concepts to probe professional development. As explained in Section 4.2, LPP in a community of practice posits that learning is a process where newcomers gradually move from the periphery to becoming full participants in the activities of a community. A community of practice, on the other hand, is viewed as "a living context" which provides opportunities for newcomers to access and rehearse the required competences of the practice (Wenger, 1998). This chapter therefore uses the concept of legitimate peripheral participation in a community of practice to report on the experiences of the participants in the virtual classroom project. As discussed in Chapters 4 and 5, it specifically looks at the organization of access, levels of participation, structuring resources for learning, discourse, contradictions and conflicts in learning, and transformation of practice.

8.1 Organization of Access

Lave and Wenger"s (1991) case studies of apprenticeship demonstrated that learning does not simply refer to the accumulation of skills and knowledge. Rather, it refers to the process of becoming who one wishes to become by developing the required competencies during the capacity-building partnership. This implies that learning in a community of practice does not always require a teaching effort; as long as people have access to, and membership in, a community, they can assimilate the essence and required knowledge of the practice. Lave and Wenger (1991) therefore emphasized the need to ensure that participants have access to difference sources of what needs to be learned. According to them, these sources include observing the masters at work, listening to their stories, having access to their sources of

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information, and having access to opportunities. This section will therefore assess these sources of information in the SANTED virtual classroom case study.

8.1.1   Observing the masters at work

In the first year of the implementation of the SANTED virtual classroom project, the objective was to have all the modules presented by lecturers who were already experienced (RU lecturers) in that subject, with lecturers who aimed to develop the required competencies attending as observers (UNAM lecturers) in the specific modules. According to the principles of LPP, the facilitators in this case need access to both the lecturers, the content they present, the books the use, and other technological and cultural tools they use to support their activities, in order to have legitimate access to the community. In addition, they also need to observe the lecturers in practice: how they present the specific topics, how they interact with the students, and how they appropriate the technological and cultural tools to serve their purposes.

The interest in this research was to identify technologies that were used and how they enabled people distributed across the two institutions to participate in their community of practice. According to Lave and Wenger (1991, p. 101), "becoming a full participant certainly includes engaging with the technologies of everyday practice, as well as participating in the social relations, production processes and other activities of the communities of practice". It was therefore important to identify the tools the community of practice used, what tools they developed, how they used them for growth and development to serve their purposes, and how technology made them experience the community although they were not together physically.

By participating as observers, the facilitators had access to the lecturers, their actions, their style of organizing and presenting lectures, the way of interacting with the students as well as their style of assessment and evaluation. As explained already in Section 6.1, many of the facilitators had little or no experience in the contents of the modules, and hence the need for their participation. The capacity-building methodology used did not enforce learning of "a discreet body of abstract knowledge which can be transported and reapplied in later context" (Lave & Wenger, 1991, p. 14). Rather, the facilitators were exposed to mentoring and role modelling. Through lecture attendance, they were exposed to both the terminology and concepts of the module, the skills required to present such topics, and in some sense, their

initial understanding of the contents and important topics that needed to form the curriculum of these modules.

In addition, there was mutual engagement between the lecturers and the facilitators, as well as the facilitators and the students. Initially the involvement of the facilitators was limited to arranging common times for the students and lecturers for the class sessions, and ensuring that the classes ran smoothly from UNAM side. As the classes progressed, however, and the lecturers went deeper into the content, the students" first point of contact was with the facilitators. They began engaging in the content and discussing it with the students, often taking the more difficult topics or points that need clarification to the lecturers. When they experienced problems with the general organization of the classroom and the technology and tools that were in the classroom, they had direct contact with the Project Coordinator.

8.1.2   Listening to stories

Within the timeframe of the implementation of the module, the participants in the virtual classroom shared stories of the module experiences. After presentation of specific lectures, the lecturer would discuss with the facilitator specific issues with regard to the lecture. These included failures and successes of the technology, their original intentions and plan of presenting a module and how or why it did or did not work, and the plan and changes that need to be made for the next lecture to ensure that it is more successful than the previous lecture. Both the facilitators and lecturers were interested in the improvement of the practice in the virtual classroom. They were interested in ensuring that the content matched the students" understanding and that the presentation was appropriate for the students. In discussing their experiences and suggesting changes that needed to be made to ensure the success of the lectures, they contributed to designing the learning curriculum of the project.

From the transcripts of the interviews, it became apparent that the lecturers also shared stories of experiences among themselves. In the transcript below, the lecturer"s choice was influenced even before using the software.

> *"I had only heard negative things about the Wimba classroom before I taught this course so I was a bit sceptical about the software itself. It does not seem appropriate for how we use it. It doesn't seem to support our uses, demonstrations as well as slide shows, etc. I heard that it worked well for a demonstration was given by the Wimba people, but it does not work for us…"*

SANTED had established Monitoring and Evaluation procedures that required semi-annual meetings reporting on the project‟s progress (Smith & Cross, 2010). During these meetings, the participants in the project shared stories of their experiences of developing and presenting modules in the virtual classroom. Such experiences included what worked in the virtual classroom, what did not work, how the students participated in the modules, how the lecturers changed their modules to accommodate the background and programming capabilities of the students. In addition, bi-annual reports prepared for the funders documented the narrative experiences of both the lecturers and students, and were widely circulated among the participants of the virtual classroom. In sharing their stories of successes and failures as well as experiences, they provide a model to others who are in the same context, sharing the same conditions of the practice that they are engaged in.

8.1.3   Having access to the sources of information

In a community of practice, learning is believed to come from a variety of sources. In addition to having access through availability of individual lectures, therefore, the facilitators also needed access to other sources of information. They needed to learn about creative ways of engaging students by involving them in lectures, discussions and reflections. They also needed to have access to other members of the two departments who might not necessarily be involved in the project. In addition to the semi-annual reports that were distributed to the departments as well as the online contact with the specific lecturers, periodic visits for staff from both institutions were also scheduled. A visiting lecturer from both institutions is allocated an office in the department, where they could engage in informal discussions with the staff members at their own convenience. Occasionally, the departments would also hold a dinner in honour of the visiting lecturer from the institution. While these may appear informal, Wenger (1998) highlights the difficulty in distinguishing the value from a piece of information and the atmosphere of friendliness they create:

> *"In order to be a full participant, it may just be as important to know and understand the latest gossip as it is to know and understand the latest memo" (Wenger, 1998, p. 74).*

One such dinner was held in honour of the Real Time Multimedia lecturer‟s visit to UNAM in 2010 (see Table 8-1 for an edited version of the recollections from the dinner from the research diary). During the visits, the departmental family members had a discussion about

their family members, when one suddenly indicated that they were thinking of a project in Indigenous Knowledge because of the interest that her son has shown in acquiring local knowledge. From the discussion, it emerged that one of the departmental members was also engaged in a project on Indigenous Knowledge with another department at UNAM, while RU has a full research group that is focusing on indigenous knowledge. As a follow-up on the discussion, the two departments have already made the initial contacts and plans to collaborate in this research topic are underway.

Table 8-1: Piece of information from the research diary

Date: 26 November 2010 **Place:** Joe˙'s Beer House **Title:** Dinner in honour of [X]

Details of the Event: A dinner was called in honour of [X]. It was organized at a short notice. Four members of staff had made prior arrangements and could not make it.
What happened: critical incidents? A colleague indicated that she is planning to submit a proposal titled "Namibianizing the Internet" for UNAM funding. [X] indicated that the work is related to what they are doing in the CoE with the Siyakhula Living Labs in Dwesa. They are looking at the preservation of indigenous knowledge. [X] added that Mr. Y [name withheld] from UNAM is currently also doing research in that area, and it could really be good if we can work together. The two departments informally agreed to jointly explore the area of indigenous knowledge starting in the year 2011.

What I observed: None of the members were aware that our colleague is doing research that is directly linked to the department. We do not share information with one another. Perhaps we do not have enough corridor talks to discuss our work in the department.

What I thought, felt or concluded: It is very strange that we only come to discover our commonalities during dinner, in the presence of the visitor. We need to be much more open with one another. We need to share more.

What I planned: To discuss this further with the department, on how we can be more open with one another regarding research. To follow up with the RU student early next year

8.1.4 Having access to opportunities

A potential limitation of a community of practice is that of sequestering newcomers. Lave and Wenger (1991) argued that the community must be careful not to seclude newcomers. They provided several examples where a community of practice prevented newcomers from accessing the central practices of the community, or where the activities were far removed from the practice, thereby denying newcomers productive access to the activity of the practice. In the first year of the SANTED Virtual Classroom Project, the facilitators were given limited access to the practice. They arranged sessions and did trivial jobs. The aim,

however, was not merely for them to attend the lectures and conduct their observations. Rather, it was to open up opportunities to allow them to participate in the practice.

The facilitators and lecturers often did not have a session to discuss the basic concepts of the topics to be presented. One facilitator strongly suggested that they should get an orientation on the module before it was presented to the students. "*I was not prepared for this course at all… I needed [a] little training on the course before the course started*". The facilitator argued that the students would sometimes approach her with questions, and she felt bad that she was not always able to answer their questions. All the facilitators agreed that having some background knowledge on the modules made it easier to facilitate the module, and also enabled them to follow the module presentation style more easily. It also made them much more comfortable in front of the students. This issue was taken up with some of the lecturers in the modules, to discuss the possibility of the crash module to the facilitators before the sessions with the students. The facilitators" responses are summarized in Table 8-2.

Table 8-2: Participants' perspectives on the need for training on the content before the module starts

Question: Some facilitators proposed that there should have been a train-the-trainer session between the lecturers and the facilitators at the beginning of the module. Do you agree with this perspective?

Answer 1:

I think before they start the teaching, they should have come down to the department. I sit in the class, they will come down to train the in-house people first. So that when we go to the class to facilitate, we will not be sitting down without knowing anything. You know … I was just like a student. I was just one hour ahead compared to the students. Just that I am a lecturer. So, I shouldn't be that. I should know more. It is better that the lecturers are trained first. Contact sessions with the lecture are a must. So that we as the facilitators feel confident and comfortable around the content.

Answer 2:

In my view, the facilitator does not need to have prior knowledge on the subject… for example in my case when I facilitated…HCI … I had no idea about HCI… so, while the lecturer was teaching it also helped me …apart from teaching the students, the lecturer also made it possible to make the facilitator to have more insight into the subject that is being taught. This also makes it possible for the facilitator to be able to teach the course in the absence of the distant lecturer.

Answer 3:

My lectures were all recorded and I think the facilitators could have gone through the materials before the class. I think they should have asked questions after the class… because never did anyone ever ask anything…. I could tell that both the students and the facilitators did not go through any of my resources that I sent up. And when I visited Windhoek, they… they didn't go any of the stuff that I set up for them while I was there either.

As can be seen in Answers 2 and 3 of Table 8-3, not all participants agreed with the need for train-the-trainer sessions. Some lecturers felt that since they were the ones teaching the modules, there was not much needed by the facilitators before the modules started. If there were questions that arose directly from the content, the lecturers could pass the questions to the facilitators during class time. A lecturer who had pre-recorded her lectures on DVD noted that the participants in her class did not appreciate her efforts; neither the students nor the facilitator went through the content before the scheduled sessions. She was therefore expected to repeat all the content on the DVDs because the participants had not gone through it.

8.2 Levels of Participation in a Community of Practice

As explained already in Chapter 6, the SANTED Virtual Classroom Project defined three different levels of participation that enabled newcomers to move to full participation in the community of practice. These levels are realized in the different stages of the capacity-building process, where each level hands over more and more responsibilities to the facilitator, until the full module has been taken over by the lecturer. These levels are based, however, on the assumption that the departmental members will participate in the partnership (i.e. they will be actively involved in the process of capacity building). As Wenger (1998) correctly observed, people do not automatically belong to a community of practice because they work in an organization, belong to a certain department, or talk with people who belong to a community of practice; they belong to a community of practice because they sustain relations of mutual engagements that are organized around what they do.

Even in the Virtual Classroom Project community of practice, not all members of the departments were members of the community. It is only the Project Coordinators, the lecturers, and the students who participated in the project that can be considered members of the community of practice. These people worked together from time to time, interacted with one another regularly, exchanged opinions and experiences and influenced each other"s understanding as they developed shared ways of achieving their objectives. Even those who engaged in these VCP activities, however, did not always reach the desired level of full participation. For some, it remained peripheral; limited to observations and with no engagements in the real work that demonstrated their grasp and confidence to participate in the practice. For others, it was a matter of marginality. They could not participate because the

conditions of the project restricted them from participating. The main reasons identified that prevented people from participating thus include: workloads, politics, and marginality.

8.2.1   Politics of participation

According to Wenger (1998), participation in a community of practice may be affected by politics. Politics, in this case, includes influence, personal authority, nepotism, rampant discrimination, charisma, trust, friendship and ambition. Participation in Wenger's opinion can be affected by a combination of factors, such as how people see themselves, what they care about, what they choose to do or to ignore and who they want to connect with or avoid. While some of these are defined by individuals, not of all of them are personal choices. Considering the case of lecturers from RU, for example, they might have wished to participate in the project but were restricted from doing so because of the "experts" condition. The project required lecturers who had taught the modules before. This immediately discriminated against the lecturers whose areas of specialization were not covered by the project.

Regarding the capacity building at UNAM, the tutors for Computer Literacy also described their disappointment at the restrictions placed by the project. Apart from those who participated in the VCP as students, the tutors were not given an opportunity to facilitate any of the modules. This is because the facilitators were seen as lecturers who would take over the modules once the project has come to an end. Although they were encouraged to participate in other activities of the project such as project meetings, they felt marginalized and excluded from the main activities of the project. Participation in this case was therefore a source of power or powerlessness (Lave & Wenger, 1991), since it afforded or prevented interchange between the participants through the discrimination of who could participate and who could not.

Wenger observed that non-participation may be a sign of disengagement and boredom. He clarified, however, that people could also deliberately choose not to participate because they want freedom, privacy or protection from societal conflicts of interest that they feel powerless to address. When none of the students made it to RU after the first year of implementation, one of the facilitators remarked, "*I felt embarrassed to have been part of the project*". He could not separate the failure of the students from his own failure, and felt responsible for the

students not making it as expected. He also indicated that he did not want to be associated with the project in the following year. In an interview with a lecturer at RU on the views of the lecturer not wanting to be associated with the project, the lecturer answered:

> *"That would not have helped at all. It is the students themselves that did not perform. So it is the students rather than the institution that was a problem"*

8.2.2 Participation in the different stages

Expectations of participation in the project were defined for different levels at the initial stages of the project. Observations from comparing the expectations and the actual levels of participation were variable, however. In the first year of implementation, not all the facilitators and the students attended all sessions. The researcher"s observations and the lecturers" questionnaires revealed that session attendance was quite good for the first three modules presented, but decreased greatly in the last module. The lecturer for the third module in 2008 commented on the facilitator"s availability as follows:

> *"My facilitator was unavailable for most of the time I taught this module. He attended only one of my lectures that I gave when I taught the module in Windhoek. The Project Coordinator stood in for him during the online sessions."*

A follow-up with the facilitator revealed that the lecture sessions sometimes coincided with his normal lecturing hours. However, it also appeared that the facilitator was not always aware of when the next session would be. Because the last module was conducted right at the end of the year, the students had more freedom to choose a suitable time the day before, as they were not attending many lectures during that time. The lecturer and the students would then decide on the next session during the lecture, and because the facilitator was not present, he would not know when the next session would be. The facilitator is to blame for this inconsistency, however, because he could have followed up with the class to find out when the next sessions would be conducted. In addition, the students reported that they did not receive any kind of support from the facilitator in this module.

The students" participation in the modules was initially good in 2008. However, the two students that had not done their previous studies with UNAM had difficulty with the skills required by the first two modules and dropped out. Apart from the first module, the lectures

reported that the students" participation in terms of interactivity and feedback when asked questions was very low, and their lack of respect for the agreed lecture times was also noted.

In the second year of implementation, the facilitators were supposed to take over some of the lectures in the modules that they facilitated in 2008. Two of the lecturers that participated in 2008, however, did not feel comfortable enough with the content to take over the sessions. As a result, they made an internal request (only done in the department at UNAM) that they be given enough time to go through the content on their own, to get a grasp of the content before they presented it. This arrangement disappointed the lecturers at RU, however, who were eager to see a proper hand-over of the modules by the end of the project. The two departments agreed, however, that two facilitators would be appointed in these modules instead of one, so that the two could assist each other when the full implementation was handed over to UNAM.

In the third year of implementation, the facilitators were supposed to take over all of the modules, and these were now handed over to UNAM as credit-bearing modules, and part of the new curriculum. The results for the handing over was disappointing, however. Of all the modules that were handed over to UNAM, only one, Computer Networks, was implemented according to the planned staged capacity-building process. The lecturer who taught Human Computer Interaction in 2009 left on study leave to complete her PhD, and the second lecturer who co-facilitated the module felt uncomfortable with taking over the module. This is to be expected because the lecturer did not attend most of the sessions, as explained in Section 6.2. The new, part-time lecturer that took over the module explained that he found the content too difficult and advanced for him to follow, and rather decided to re-create the module from scratch. The Enterprise Java module was incorporated into the module called Advanced Web Programming. The lecturer for this module was requested and reminded on a number of occasions to invite the observer lecturer from RU to at least one session. Although the lecturer agreed, the invitation was never made. The PowerPoint slides distributed to the students, however, revealed that the lecturer had incorporated quite a substantial amount of content from the lectures presented at RU. The last module, Real Time Multimedia, could not be offered at all at UNAM. Since it is an elective module, the department has a choice of not offering it in a particular year, and the students were informed that the module was not available for 2010, and therefore did not register for it.

8.3 Structuring Resources for Learning

Lave and Wenger (1991) stressed the need to ensure that the resources are organized to the curriculum of the practice. They suggested that learning may be subdivided into phases, where each phase is a level of opportunity to consider how the previous step contributes to the next one. In the virtual classroom project, the resources were structured in terms of stages that were explained in Chapter 6. In the first stage, the facilitators started their membership with a period of observation and limited duties in the classroom. Here, they constructed their first approximation of teaching the specific topics in a module. In the second year of study, they moved to more complicated parts that required them to collaborate with the lectures. Here, they had access to many resources, including the previous lectures recorded on the system, and the lecturer herself. In the final year, they advanced to presenting the modules by themselves, only requesting for lecturer"s interventions when necessary. Since these stages have already been explained in greater detail, this section focuses on the relationship between the participants. Lave and Wenger (1991) argued that the structure of resources for learning can also be analysed by looking at the relationships between the participants. They stressed, however, that the focus should not be on the master-apprentice relationships, because these relationships are not a characteristic of learning, and that they will vary across time and place. Rather, they suggested that focus should be on the division of labour, apprentices" relations to other apprentices and apprentices to other masters who organized opportunities to learn.

8.3.1   Relation of facilitators and lecturers

There was some variance regarding the relationships between facilitators and lecturers, as well as the level of interaction between them. In the first year, the lecturers felt that they did not have sufficient contacts and interactions with the facilitators, mainly due to the facilitators missing scheduled class sessions, arriving late, or just distancing themselves from the activities of the class. In the second year, two lecturers did not have the same facilitators as the previous year. The lecturers had to start all over again with the capacity-building process, and the facilitators in those modules acted again as observers in the second year of implementation. In the third year of implementation, two of the lecturers were new, and they had to develop new relationships with the facilitators all over again.

The facilitators who had been with the project for three years, on the other hand, felt they had a good relationship with the lecturers. Although some did not facilitate the same subjects in

subsequent years, they felt they knew the lecturers better, and could approach them if they needed any kind of help from the lecturers. A follow-up with the lecturers, however, revealed that none of the facilitators had contacted the lecturers in 2010 about the lecture materials and content presented over the past two years. Rather, the facilitators who made any contact at all were interested in starting their PhD studies, and asked the lecturers to assist them with identifying a topic for their PhD research.

8.3.2   Relations between lecturers, facilitators and students

Both the lecturers and the facilitators commented on the low level of interaction between the students and the lecturers during a typical lecture. This was especially observable in modules where the students and the lecturers had not met face to face before the modules started. One lecturer remarked that the level of interaction was very low, "*except for one student who was the most bold in asking questions. [The rest were] mostly quiet even when asked if they had questions*".

8.3.3   Relations between learners

There seemed to be quite a good relationship between the learners. Even outside of classes, the women especially, were seen hanging about and walking together in corridors, doing their assignments together, and consulting with their facilitators together. When one of the learners was not present in class, they would send each other messages to remind each other of the class times. They seemed to even know each other"s family conditions and situations better. The relationship can therefore be described as good.

8.3.4   Other opportunities for engagements

According to Lave and Wenger (1991, p. 93) "a learning curriculum unfolds in opportunities for engagement in practice". Although there were common activities that were built in all the modules, different lecturers and facilitators also provided different opportunities for engagements in the individual modules. In the networking module offered in 2009, for example, the lecturer used a wiki, in addition to recorded lectures and the discussions, to enable students and facilitators to extensively discuss their topics of interest. A look at the wiki, however, revealed that neither the facilitators nor the lecturers from UNAM made an effort to contribute to the discussions on the wiki. Only two students asked questions related

to the content presented in the module. On reflection then, it appears that despite the opportunity provided to engage in and contribute to the activities of the module through the wiki, participation was still limited to the synchronous module activities.

Outside of the planned lecture sessions, other interaction opportunities were arranged throughout the duration of the project. In 2008, for example, the Mobile Telecommunications Company (MTC) learned of the developments that the CoE at RU were making in connecting rural citizens. They also learned about the collaboration between the CoE and the department at UNAM. Through this collaboration, the two departments were requested to draft a proposal for the creation of MTC"s Citizen Connect Centres that would provide rural citizens with a connection to the internet. However, although the joint proposal was submitted, the manager responsible for Corporate Responsibility resigned before the Centres could get going, and the project was called off. Other initiatives that provided opportunities for engagement in 2008 are highlighted in Table 8-3.

Table 8-3: Other capacity-building activities for 2008

Activity	Date
Official Project Launch and signing of MoU between UNAM and RU	3 July
Face to Face lectures for Real Time Multimedia at UNAM	1-5 July
Face to face lectures for Computer Networks at UNAM	26 July–1 August
UNAM staff member visit to RU	1–4 October
Dinner with other SANTED sponsored project at Grahamstown	2 October
SANTED Progress Review at RU	3 October
External moderation of UNAM exams by RU lecture	23–28 November
Computer Department Planning session with RU	27 November
Face-to-face lectures for Java Enterprise at UNAM	28 October – 02 November
Face-to-face lectures for HCI at UNAM	17-28 November

Apart from the traveling opportunities where staff members had the opportunity to engage, the year 2009 was characterized by the presentation of research project proposals and results by Honours students at RU. These presentations were synchronously streamed to all final-year students in the department at UNAM, with the purpose of getting ideas for research projects and at the same time establishing contacts and increasing interaction activities between the students. The activities are summarized in Table 8-4.

Table 8-4: Other Capacity-Building Activities for 2009

Activity	Date
RU Honours presentations, viewed at UNAM via video-conferencing	24 March
Visit by UNAM staff at RU	19–22 April
SANTED Programme Review, attended by one UNAM staff member	20 April
UNAM staff member attends and presents at technology workshop at RU	10–14 May
Face to Face lectures for Computer Networks at UNAM	10–15 May
Signing of MoU between UNAM and TN, attended by RU CoE coordinator	23–25 July
Face to face lectures for Real Time Multimedia at UNAM	26 July–1 August
RU Honours presentations, viewed at UNAM via video-conferencing	28 July
Visit by UNAM and TN representatives at the CoE at RU	20 -23 September
SANTED Programme Review, attended by one UNAM staff member	22 September
External Moderation of UNAM exams by RU staff member	17 - 21 November

Expansion of relationship building between the two departments was one of the top priorities for the year 2010. The focus was particularly placed on the relationship between the staff members. As a result, staff members interacted more frequently than in the previous years. From March to April, staff members from both departments jointly developed papers on their research experiences in the SANTED Virtual classroom. These papers were jointly presented at the IST Africa conference in Durban. In addition, the achievements and challenges of the project were also presented at the IST Africa Workshop in Windhoek. More visits by staff members were also conducted in 2010 than in any other year of the project. One of the facilitators who visited RU remarked as follows in an interview after the visit:

> *"When I was in Rhodes, I attended X's class … a small class in Rhodes. She was taking the paper… the research paper in the classroom. And she was taking the assignments from the research paper, ok. This is the problem that they are solving in this paper… the problem statement is this…. go and code this, this, this… in Java on your mobile phone. I was thinking, the teaching with the research paper… while we are still using the old books at UNAM… that really impressed me. And I am going to use the same in my classes from now on"*

The other activities carried out in 2010 are summarized in Table 8-5.

Table 8-5: Other Capacity-Building Activities for 2010

Activity	Date
Installation of Firewall and Internal switch at UNAM by RU staff	8–11 February
2 UNAM and 2 RU staff present joint papers at IST Africa Conference in Durban	18–21 May
RU staff visits department at UNAM	6–19 June
UNAM staff member visits RU	31 August–5 September
2 UNAM staff members visit RU	12–25 September
2 RU staff members visit UNAM	24-25 November
UNAM staff member visits RU	1 – 15 December

8.4 Discourse of Practice

Several avenues were provided for in the practice that enabled the lectures at both institutions to dialogue about the teaching and learning of Computer Science. Firstly, at the end of each year, a departmental meeting was called where the activities of the virtual classroom project were reflected upon. These meetings were usually attended by all members of the department at UNAM and at least one or two staff members from RU. In the meetings, the two groups discussed what worked best for the year, what did not work, and decided on how the next phase of the implementation might be changed. In this meeting, they also jointly agreed on the plan for the following year, which included the activities to be pursued and the changes to be made to the implementation.

In addition, one of the Professors from RU is also the external examiner in the UNAM department. As the external examiner, the professor moderates all the question papers for all the second and fourth-year modules of the department, as per UNAM requirements. After the examiner has gone through all the question papers, feedback is given to all the lecturers in the department. In addition to ensuring fair allocation of marks and the relevance of questions in relation to the curriculum, the external examiner also ensures that an acceptable standard is kept across all the years of study in the department.

8.5 Contradictions and Conflicts in Learning

Lave and Wenger (1991) observed that a major contradiction in a community of practice lies between LPP as a means of achieving continuity over generations and the displacement inherent in the same process as full participants are replaced by newcomers. They also

observed that as the old-timers and newcomers share the „stage" of their practice, they not only discover their commonalities, but they also act out their differences and manifest their fears for one another as they threaten each other's destinies. In the virtual classroom project, this contradiction of a community of practice is inherent in the participants from the department at UNAM. According to UNAM's affirmative action policy, recruitment of employees should give priority first to Namibian citizens before expatriates. In fact, all non-Namibian lecturers in the department are employed on a contractual basis, on the assumption that they are training Namibians in the department to take over once their contracts have expired. Because of the inability of the department to attract staff development fellows in the department over the last few years, these contracts were automatically renewed upon expiry. Participating in this project, however, will indirectly affect their future. The students that would complete their Masters would come back to UNAM, and would immediately take over any position that becomes vacant as a result of an expiry in the contact. This is therefore a conflicting situation in the project: on the one hand, the lecturers want students who can contribute to the teaching of the modules. On the other hand, however, they are indirectly getting themselves out of UNAM because they will not be employed once the capable candidates are found. This conflict must have made it difficult for the non-Namibian lecturers to participate in the project. Although it is difficult to acknowledge openly, their fears are manifested in the actions that are sometimes taken in the project.

In addition, the project aimed at developing the capacity of existing lecturers in the department by enabling them to register for higher degree qualifications at RU. It was assumed that the staff members would be supported through the staff development office. As explained in Section 3.2.1, staff development support can only be extended to permanently employed staff members of UNAM. If the staff members are registering for PhD studies at UNAM, they would be exempted from tuition and class fees, although they would still have to pay the registration fees. If the staff members were to register at RU, they would be expected to pay for themselves. There was therefore no incentive to participate in the project, because they would not benefit from the project.

Another contradiction experienced in the project is that of teaching of the Masters modules at UNAM by RU lecturers during the year 2010. While the lecturers on one hand were interested in building the capacity of the lecturers at UNAM to enable them to teach Masters, they were on the other hand making it unnecessary for potential students to register for a

Master‟s degree with RU, because the same lecturers were teaching the modules offered by UNAM. As a result, students could not be sent for the Master‟s at RU at the end of the year 2010. Rather, they all decided to register with UNAM.

8.6 Generation of Identity

This section reports on the participants‟ perceptions of their involvement in the capacity-building process. It describes both the students, the facilitators and the lecturers‟ own interpretation of their role in the project, as well as their perception of what they achieved (or who they became) after having gone through project. The chapter arranges this according to: interpretations of their roles, what the projects enabled them to become, developing of new competencies and learning to teach the modules.

8.6.1   Interpretation of their roles

The students‟ perceptions of their role in the capacity-building virtual partnership differed widely across the years and as the year progressed. By the second semester of the first year of implementation, for example, all but one student had given up hope of getting a chance to register at RU, which eventually also affected their participation in the modules. In the second year of implementation, students were all enthusiastic and saw themselves as having equal chances of making it to RU and eventually becoming lecturers at UNAM. Apart from the student that dropped out of the module due to personal problems, they all worked hard until the end of the year. In the last year, the students were all mature students, and were all employed already. The modules were all credit bearing for all students and passing of the modules would have facilitated opportunities for promotion for all students. They all therefore were enthusiastic and took their roles in the project seriously.

For the lecturers, their roles seemed to have remained constant for the duration of the project. Most of the lecturers however focused on their role of teaching the students rather than specifically on capacity building. This was specifically evident in the second year of teaching, where some lecturers asked their facilitators to take over some modules, while the other lecturers proceeded with their daily teaching and did not ask the facilitators if they wished to present any of the lectures. While the facilitators themselves could have intervened by indicating which lectures they wished to present, it was evident that the lecturers saw more

of their roles as lecturing rather than transferring of skills. This is also evident in the answers given by the lecturers on their role in the project.

All the facilitators seemed to have a common understanding of their role: they saw themselves as the contact person for the lecturer based at RU, the first point of contact where students would go to physically to discuss and get help with the content of the modules, as well as ensuring that students turn up for classes and hand in their assignment work as required by the lecturers. In addition, they also saw themselves as future lecturers of the modules, and therefore believed that skills transfer was important between the two departments. They however seemed to have felt inferior in relation to their counterparts at RU. One of the facilitators that was asked to present his research topic when visiting the department at RU later remarked "*I did not want to present anything .... I went there as an empty vessel that was waiting to be filled*". This choice of words is strikingly similar to Freire"s oppressor-oppressed model (or the banking concept of education) discussed in Section 2.1.1.1. It was clear from the observations that some of the facilitators saw their roles as "vessels to be filled". It is however important they see themselves as both "vessels to be filled" and "vessels to be drawn from".

8.6.2   Becoming members of a community of practice

For the students, one of the main objectives was to register for Masters at RU, and to become lecturers at UNAM once they have completed their studies. Out of the 10 students registered in the first and second year of implementation that could come to RU however, only two students managed to secure admission and register at RU. Even those that did not make it however remarked that they did gain skills that enabled them to better pursue their careers in industry. One of these students remarked in the interview:

> "*Even those of us that did not make it to Rhodes for further studies .. we gained the additional knowledge, and gained the academic skills.. we are pursuing a different direction in the industry, although we did not necessarily come to the department. For me, it was an avenue that assisted me to move forward into my career*"

The lecturers all agreed that it enabled them to become more tolerant of other peoples" cultures and backgrounds. Those that participated in the lectures taught by the facilitators also noted the differences in the teaching methodologies used at both institutions, emphasizing the

level of details that the facilitators went to, as well as the preparation that the facilitators seemed to have put in before the presentation of the lectures.

8.6.3   Developing new competencies

The participants perception of the competencies developed in the project varied widely. Both the students and facilitators believed that they gained from the modules. The facilitators indicated that they now feel much more confident with the content of the modules. They all felt that they were more knowledgeable about the module than before they participated in the module. Only two of the five facilitators that participated indicated that they did not feel confident enough to present the full modules themselves, while the rest felt confident of the ability to present the module, and to adapt it further to the needs of the students at UNAM.

The lecturer however indicated that they did not feel that both the students and the facilitators developed the necessary competencies. With regard to the students, the lecturers came to this conclusion after looking at the assessment work done in the module, and the performance of the students in their exams. For the facilitators, the lecturers were unsure of the developed competencies since the facilitators did not attend all the sessions of facilitation and they did not invite them to all their sessions as expected in the third year of implementation. Nevertheless, the modules have now been handed over to UNAM, and the facilitators are now responsible for the modules.

8.7 Transformation of Practice

From Lave and Wenger's (1991) writing, one can deduce that the main aim of a community of practice is to reproduce itself through the addition and transformation of newcomers into full participants. LPP defines the experts as full participants while the newcomers are the learners that are aiming to participate fully in the practice. While it recognized that the newcomer is the one who is radically transformed during the process of achieving full participation, it also acknowledges that the masters themselves are also changed by acting as co-learners. In addition, the skills, knowledge and practice being mastered is also changed in the process. The changes that emerged as a result of the Virtual Classroom Project are explained in this section. The main changes include the ability to pilot future modules at the university, joint teaching of modules from outside, development of relationships between the two departments, changes in the lecture presentation style, development of module content,

experiences, knowledge and skills, registration for higher degrees, focused research and collaboration with Telecom.

8.7.1   Developing mutual relationships

The findings regarding the development of mutual relations are consistent with the work of others. The interest in collaboration between the two departments started as a result of a relationship between two colleagues in both departments. As the time progressed, however, and the participants from both departments got to know one another, more personal relationships began to develop between all the colleagues involved in the project. They began to trust one another more and more. In the early years of the project, it was observed that visits to departments were organized around the presence and availability of specific staff members that the visitors were comfortable with. As they began to mingle and interact with one another, they began appreciating each other more and being comfortable with one another. Visits to the departments, invitations for dinners and visits to personal homes were no longer restricted to the presence of specific individuals, but stronger, mutual relationships are now developing among the different staff members in both institutions.

8.7.2   Piloting of future modules

According to the implementation plan of the new curriculum at UNAM, modules that were taught in the project were only supposed to be phased in during 2009 and 2010. The modules could not directly bear credit for the students registered in the project because they were not authorized for teaching by Senate before 2009 and 2010. Through the project however, the department piloted the modules and even tested them before the implementation. This enabled the facilitators at UNAM to review the modules and to adapt them to cater for the different needs of the students in the department at UNAM. It also enabled them to get a feel of the level of difficulty of specific topics in the modules, and to estimate the level of engagement required with the content before implementation. As observed in the Advanced Object Oriented Programming module that was taught in 2010, the lecturer adapted the flow and wording of the presentations given in the Enterprise Java Module in order to make it more clear from their students. Piloting the modules therefore enabled the lecturer to be aware of what to expect and how to navigate the different components of the modules before they were presented in 2010.

8.7.3 Joint teaching of modules with lecturers outside

Most of the modules taught through the project were treated as pilot modules, or modules belonging to the project that did not directly affect the qualifications and running of modules in the department. In 2009 however, permission was granted by the PVC: Academic Affairs and research to teach part of the module Computer Ethics and Human Computer Interaction jointly with a lecturer from RU, using the virtual classroom. This was a new practice in the department, where a module is taught jointly by two lecturers from the different institution.

If it was not for the project, the Computer Science Department would have been disqualified from offering the postgraduate Master of Science in Information Technology in the year 2011. Under the implementation of the new curriculum, the rule necessitating lecturers teaching Masters" modules to have PhD qualifications was enforced by UNAM, and a minimum number of the PhD holders was required depending on the number of modules to be offered. The Department of Computer Science at UNAM did not meet this requirement, since it only has one lecturer who is a PhD holder. Through the collaboration, the department became the first at UNAM that was authorized to offer the modules with only one PhD holder, provided that the other modules are offered from RU by lecturers with the required qualifications.

8.7.4 New module content

The content developed in the project was made available to the department at UNAM. Apart from the lecture slides and books that were acquired for the department through the project, all modules have part of the module content recorded either on DVDs, or using the virtual classroom tools. All the lecturers in the department at UNAM have access to all the module content, which is stored in a central computer located in the SANTED lab. The availability of this content has not only harmonized curricula between the two institutions, but it has also enhanced the quality of the content presented in the department at UNAM, and save the lecturers the cost of developing new content for new modules from scratch.

8.7.5 Other experiences and skills

Lave and Wenger (1991) indicated that it is not only the apprentices that are changed in communities of practice, but that the masters themselves become co-learners. Apart from developing further skills in using virtual classroom solutions, the lecturers commented on the

different learning cultures between the institutions. In addition, lecturers from both institutions commented about learning from each other's teaching methodology. One lecturer expressed this as follows:

> *"My biggest learning in this project is the methodology of teaching ... they had a very good teaching methodology ... for example ... they discuss the latest research papers along with the subject. And they tell the students what is up to date ... „Look this is what is going on in the industry. This is the latest which you can research on." Us here, we only discuss the textbook. They have also books but some research from the book you know ... for example they would say ... this is where the latest research is going on ... for example ... transportation layer ... you have to write Java code ... You see ... they discuss the research paper. That idea I liked a lot and I am also planning on using it in my courses this time. You have to take the research paper to the class and show the students. Teaching methodology was really good."*

One lecturer also observed that the social context of the VCP enabled them to interact and learn from one another outside the classrooms. She indicated that she was very happy to be invited for dinners with the department, because this was the only context that she could get to interact with both the visiting lecturers and her colleagues in the department. Another lecturer expressed satisfaction with the project presentations between the two institutions, which she felt enabled the students at UNAM not only to communicate with their colleagues at RU, but provided them with a view of what other students are researching about, and how they go about doing their research.

8.7.6   Registration for higher degrees

A core aim of the project was to attract students that could complement the staff members at UNAM. Although the project was targeting two students per year, difficulties beyond the project's mandate did not make it possible to have six students at the end of the project. However, two students were successfully been registered for M.Sc. at RU, under the support of the Staff Development office at UNAM. One of the students completed their research at the end of 2011, while the other is expected to complete at the end of 2012. Once they complete, the students are obliged to join the department at UNAM and assist in the implementation of the new curriculum.

Registration of existing staff members for higher degrees has been one of the top priorities for the project. Prior to the start of the project, the UNAM department did not have a single PhD holder in its staff complement. During 2009, a new Head of Department with a PhD qualification was appointed. It was however still critical that the staff members register for the higher degree qualifications, especially in the light of the Master of IT degree offered by the department, that can only be taught by PhD holders.

In 2008, the first candidate registered for PhD in information systems with RU. In 2010, another lecturer registered for PhD with UNAM, with supervisors both from UNAM and RU. Towards the end of 2009, another staff member who has been doing research in African languages travelled to RU to share his research results with the faculty of education. The staff member is currently in the process of enrolling for PhD with the African Languages Department. In addition, two more staff members from the department travelled to RU in 2010 to meet with staff member and discuss the possibility of PhD registration in the departments of Computer Science and Information Systems.

8.7.7   Increase relations with the community

The department at RU has a collaborative partnership with Telkom South Africa, that initiated the CoE at RU in 1997. Through the CoE, the department receives industry relevant projects that the students carry out in the department, accompanied by a generous research funding from the different players in the industry. The department at UNAM had wanted to simulate this partnership with Telecom Namibia since 2004. Although presentations were given to forge this relationship, it never materialized until 2010. In June 2009, the department invited the coordinator of the CoE to address a meeting with Telecom Namibia executives regarding the operations of the CoE at RU. In addition, a delegation composed of UNAM and TN staff was invited to understudy the operations of the CoE at RU and meet with Telecom executives to discuss the way forward. One of the activities that the visitors attended was the activities of the virtual classroom project that the two departments are working on. Telecom expressed a great interest in sustaining the activities of the project.

The Centre of Excellence in Information Technology and Telecommunications was launched at UNAM in February 2011. In attendance was the Telecom Namibia Executives, the deputy Ministers of Education and Information and Communication Technologies, and the UNAM

executives. In addition, invited guests came from RU. This initiative was only able to be concluded because of the special relationship between the two departments. In general, the collaboration between the departments seemed to have increased the status given to the department by the community. Although the department at UNAM had showcased its‟ research achievements to the telecommunications companies before the project, it has proved difficult to start any real collaboration initiatives with any of the companies before the project started. As soon as the collaboration with the CoE was finalized however, the industry started approaching the department of possible research collaboration between the two entities. At the end of the project, one of the facilitators commented during an interview:

> *"It has made a dent in a lot of people"s lives, and for the department…Look at the Centre of Excellence. The project has left us walking high, knowing that we are a significant department in Africa. I now feel that we are at par with our colleagues at Rhodes and in the region. If I were to go in a conference, and I am from this department, my shoulders are high. I don"t have to look up to other people, because I know that our quality is just as good and it is at par with the rest of the world"*

8.8 Conclusion

This chapter used elements of LPP to analyse the virtual partnership implementation studied in this thesis. It first explored how participants in the partnership developed the required competencies through the Organization of Access element. It demonstrated that access to a community of practice was enabled through the sharing of stories, observing masters at work, as well as having access to sources of information and opportunities. It then analysed the different levels of participations, and identified the reasons that either enabled or prevented newcomers to move to full participation in the community of practice. Using the Structuring Resources for learning construct of LPP, the chapter also identified the variance regarding the relationships and interactions among the participants, while the Contradictions and Conflicts element enabled the identification of commonalities and differences that contributed to either the strengthening or the weakening of a community of practice. In the last sections, the chapter looked at how participating in this project eventually lead to changes in both the participants, the departments and the overall institutions in which these departments are located. The specific LPP elements that were used, as well as how they were used in this chapter, are summarized in Table 8-6.

Table 8-6: Summary of elements of community of practice used to analyse the partnership

Element	Focus
Organization of Access	Participants‟ access to activities, members, resources, information and opportunities for participation
Levels of Participation	How participants‟ involvement in the practice progresses with time
Structuring Resources for Learning	Different structures of learning provided to enable learning from different sources
Discourse of Practice	Opportunities that enable participants to discuss and talk about their learning in a practice
Contradictions	Tensions and conflicts inherent in participation
Generation of Identity	Participants experiences of the practice
Transformation of Practice	New ways of working, knowledge and skills acquired by participating in the practice

CHAPTER 9: TOWARDS CAPACITY-BUILDING VIRTUAL PARTNERSHIP IN THE SADC REGION

This chapter synthesizes the findings of this thesis by putting together the results of the analysis done using the activity theory framework, as well as the notion of community of practice, which together made it possible to draw the attention of this research to important components of virtual partnerships. The chapter also draws from the literature review presented in Chapter 2 to connect and explore the significance of the findings. In the first section, the achievements of the project are presented, and then the discrepancies in the original implementation plan are highlighted. The important features of a capacity-building partnership as perceived in this thesis are then presented. In the last section, a framework that could be used for the implementation of capacity-building virtual partnerships in the SADC region is proposed, as gathered from the findings and experiences acquired through the analysis. The framework highlights the salient factors that should be considered when harnessing a virtual environment to support capacity-building initiatives in the SADC context.

9.1 Reflections on the Staged Capacity-Building Process

This section presents and discusses observations made by the researcher in the project. It focuses on the perspectives of the students, the lecturers, the facilitators, the management of the institutions and the sponsors.

9.1.1 Students involved

Overall, the SANTED project was very popular and in high demand among the students at UNAM. The constraints placed on who could participate, however, made it difficult to accommodate capable and hardworking students from the onset.

Students" commitment and participation seemed to be directly affected by the usability of the technology used to implement the virtual classroom. In the first two modules delivered in 2008, for example, the lecturers found that the technological environment provided them with a "relaxed intimacy" and that they especially enjoyed the feeling of close proximity to the students, describing it as "being closer to the students than lecturing to a live class"

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(SANTED Virtual Classroom Project, 2008). They also attributed this feeling to the smaller class size, however. In these first two modules, the students were also very interested in the modules, and they seemed to be committed by attending the class regularly and on time, despite the connectivity problems experienced in the second module. By the time the third module was presented, however, there were a number of complaints from the lecturers and students regarding bandwidth instability. The lecturers resorted to recording lectures on DVDs and limiting the virtual classroom time to discussions. In 2011, at least two of the lecturers indicated that they felt student engagement and student commitment was the biggest challenge to the continuation of remote delivery of classes. Although the students reported that they were happy with the recorded content because it is easy to revise, both the project coordinators and the lecturers found that the students were no longer as committed to their modules as they had previously been, and some students eventually dropped out of the modules. Even for those that remained till the end, the lecturers reported that they did not adequately participate in the modules. The results seems to have been the same again in 2009 and 2010, with modules where the technology enabled smooth, uninterrupted discussions having higher participation rates and commitment from the students, and with lecturers where the modules were recorded reporting lower participation rates.

The major deviation in the project plan with regards to the students is the commencement of MSc studies at RU. As indicated in the project plan, at least two students were expected to apply for admission at RU at the end of each year of implementation. Qualified students are those that have passed their SANTED modules well, and have met the graduation criteria for a Bachelor of Science at UNAM. In each year, however, it only became apparent at the time when these students were expected for registration, that they had not met all their second major requirements to graduate for their BSc at UNAM. This automatically disqualified them from enrolling for an MSc.

Despite these setbacks, the Project Coordinators worked with the Offices of the Registrars at both institutions to ensure that the students who completed their outstanding credits commenced with their studies as soon as they had met the requirements. In 2009, for example, a student was allowed to complete their first semester module in 2009, and started their MSc at RU in the second semester. The same logistical problems with regard to the registration of MSc students were again faced in the project in early 2010. Initially, two

students were accepted to begin their MSc in the first semester of 2010. In the end however, only one of the two opted to proceed with registration at RU. In 2010, teaching was provided for Masters" students already at UNAM and not for undergraduate modules. There was thus no student mobility expected as an outcome of the project in 2010. In the end, therefore, the project only managed to directly send two students for the RU MSc degree. One of the students came back to the UNAM department in February 2012 and the other is expected to complete her studies and join the department at UNAM at the end of 2012.

9.1.2   Lecturers involved

The lecturers involved were very enthusiastic about the project, and the modules that they were teaching. In some modules, the lecturers first examined the students prior to the commencement of the modules to establish their level of understanding of the basics of the content. Even in these basic exams, the students did not do too well. The initial plan for most lecturers was to present the same modules that were presented at RU to the UNAM students, as-is. Some adjustments were made, however, as soon as the lecturers established the level of understanding of the students. In many modules, the lecturers indicated that they had changed the module content because they could tell that the students would not have been able to cope with the modules. As a result, the modules were tailored to the requirements at UNAM, rather than remaining static to suit RU students.

Although a technological solution was chosen and recommended for use in the project, the lecturers opted to use solutions that they were comfortable with, and solutions that would present fewer disruptions to the students" learning. The lecturers experimented with a mix and match of the technologies within their reach. Observations and interviews revealed that they considered point-to-point solutions that are less-bandwidth intensive to be more suitable to the context of implementation because they decrease the latency in communications. By experimenting with different tools, lecturers contributed in establishing the repertoire of tools that could be used to implement virtual classroom solutions in developing contexts.

The lecturers did not seem to pay too much attention to the missing facilitators, however. In some cases, such as the Computer Graphics module taught in 2010, the facilitator did not attend a single class. The lecturers therefore made use of available staff members from UNAM who were available to assist them, even though they might not have been the official

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facilitators for those modules. This is also evident in the Semi-Annual Review Report and questionnaires, where the lecturers often indicated that the Project Coordinator was the facilitator for that module, when there was in fact a facilitator appointed for each module.

9.1.3 Facilitators involved

All the facilitators acknowledged that they found the joint workload of the department and the SANTED VCP too demanding for them to cope. In some cases, they had up to 18 contact hours with the students in the department, outside of the SANTED project. They also attributed their inability to attend lectures to clashes with their main activities at UNAM, especially the university timetable, which was arranged independently from the SANTED modules. The facilitators felt that if the activities of the virtual classroom were better integrated with the other activities of the departments (such as the workload and the timetable), they would have had more time to dedicate to the project.

Overall, the facilitators felt that they had learned a lot from the project. All facilitators emphasized that their main learning curve was in the preparation and teaching methodology used by the RU lecturers. They found the "participative" methodology used in the project to be engaging and challenging for the students. Particular emphasis was placed on the technological and research updates that were part of the part of the instructional materials used by lecturers.

The facilitators also expressed their disappointment with the level of commitment by the students. While they did understand that some of the modules did not bear any credit for the project, they expected the students to be appreciative of the efforts of the project. They thought the way the project was organized would encourage the students to work hard and compete amongst themselves in order to get the scholarship for further studies. Many lecturers also emphasized the need for capacity building among Namibian students, so that they can sustainably take over the running of the Department at UNAM.

9.1.4 Funder's perspective

As reported in its Final Review Report (Smith & Cross, 2010), the funding agency SANTED was interested in the overall effectiveness of the programme in addition to providing the funding. This was measured by looking at the extent to which the original objectives of the

project were achieved, how critical SANTED was of the achievements of those objectives, and the institutions" willingness to take over the financial responsibilities that would sustain the activities beyond the termination of the programme (Smith & Cross, 2010). In order to measure this effectiveness, SANTED held regular monitoring and evaluation workshops where the participants provided the progress of their projects. While these workshops were a valuable avenue for providing feedback on the progress of the project, however, they often placed a heavy burden on the Project Coordinators to ensure that the project milestones were met at all costs before the workshops. Table 9-1 shows a sample email exchanged between the Project Coordinators, stressing the importance of having the students at RU.

Table 9-1: Email between the coordinators highlighting the importance of meeting the funder's requirements

Hi [Name withheld]
I see there are all sorts of troubles around these students coming. Still, it is critical that at least two students arrive, no matter what: or we will be in trouble with SANTED, because of failing a critical milestone.
I understand your frustration, but unfortunately you are the only one really able to push this thing from the Namibian side, which is the only important one in this case.

Apart from having the students registering at RU, another critical milestone for the funder was the development of competence and capacity in the department at UNAM. SANTED had a specific interest in developing capacity among tertiary education institutions through regional collaboration with institutions in South Africa. Specifically, they encouraged the joint authoring and publishing of research papers and the joint development of curricula and module materials. Apart from funding the activities of the Virtual Classroom Project, SANTED also funded many other projects focused on university student access, retention and success, capacity building within the tertiary sector and the development of regional linkages within higher education (Smith & Cross, 2010).

9.2 The Project's Achievements

This section reports on the achievements of the SANTED VCP, by reflecting back on the attainment of the activities and plans set out in the original business proposal.

At the end of the SANTED VCP, the project participants unanimously declared the project a success (Virtual Classroom Project, 2010). This section will revisit the three main activities that were planned for the project: teaching, research and administration activities. The objectives attached to each of the activities (as presented in Section 3.3), as well as the extent of their achievement are briefly described.

9.2.1 Teaching activities

Objective 1: To develop the curriculum and content of the new courses in the department at UNAM, to ensure that the department has the content of the new modules introduced as part of the new curriculum by the time that these courses are officially activated in 2010.

As discussed in Section 3.4, the Project was structured into three transitions stages, with each stage corresponding to a year of implementation. The first stage, from dependent to guided, was thought to be a pilot of the implementation, because it was during this stage that a feasible technological solution for use in the duration of the project was supposed to be identified, and the content to be used in the courses would be developed. During this stage, content for the four modules taught in the project was developed. The content was remotely taught to UNAM students by the lecturers from RU, and classes were co-facilitated by a lecturer from UNAM for capacity-building purposes. The facilitators were responsible for guiding the students in the absence of the lecturers, and acted as an intermediary between the students and the lecturers.

It was initially envisaged that all 20 lectures of each of the four modules would be remotely delivered over a period of four consecutive weeks using a virtual environment in each year of implementation. After the delivery of the first lecture however, the reliability (and eventually participants‟ preferences) shifted, and they tended to avoid use of the virtual environment. As shown in Table 9-2, the selected virtual solution was not used in 2009 and 2010, although it was already paid for and made available to the participants. Rather, each lecturer was given the option to choose a solution that they felt better enabled them to achieve their course objectives.

Table 9-2: Technological solutions used to deliver courses in the VCP in each year of implementation

Course	2008	2009	2010
Real Time Multimedia	Wimba Virtual Classroom	Video-conferencing	face-to-face
Java Enterprise	Wimba Virtual Classroom Recorded Lectures	Skype and Google Docs	face-to-face
Networks	Wimba, DVDs and Skype	DVDs, Skype and Wiki	face-to-face
Human Computer Interaction	DVDs and Skype	Skype and Google Docs	face-to-face
Advanced Operating Systems	-	-	Skype and Google Docs Lecture recordings
Advanced Computer Networks	-	-	iLanga and Xlite
Computer Graphics	-	-	Skype Video
Cryptography and Network Security	-	-	Skype and Google Docs Lecture recordings

Objective 2: To increase the staff complement at UNAM to enable them to cope with increased teaching load required by the new curriculum.

At the end of the project, 15 students would have been registered for the project (five students per year). In the third year, however, only three students were registered rather than five. Out of 13, at least four were expected to register for MSc studies as RU, and two of those would have finished with their studies and joined the department at UNAM as lecturers by 2011. After the implementation, however, the targeted number of students to register at RU was not reached (only two students were registered in the three years). The number of students who participated in the project in each year of study, the number who completed the course and the number of students who dropped out is shown in Table 9-3 below.

Table 9-3: Student statistics in the SANTED Project

Year	Enrolments at UNAM	Completed Modules	Passed all modules	Dropped out
2008	5	2	1	3
2009	5	4	1	1
2010	3	3	2	0

Objective 3: To develop the teaching capacity in the department at UNAM to enable UNAM lecturers to teach the courses after the project has come to an end.

In the second stage of the VCP (2009), most lectures were still supposed to be developed and delivered from RU, but the facilitators were expected to co-teach a selected number of lectures to ensure that the transfer of expertise after the period of the project has lapsed. The actual number of lectures delivered by the facilitators was different for each course, and was agreed upon by the lecturer and facilitator themselves. In the last stage (in 2010), a handover of the modules to the department at UNAM was done. During this stage, the facilitators assumed the lecturer role, and the lecturers from RU were supposed to observe the teaching of selected lectures delivered by the new lecturers and give them useful comments.

Table 9-4 shows the number of lectures presented by the facilitators in each year of implementation. As shown in the table, the facilitators did not present lectures for at least half of the modules offered in the year 2009. In 2010, the module Real Time Multimedia had to be cancelled as there was no one available lecturer to teach it. One of the modules was also taught by a part-time lecturer at UNAM, rather than the lecturer who participated as a facilitator in 2008 and 2009. Although not all lecturers presented the minimum four lectures in 2009 and not all lecturers who acted as facilitators took over the modules in 2010, the content presented in these modules was the same content developed in 2008. As presented in the analysis chapters, UNAM lecturers also explained that they acquired new teaching methods as a result of participating in the project that they would apply in their other modules taught in the department.

Table 9-4: Number of lectures presented by UNAM lecturers in 2009 and 2010

Module Name	No of lectures in 2009	No. of lectures in 2010
Enterprise Java	5	20
Computer Networks	0	20
Real Time Multimedia	0	0
Human Computer Interaction	6	20

9.2.2 Research activities

Objective 4: To strengthen existing staff capacity at UNAM, through registration of higher degrees with RU. Current lecturers (who are all Master"s Degree holders) would be given an opportunity to register for PhD studies and conduct joint research with experienced professors at RU.

The two departments planned to identify common research areas where candidates from UNAM would be registered for PhD studies to carry out research. Research areas of common interest to UNAM and RU were supposed to be identified. At the end of the VCP, at least two UNAM lecturers have been registered for the PhD studies. One lecturer is registered as a full-time student at RU, while the other is registered for full-time studies with UNAM, where co-supervision is shared with RU. Two staff members have also initiated contact with possible supervisors at RU, and are in the process of facilitating their registration process for PhD studies with RU.

In addition, it was also expected that staff will have joint publications and co-authoring of papers in order to boost the research publication output of the department at UNAM. In the first year of study, one conference publication co-authored by both RU and two UNAM staff was recorded. In the second year, three international conference publications were co-authored. Staff from both departments also continues to co-author papers in different areas of research after the VCP has come to an end. At the end of the three years, one research proposal for enabling Namibia‟s Mobile Telecommunications operator (MTC) to create sustainable multipurpose centres called Citizen Connect Centres (CCC) was also jointly developed between the two departments, although MTC unfortunately cancelled the CCC concept before it got off the ground. The outputs of joint publications and co-authoring, however, require a much long time span than was available to the project. The real manifestations of meeting this objective will therefore only be visible after some years.

The two institutions were also expected to collaborate in the co-supervision of both undergraduate and postgraduate research projects for UNAM students. In this collaboration, the main supervisor is based at UNAM, and the supervisor at RU is a co-supervisor. Through the project, three MSc students were supervised, of whom two have already graduated and the third still busy with his thesis. In addition, one of the Professors at RU is the external examiner for the department at UNAM, and has contributed on the curriculum review and implementation process, as well as on how to improve the quality of research done in the department at UNAM.

The final activity of research collaboration planned in the project was that of joint presentation of seminars between the two departments. As noted in Chapter 6, several joint presentations that involved sharing of research progress and results between the two departments were also held, some through video-conferencing, and others face-to-face. The presentation did not only involve the lecturers, but also students from both departments. This enabled researchers in both institutions to share research experiences, and to identify common research focus areas in which the two departments are now collaborating.

9.2.3   Administrative activities

Objective 5: to forge a stronger collaborative link between the two departments of Computer Science.

The two departments jointly pursued the process of ensuring the accreditation of modules done through the project by both institutions. Although it was initially difficult to accredit the modules completed through the project for UNAM students, it was found that one of the students that had to be registered at RU in 2009 needed extra credits in order to graduate with a BSc from UNAM. Through the intervention of the Project Coordinators at both institutions, one of the modules done through the project was eventually accredited in 2009, enabling the student to register. By 2010, the modules and content developed through the project were completely integrated into the curriculum implementation at UNAM, and the students graduating with a single-major BSc are accepted for MSc registration at RU without having to first do an Honours degree. This further facilitates access to registration for higher degrees for UNAM graduates at RU.

Objective 6: To develop a blueprint for similar interventions linking universities across Africa to build capacity in tertiary institutions, using recent developments in telecommunication to reduce the problem of distance.

Through this thesis, objective 6 of the SANTED VCP was also partly addressed. The thesis identified the possible challenges that can arise in the implementation of similar partnerships in the SADC context, which can also be applicable in the general African context. The thesis has also demonstrated that although the available telecommunication infrastructure is not yet adequate enough to support these types of initiatives, a combination of synchronous and

asynchronous technological solutions, and flexible pedagogical models suited to the technology, can be used to enable the formation of virtual partnerships in these contexts.

9.3 Summary of Implementation Discrepancies

As discussed in Sections 6.2 to 6.5, the project did not achieve all of its six objectives (described in Section 9.2) as set out in the initial implementation plan. Failure to achieve these objectives is partly due to some basic assumptions that were made in planning the project, but did not hold true at the execution stage. These assumptions are briefly described below.

9.3.1   Implementation of the single-major degree

The whole implementation of the virtual classroom project was based on the assumption that the students who registered for the project would graduate with a single-major BSc degree in their final year of study. Although these students had done double majors up to their third year of studies, the assumption was made that by registering only for the Computer Science modules of the new curriculum in the fourth year of study, UNAM would enable the students to graduate with a single-major BSc in Computer Science. Another major assumption was the support of the Pro-Vice Chancellor: Academic Affairs and Research. The department at UNAM simply assumed that the PVC: AAR"s support for the collaboration between the two departments exempted the department from following the standard procedure for approval of qualifications. The assumption was that since the students were already registered, and all the modules that they were going to do in the SANTED project were already approved for the implementation of the new curriculum, the students would be allowed to graduate with a single-major BSc.

9.3.2   Accreditation of modules

Participation of students in the project was automatically assumed because of the assumption that the modules would contribute to the academic records of the students. If this basic assumption did hold, the students would have been forced to work hard in their modules in order to ensure that they graduated from UNAM. Modules not bearing credit, however, introduced a new dynamic in project: the students did not actually need these modules in their

academic records, and whether they failed or passed, attended or not, it would not make a difference to their final degree (Andreassen, 2000). If these students were attracted to the project because of other incentives (such as the scholarship incentive made available to all students participating in the project), the other incentives would not matter, especially if they knew that there were other more capable students in class that would, anyway, outperform them. The students did not have any real motivation to work hard in the modules.

9.3.3   Registration of students

An assumption was made that only students who had demonstrated outstanding capabilities in their previous years of study at UNAM would be accepted on the project. This was the intention, because the Project Coordinators were aware that the students would not have had sufficient background to cover the Honours" equivalent modules. The students for the project were therefore expected to be hard working and demonstrate intellectual capabilities. The dynamics introduced in the project, however, where only students with fewer modules and those who met the requirements of UNAM"s affirmative action policies could participate, negated this assumption.

9.4 Important Features of a Capacity-Building Partnership

The data analysed in this research and the important themes from the literature review on capacity building and virtual partnerships in tertiary education institutions discussed in Chapter 2 were combined to identify the important stages of a capacity-building partnership. The result of this inductive and deductive analysis is presented here as key aspects that should be considered prior to, during, and after the process of a capacity-building virtual partnership. These aspects are briefly discussed below.

9.4.1   The aims and objectives of the partnership

The aims and objectives define what the partnership is all about and what the partnership hopes to achieve. It is also from the aims that the partners can determine whether the partnership is needed, and whether it is likely to be beneficial for them. There were three important aspects of the aims and objectives of the partnership highlighted by the participants of the SANTED VCP and also highlighted in literature. The first is that the objective should

take cognizance of the current needs and capabilities of all the partners involved in the partnership. In the SANTED VCP, the purpose of the partnership was to build capacity in the department at UNAM, and in the long run to build a collaborative relationship between the two departments. Three specific needs of the department were identified: to build teaching and research capacity of existing staff members, to improve the qualifications of existing staff members and to attract students who would be sent for further studies and join the department as staff members at the end of their studies. It was these three aims that guided the activities of the project.

The second point is that the partnership‟s aims and objectives should be well articulated and well circulated to all the participants, so that they all know what to work towards. As highlighted throughout the thesis, the partnership initially started with a few people involved, but many more new people became involved as the collaborative effort developed. Each person involved had their own expectations from the partnership. It was important, however, that in the long run all the people involved knew what the mission of the partnership is from the very beginning so they knew what to expect. In the SANTED VCP, the participants had different expectations that were not met in the time that they expected, and they were discouraged from continuing with the work because they were not aware of the bigger picture of the partnership.

Consonant with other findings from literature (see for example, Kezar, 2005), the third requirement is that the aims and objectives of the partnership should be aligned with the existing activities of the institutions involved. This not only makes it easier to gain institutional support for the collaborative work, but also makes it easier to integrate the work of the partnership with existing structures of the institutions. The SANTED VCP was supported by both institutions because it was within the existing work of the CoE at RU, and also included the teaching of the modules that were part of the UNAM curriculum. The project was almost brought to a halt, however, because the modules taught through the project were only supposed to be implemented from the year 2010. If the project had focused on the modules that were approved for teaching in the years 2008 and 2009, it would not have been necessary to change the initial project plan that eventually affected the implementation of the partnership.

9.4.2 Participants in the partnership

Another critical feature of capacity-building partnerships is the stakeholders to the partnership. At the highest level, the main stakeholders to the partnership are the two institutions that are involved in the partnership. As explained in Chapter 2, it is important that the partner who is building the capacity has the required capacity. It helps even more if the institution is already well recognized as possessing the capacity that would be "imparted" to the beneficiary institution. As Moran (1990) observed, institutions are sometimes better partners because of the prestige that they bring to the partnership. In the case of the SANTED VCP, association with a well-known institution in the SADC region attracted a good reputation that eventually resulted in the construction of a CoE at UNAM.

It is also important to ensure that critical stakeholders are involved in the planning stages of the partnership, instead of restricting negotiations to the level of the institutions only. From the onset, the specific departments within the institutions that would be required to successfully achieve the objectives of the partnership should be engaged. In the SANTED VCP for example, these offices should have included both Departments of Computer Science, the Offices of the Registrars, which deal with the registration of students, the Staff Development Office, which provides funding to staff and students, and the Finance Departments, who would handle the project budget. At the lowest level, the specific individuals or groups of individuals (e.g. students, lecturers, etc.) that would be involved in the partnership must be identified. For each group of individuals, it is also important to ascertain their interest in the partnership, their current levels of capacity and their needs and expectations of the partnership.

9.4.3 The context and operating environment of the partnership

The context and operating environment of the partnership was also identified as an important component of the partnership. The operating environment and context determine what is possible and what is not, given the limitations and constraints of the context. One important aspect of the context is the formal and informal rules currently existing within the environment. These rules can promote or constrain, and they can also directly or indirectly affect the implementation of the partnership. For example, in the SANTED VCP, one of these rules was the employment contracts of non-Namibian staff in the department. All the staff

members were aware that the once the students had completed their studies, and they would have the same qualifications as the staff members. If there were insufficient Namibian lecturers in the department, there is a high possibility that the expatriate staffs" contracts would not be renewed. It is therefore important that all the rules are known, so that people do not feel betrayed by the outcome of the partnership.

Another aspect of the context and operating environment of the partnership is the tools and artefacts that are available for use in the partnership. In a virtual partnership, interaction is only achieved by technological means. Technology is therefore a crucial component of the partnership. If it is unavailable or inaccessible, it hinders communication and eventually contributes to the failure of the partnership. Available technology will also guide what is possible and what is not possible to achieve. For example, in the SANTED VCP, the Project Coordinators wanted an integrated solution that provided all the functionalities required to present a live, synchronous session. The bandwidth available in the context did not make it possible to do that, however.

9.4.4   Time frame to develop the expected capabilities

Another critical aspect of the partnership is the time frame available to develop the required capacities. The time frame will differ depending on the required competencies, as well as the type of capacity that would need to be built among the different participants of the partnership. Our experience in the VCP and from literature, for example (Eade, 1997; Dall'Alba & Sandberg, 2006), has also shown that both building of relationships and building of required competencies are complex activities that require a long time to develop. In the SANTED VCP, the time frame was limited by the amount of funding that was provided, as well as the expectations of the funders. As reported by the participants however, the actual results of this partnership will probably only be observed years after the funding and the project has come to an end.

9.4.5   Identification of transition stages

A purposeful strategy of how capacity building will be done is another critical feature of the capacity-building partnership. In the SANTED VCP, the three transition stages defined were used as a guide because they matched the capacity-building stages taken in the project. The

principle of Legitimate Peripheral Participation also emphasizes that learning through mentorship is characterized by transitions from one stage to the next, where the learner moves from a periphery to the full participation in the community of practice. In the SANTED VCP, these transitions were identified as dependent to guided, guided to assisted and assisted to independent. The stages do not have to exactly match these four stages, however. Nevertheless, it is important to know that the participants" knowledge, experiences, skills, and participation in a capacity-building partnership are in transit. Participants are moving from the periphery to becoming full and independent participants. The stages that they take to move through these transitions should therefore be defined.

9.4.6   Roles and responsibilities

Roles and responsibilities define who will do what in the partnership. As explained in Section 4.2, the notion of community of practice argues that the participants must be given access to the experts, access to resources and most importantly access to opportunities in the partnership. LPP posits that initially, the participants may be given trivial jobs to perform in the practice. As their experience improves with time, however, their roles and responsibilities also increase and, with time, they are able to do much more than they were able to do before. LPP also recommended that the practice should be arranged deliberately so as to provide greater and deeper opportunities for immersion in a community of practice as time goes on. It is therefore important that the roles and responsibilities of the participants also reflect the principles of LPP. In the SANTED VCP, all that the facilitators were initially allowed to do was to round up the students for the sessions and ensure that they handed in their work on time, as well as observing the lecturers. As the time progressed, however, they became more and more involved in the activities of the project; initially, assisting the students with assignments only, and then presenting a few lectures of the module, and eventually taking over the entire module. The roles and responsibilities for all the participants should therefore be clearly communicated to all, and should change to reflect their changing levels of participation in the capacity building process.

9.4.7   Implementation of the transition stages

Once the aims and the objectives of the project are identified, the participants are ready, the context of the implementation is defined, the timeframe and the transition stages are well

defined, and everyone involved in the project knows what is expected of them, the implementation can then commence. Implementation is really the execution of the transition stages by the participants using the defined division of labour, within the timeframe and the context of the project to achieve the defined aims and objectives of the project. Implementation therefore carries out the project plan with the aim of successfully completing the project. As was seen in the SANTED VCP, the implementation plan should be seen as an unfolding process, rather than a rigid plan. The different participants and institutions will continuously introduce new dynamics to the partnership, often necessitating a readjustment in the original implementation plan.

9.4.8 Periodical review of technology, rules, division of labour, roles and progress

During the implementation process, monitoring and evaluation of the project plan needs to be done. A periodical review needs to be done of how the technology is being used and whether the users are happy with it, how the rules are being implemented, how the participants are carrying out their duties and the general progress of the project towards to attainment of the goals. If changes need to be made on any of the tools, rules, division of labour or rate at which the work needs to be done, adjustments have to be made.

9.4.9 Periodical evaluation of the implementation

Experiences in the SANTED VCP demonstrated that there is a variety of factors that mutually influence each other to impact the outcomes of capacity-building partnerships. Evaluation of the success of the partnership is therefore not simply a matter of looking at the attainment of the objectives at the end of the partnership. Rather, evaluation takes into consideration the constraints placed on the partnership by the network of activity systems in the context within which the project is embedded. As shown in this thesis, the success of the VCP is mainly attributed to the periodic changes in the implementation plan, which had to be adjusted to the changing rules and circumstances of the project.

9.5 Towards a Framework for Capacity-Building Virtual Partnerships in Tertiary Education

This thesis has argued that capacity-building virtual partnerships are complex and dynamic processes that evolve with time. It also argued that there are many contextual factors that can affect the actual outcomes of a capacity-building partnership. This makes it difficult to design a specific framework that can guide the implementation of future virtual partnerships, even in similar contexts. This section will therefore not recommend a specific implementation framework. Rather, it highlights the important phases that each transition stage of a partnership goes through, and explains the important aspects that must be addressed during those phases. This section therefore focuses on the phases, and compares the recommendations of this thesis to existing models presented in Section 2.2.3.

9.5.1 Phases of transition stages

The thesis made a distinction between the progression stages of a capacity-building processes, and now proposes that each stage goes through different phases. The stages are distinct points corresponding to the different levels of participation defined for the capacity-building process. In the SANTED Virtual Classroom Project, for example, three transition stages were defined: from dependent to guided, from guided to assisted, and from assisted to independent. Dependent, Guided, Assisted and Independent are therefore defined as the stages of the partnership. Figure 9-1 summarises the transitions stages of the SANTED VCP. For each stage, the activities expected from the Individual, the Department and the Institution are incorporated. The figure also shows the inputs to the transition stages: partners, objectives, resources, time and activities. On the left hand side, the figure shows the expected outcome of capacity building in a virtual partnership: desired capacities, problem solving capabilities, and sustainability of work activities.
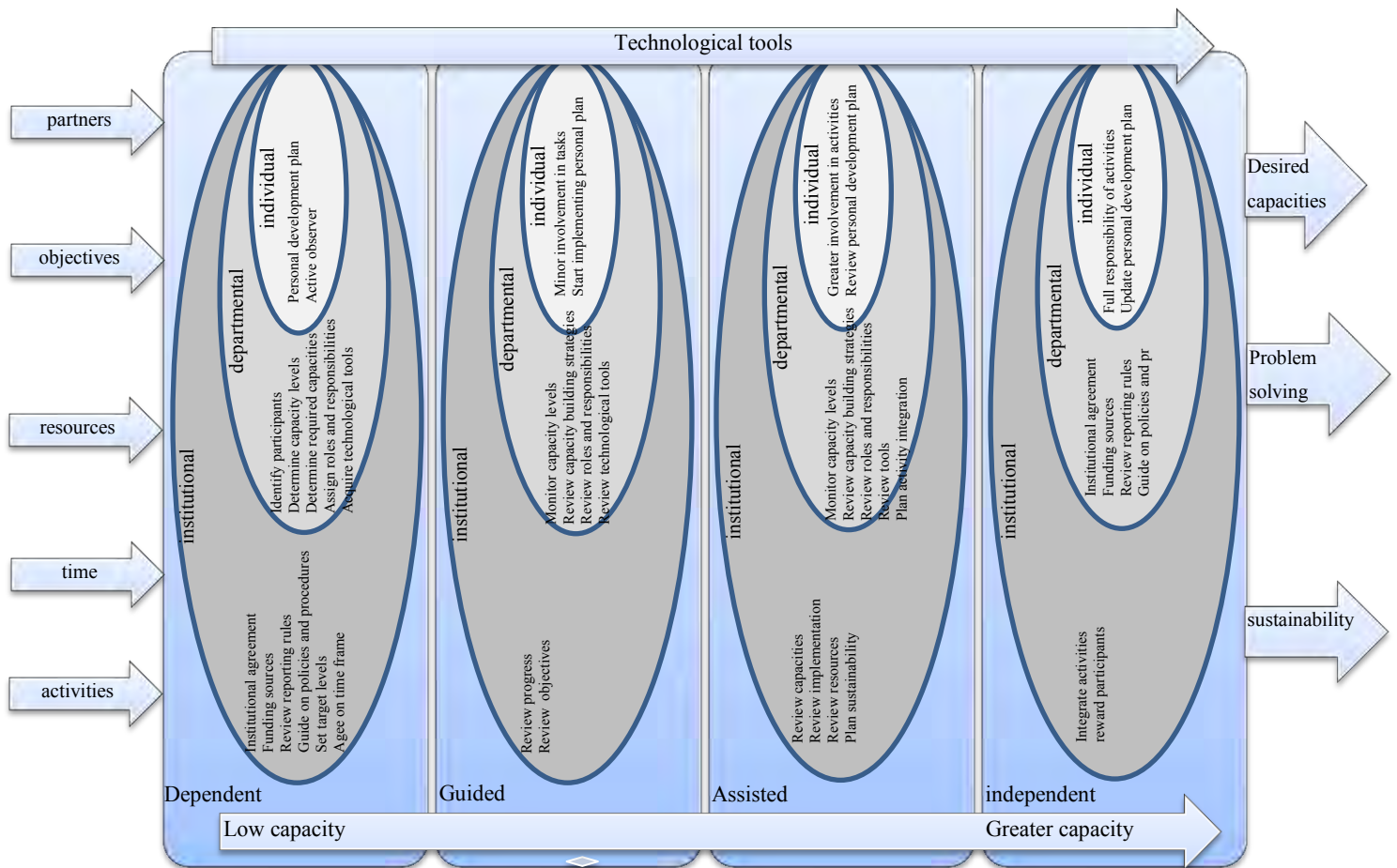
Figure 9-1: A summary of the transitions stages observed in the SANTED VCP

Phases, on the other hand, are specific points during the implementation of a transition stage. From the perspective of this thesis, each of the transition stages defined for capacity building is goes through the following five phases: Preparation, Planning, Implementation, Evaluation and Termination. Four of these phases are presented in Figure 9-2.
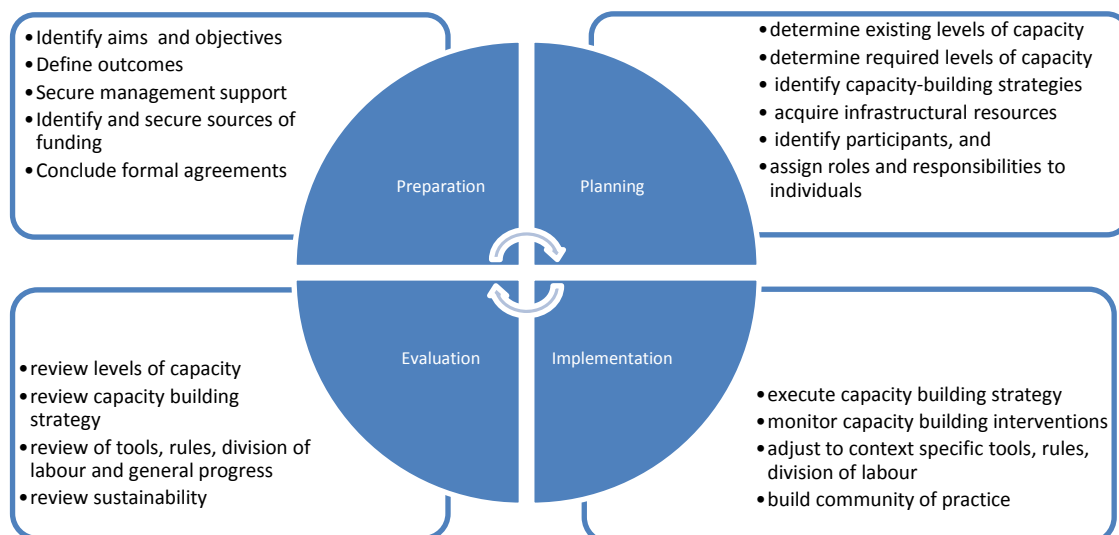
Figure 9-2: Phases of a transition stage in the capacity-building process

During the preparation phase, the important aspects of the transition stage and the aims and objectives of the partnership are identified. At each stage in the partnership, the partners define what they hope to achieve at the end of the stage, which eventually translates to the overall aim desired at the end of the partnership. This phase is similar to Gray"s (1989) precondition stage, Ring and Van de Ven"s (1994) negotiation stage and partly covers the elements defined by Arino and de Torre"s (1998) negotiation stage and Kezar"s (2005) building commitment stage. The emphasis here, however, is to define what the outcome of each stage of the partnership will be. When the partners have agreed on an overall aim and the expected outcome, they need to present this information to the relevant stakeholders and to identify sources of and to secure funding for the activities. During this phase, the partners must also attempt to formalise any formalities that will need to be completed during the implementation stages.

The second phase, planning, defines what is needed to execute each stage of a partnership. This phase is related to Gray"s (1989) process stage, Ring and Van de Ven"s (1994) commitment stage and partly covers the elements defined by Arino and de Torre"s (1998) negotiation and commitment stage and Kezar"s (2005) building commitment stage. The planning stage should cover the following important aspects of capacity-building partnerships: determination of existing levels of capacity, determination of required levels of capacity, identification of capacity-building strategies, acquisition of infrastructural

resources, identification of participants involved in the partnership, and assigning the roles and responsibilities to the individuals involved in the partnership.

The implementation phase executes the plan of the capacity-building stage of a partnership. It partly addresses the components raised by Gray"s (1989) outcome stage, Ring and Van de Ven"s (1994) execution stage, Arino and de Torre"s (1998) execution stage and Kezar"s (2005) commitment and sustaining stages. At each stage, participants" relationships to one another will vary, and would be dependent on the level of inter-dependence between the participants. This phase should therefore focus on execution, as well as the relationships between the participants.

The next phase, evaluation, emphasises the need for a periodical review of technology, rules, division of labour and progress. Evaluation may be done after the implementation phase of a stage has been executed, but it is recommended that it is done after implementation of a specific part of a stage has been done (i.e. in the SANTED VCP, evaluation may be done at the end of the year, or it may be done at the end of each module). Once the evaluation is done, it may require the planning for the stage to be revisited, and improvements to be made to the implementation of the next part of the stage. Evaluation addresses components raised by Gray"s (1989) outcome stage, Ring and Van de Ven"s (1994) execution stage, Arino and de Torre"s (1998) execution stage and Kezar"s (2005) commitment and sustaining stages. It also partly addresses the components raised by Gray"s (1989) outcome stage (i.e. determination of the success of the collaboration), Ring and Van de Ven"s (1994) assessment stage (assessment for efficiency, equity and effectiveness) , Doz"s (1996) re-evaluation of efficiency, equity and adaptability, Arino and de Torre"s (1998) revaluation stage and Kezar"s (2005) sustaining stage. At the end of the evaluation stage, the initial plan of execution may need to be revisited and readjusted, as recognized by Doz (1996) and Arino and de Torre (1998). This would lead to revised conditions of execution, which will be implemented in the next phase of implementation.

The final stage, termination, rounds up the work of that stage, and carries forward the lessons learned from the stage to the next stage for purposes of improving the partnership.

9.5.2 Discussion and implications

Because the models for collaboration proposed by previous authors were not necessarily capacity-building processes, they did not differentiate between the different stages of transition in such a process, and the specific phases that each stage comprises. Rather, they assumed that collaboration is a partnership where partners have similar level of capabilities (albeit different capabilities) and they all have to contribute at the same level in order to make the partnership a success. In a capacity-building partnership, however, the levels of contribution from each partner are different. In the initial and final stages of the partnership, for example, one partner may contribute more to the partnership than the other. It is therefore important that the capacity-building model differentiates between the stages as well as the phases that a stage may go through.

Although the existing models of collaboration took into consideration the need to readjust the initial conditions as the collaboration process unfolded, they did not specifically address the infrastructural, institutional, cultural and individuals challenges identified in this thesis. Kezar‟s (2005) model for example also highlighted the need for institutional rewards and incentives at the individual level, but completely ignored the challenges that might be associated with infrastructure. The other four models did not consider the context of the collaboration, and did not suggest the need to periodically evaluate the implementation and make the necessary adjustments when necessary.

A critical element of virtual partnerships is the use of technology for communication purposes. While Kezar‟s (2005) model emphasized the importance of relationships between the partners, it implicitly again assumed a physical contact between participants. In virtual partnerships, however, technological artefacts are the main enabler for creating and maintaining relationships between the partners. A model for technology-enhanced virtual partnership can therefore not afford to leave out the importance of infrastructure in its core operations. The model suggested here therefore focuses on the context, looking at such things as rules and regulations, as well as the infrastructure that is available within that context.

Periodic evaluation of each stage was also identified as an important phase in the implementation of a virtual partnership. Experiences in the VCP have shown that the rules, technological needs and participants‟ needs constantly change during the implementation

process. Periodical evaluation therefore becomes important not only to guide the next stages of implementation, but to see if there are changes that can be immediately introduced within the current stage of the project. In the SANTED VCP, for example, periodical reviews led to the conclusion that the lecturers were not at all happy with the chosen technology in the project. Within the same stage of implementation, they were allowed to change technologies and use whatever they felt better enabled them to achieve their objectives.

The recommend phases, as well as the specific elements which they focus on, are presented in Table 9-5.

Table 9-5: Recommended phases for each stage of the implementation of a capacity-building virtual partnership

Phase	Focuses on:
Preparation	Aims and objectives of each stage
Planning	Execution plan including: activities, participants, rules, tools, timeframe, roles and responsibilities of all participants, neighbouring activity systems
Implementation	Execution of the plan, relationships between the participants
Evaluation	Review of execution plan
Termination	Lessons from current stage to the next stage

The models presented in Section 2.2.3 bore similarities and differences in some ways. Differences were observed, for example, in some models that emphasized the pre-requisites for collaboration as the most important to ensure success, while others emphasized the actual process of collaboration. In the phases recommended in this thesis, both the pre-requisites and the actual process in the context of collaboration are considered important for collaboration. In addition, the described phases are integrated within stages of implementation, which are defined by the project implementers at the beginning of the project. Because the phases can only be implemented within the stages, defining the capacity-building stages of a project is therefore one of the most critical issues that needs to be determined at the beginning of the project.

Implicit in the implementation of phases and stages is also the need for monitoring the implementation of the stages at both institutions. It is necessary to ensure that the stages are harmoniously implemented at both institutions and to suggest probable modifications that can be made during the periodical review and monitoring process.

CHAPTER 10: CONCLUSIONS

10.1 Thesis Summary

This thesis aimed at establishing the viability of implementing virtual partnerships for capacity-building purposes between departments of tertiary education institutions in the SADC region. The thesis explored the implementation of one such partnership, the SANTED Virtual Classroom Project, specifically focusing on the implementation and execution of the partnership, the challenges experienced in the implementation, the suitability of the technological solutions used, and participants" perspectives. In Chapter 1, the broader context of the research was introduced, and the motivations for the research were explained. The research problem (i.e. determining whether virtual partnerships can now be used for build capacity in the SADC region) was also introduced together with the scope of the research. The chapter concluded with the limitations of the research.

In Chapter 2, relevant aspects to virtual partnership in tertiary education as well as to capacity building were introduced. The chapter also introduced the three main categories of communication medium that can be used to enable virtuality, and explained the factors that are widely believed to affect virtual collaboration.

Chapter 3 introduced the SANTED virtual classroom project. The backgrounds of the Department of Computer Science at UNAM and the Telkom CoE at RU were presented in order to explain why this project was important in the context of both partners. The chapter also detailed how the project was started, and described its original implementation. It then explained why it would not have been possible to carry out this project had it not been for the availability of the SANTED funding.

Chapter 4 gave the theoretical framework for analysing the activities of the virtual classroom project. It introduced activity theory and communities of practice as two appropriate frameworks for analysing the project implementation. For each of the theories, the chapter presented the specific constructs that are used to guide the analysis done in this thesis.

Chapter 5 presented the research process followed. Although the research was not directly designed by the researcher, the choices made in the project that enabled the choice of the

participants, the modules and the virtual classroom solutions were explained in detail. In addition, the methods used to collect data were presented, and the specific frameworks used analyse the data and present answers to the research questions were discussed and motivated.

Chapter 6 detailed the implementation of the project. It demonstrated the steps taken in the project in each year of the implementation, to enable the participants to move from different stages of the capacity-building process. It used activity theory constructs to demonstrate who the participants in the project were, their motive for participation, the tools they used to achieve their objectives and the actual outcomes for each year of implementation. The chapter also highlighted how the actual implementation varied from the initial plan.

Chapter 7 presented the problems encountered during the implementation of the virtual classroom project. Using a grounded theory methodology, the chapter identified the specific problems of the virtual classroom project, and analysed them using activity theory. For each of the five activity systems identified in the project, the chapter discussed the specific problems in each category, and presented an activity theory perspective of the problem.

Chapter 8 used the concept of legitimate peripheral participation (LPP) to analyse the implementation of the partnership. Through the constructs of LPP, the different levels of participation and the avenues provided for the participants to participate in the project were identified. The chapter also discussed how the contradictions faced by the participants often proved difficult for the individuals to support the activities of the project. In addition, the chapter discussed how the participation of the different individuals in the SANTED virtual classroom transformed their practice.

Chapter 9 synthesized the findings and experiences of the project implementation. It first assessed the extent of the attainment of the original objectives of the VCP. It then presented the essential characteristics of a virtual classroom identified in the context of implementation. With this discussion, the chapter presented the key considerations for answering the main research question: whether the virtual environment can be used to mediate capacity in the SADC context. The chapter also demonstrated the phases that each transition stage of the SANTED Virtual Classroom project went through, in order to maximize the impact of the partnership on capacity building.

This chapter concludes the work done in the thesis. It looks again at the research questions defined for the study, and briefly summarizes the methodical and theoretical concepts that were used to provide answers to the research questions. It then discusses the implications of the findings of the thesis, and presents the direction for future work.

10.2 Research Questions Revisited

As explained in Section 1.4, this research aimed to address the following research question: **Can virtual environments be currently used to build capacity building in departments of tertiary education institutions in Southern Africa?** To answer this question, the main research question was further broken down into the following subsidiary questions:

1) What problems and challenges arise in the implementation of virtual partnerships for capacity-building purposes in tertiary education institutions in the SADC region?

2) How can the institutions harness the virtual environment to support capacity-building initiatives?

3) How can the institutions re-organize themselves to facilitate capacity building?

To answer the research questions, a case study approach was used to explore the activities of the SANTED virtual classroom project. The VCP was a three-year, virtual partnership initiative between the departments of Computer Science at Rhodes University and the University of Namibia, aimed at building capacity in the department at UNAM. To facilitate capacity building, the implementation process was divided into three stages, spread across three years of implementation.

- **Stage 1** (January–December 2008) aimed to mentor and provide the facilitators with the necessary background knowledge required in the modules while teaching the students at the same time. During this stage, the lecturers from RU presented all the modules, while the facilitators from UNAM observed the presentation of the modules.

- **Stage 2** (January–December 2009) aimed at distributing the duties between the lecturers and the facilitators. The lecturer at RU was still in charge of the activities, but some of the lectures were handed over to the facilitator where the lecturer acted as an observer, and gave constructive comments after the presentation sessions.

- **Stage 3** (January–December 2010) aimed at handing over all the modules taught in the project to the lecturers at UNAM who facilitated those modules in 2008 and 2009. The aim was to ensure that the capacity to teach those modules was successfully transferred to lecturers at UNAM, and therefore contact with lecturers at RU was minimal. The two departments took advantage, however, of the availability of funds in 2010 to begin the implementation of capacity-building process for teaching MSc modules at UNAM.

To identify the problems and challenges that arose in the implementation of virtual partnerships in the project as required by the first question, the grounded theory‟s principle of open coding was used and challenges identified from the data collected from multiple sources were characterized into four main categories: infrastructural problems, institutional problems, cultural issues and individual expectations. In addition, five activity systems were identified in the project: the Teaching Activity System, the Lecturing Activity System, the Facilitation Activity System, the Coordination Activity System and the Funding Activity System. For each of the activity systems, the specific problems experienced in each category were identified and analysed using activity theory. This analysis was discussed in Section 7.2.

To determine how the institutions harnessed the virtual environment to enhance capacity building, the concepts of activity theory were used in Chapter 6 to describe the activities across the three years. To determine how institutions in the SADC region can harness the virtual environment, important characteristics from the experiences of the participants in the project were discussed in Section 9.4, highlighting those characteristics required to make virtuality a reality.

To determine how the institutions should re-organize themselves to facilitate capacity building, the seven constructs of legitimate peripheral participation were suggested as appropriate for analysing the project implementation. This analysis was presented in Chapter 8. The findings emphasize the need for providing access to participation, the need to define the actual levels of learning, comprehensive planning for structuring resources to facilitate capacity building and the need to have a discourse on the activities of the practice.

10.3 Key Contributions of This Thesis

The contributions of this study emerged from Chapters 6 to 9 of the thesis. From the researcher's point of view, the following are the four main contributions of this thesis to the implementation of capacity-building virtual partnerships in the SADC region:

1) The implementation and reporting of a virtual partnership in the SADC context;

2) Identification of challenges facing virtual partnerships in the region;

3) A methodical analysis of the implementation process of the virtual partnership;

4) Context-informed considerations to guide the future implementations of partnerships in the region.

10.3.1 The implementation and reporting of virtual partnerships in the SADC context

In Section 1.4 of this thesis, the challenges experienced in setting out to answer the research questions examined in this thesis were highlighted, of which the lack of literature on virtual partnerships aimed at addressing capacity needs was noted. In addition, the general lack of reporting on collaborative partnerships between tertiary educational institutions in the SADC region was also noted. This thesis reported on the implementation of a capacity-building collaborative partnership between institutions in the SADC region. This contributes to building literature on collaborative partnerships in the region, and demonstrates one example of how partnership operations may be supported in similar contexts. It also increases the awareness of the need and possibilities that such a partnership may offer to developing contexts such as those of the SADC region.

10.3.2 Identification of challenges facing virtual partnerships

Due to the lack of implementation examples and guidance in literature, it was not clear what challenges could face virtual partnerships in similar contexts. The literature reviewed in this thesis identified challenges to be aware of, including the lack of coordination, funding challenges, and poor quality of ICT infrastructures available in the region. Through the case study, four particular categories of challenges were identified: infrastructural, institutional, cultural and individual expectations.

10.3.3 A methodical approach for analysing the implementation of virtual partnerships

The third challenge of carrying out this research was the lack of methodical approaches to analyse the results of the partnership, as well as to present the findings of the study. Using the grounded theory approach, however, the critical features of virtual partnerships were identified which subsequently led to the recommendation of two analytical frameworks that were deemed appropriate to analyse the implementation. Activity theory made it possible to describe and focus on the participants, roles, tools, and objectives of the activities of the partnership, as well as to analyse the contradictions and tensions inherent in inter-institutional partnerships. The community of practice, and specifically, the concept of LPP enabled the analysis of relationships between the participants, and the learning experienced during the transitions from different stages of the partnership. Together, these two frameworks guided the focus of the analysis and guided the reporting of the findings of the implementation.

10.3.4 Important considerations for partnership implementations in the SADC region

The last challenge highlighted in Chapter 1 was the lack of a framework for guiding the implementation of virtual partnerships such as the one explored in this thesis in literature.

Experiences in the project led to the identification of important features that can guide such implementations, as presented in Section 9.4. The considerations incorporate the several findings of the thesis, recognizing that capacity building is a staged approach, where each stage is characterized by the level of participation of the builders of capacity as well as those whose capacity is being built. Each stage goes through several phases, however. As noted throughout the reporting of the project implementation, moreover, implementations of virtual partnerships for capacity-building purposes are affected by many contextual factors. The recommendations were therefore a general, rather than a prescriptive model, to enable the required flexibility inherent in the changing dynamics during the execution of the partnership.

10.4 Implications of This Thesis

Although the findings of this thesis were reported in the context of the SANTED VCP, they have implications for the SADC region in general. This section discusses the implications of

whether such challenges are applicable across the region. Looking at findings from all three years of the project, the following are the key considerations that should be given emphasis when implementing virtual partnerships in the SADC region:

1) The availability and accessibility of technological solutions;

2) The need for institutional rules and regulations to guide implementation of partnership activities;

3) The need to understand each other"s institutional cultures;

4) The need for SADC policies to guide the implementation of partnerships and capacity-building initiatives;

5) The integration of capacity-building activities with institutional activities.

10.4.1 The availability and accessibility of technological solutions

The findings of the thesis confirmed that the technological provisions available in the project could not adequately cater for the needs of the project. Although dedicated broadband links were secured for the project, it was still characterized by disruptions and network failure that often rendered the chosen virtual classroom solution inaccessible. As demonstrated in the VCP, inaccessible technological solutions can create tensions among the participants of the virtual partnership. With technology being the main communication medium in the virtual partnership, it is therefore important to ensure that flexible solutions that are able to work with unstable and unguaranteed bandwidth provisions are given priority in the region, rather than focusing on feature-rich, bandwidth-intensive integrated solutions that are inaccessible in low bandwidth contexts. By defining the important features that are required to enable virtuality in a virtual partnership, institutions can combine freely available alternatives to provide adequate virtual functionality required within their contexts.

Solutions that provided minimum disruptions of lectures were favoured over interactive solutions in the VCP. Because of the greater need of interactivity required in virtual classroom environments, however, these solutions were creatively combined with interactive solutions in some lectures. As seen throughout the implementation of the project, the participants tried their best to balance between interactivity and availability.

10.4.2 Need for institutional rules and regulations to guide implementation of activities

Although collaboration between educational institutions is widely acknowledged as the way to make best possible use of limited resources in the region (SADC, 1997), there seems to be a general lack of clear policies on collaborative ventures at institutional levels. This lack was observed even at UNAM, where a wide range of collaborative ventures with many other institutions in different areas have already been conducted over the past few years. As observed in the SANTED VCP, the lack of policies is a challenge in a capacity-building virtual partnership because of several reasons:

1) Firstly, it does not clearly spell out what types of collaborative partnerships are allowed and how they should be implemented at institutional level. In the SANTED VCP, implementation details at the institutional level required the partners to always consult with management, as they themselves did not have the authority to make major decisions on behalf of the institutions. This often wasted time and prolonged the process of implementation. These findings are consistent with those reported by Doz (1996).

2) Secondly, in some cases, the decisions were made by management, but the offices implementing the decisions took other actions that were contrary to the objectives of the project, often seriously changing the direction of the project implementation plan.

3) Thirdly, the multiplicity of partners in a partnership implies a multiplicity in priorities, often requiring partners to compromise when implementation decisions are made (Kanter, 1994). The lack of policies made it difficult for such compromises to be reached because even the most basic decisions could not be made without consultations. These findings are consonant with those of Das and Teng (1998), who suggested that the individuals representing the partners must be fully empowered to commit resources and make decisions on behalf of the organization, otherwise they will always have to consult with their superiors before any decision is made.

4) Fourthly, the implementation plans were concluded based on the agreement signed between the institutions. Changes that were later made had an impact on the other partner and the project as a whole. If critical changes are made on the implementation plan by one institution without involving all the partners, the partners may lose trust in the partnership. This is consistent with the findings of Kanter (1994), who observed that

partners feel betrayed and that tension and doubts may arise in the partnership if the original agreements are not adhered to. Gudergan and Gudergan (2002) also observed that partners who trusted and felt confident in their partners were those who felt that their partners had a sense of obligation and accountability towards the partnership and a lower level of enforceability. The sense of obligation and accountability towards the partnership may however decrease if the fundamentals of the agreement are constantly changed by one of the partners. Gudergan and Gudergan (2002) therefore suggested that when such changes are made, the interest of both the partners in the partnership should be protected, and the consequences of such a decision should not be fatal to the partners and the partnership.

10.4.3 Understanding each other's institutional cultures

As demonstrated by the SANTED VCP, the people participating in the partnership had to operate within their institutional cultures. In addition, their behaviour and actions were influenced by their limitations and constraints dictated by their institutional rules. It is therefore important to be aware of each other"s institutional cultures and bureaucratic procedures that have a direct impact on the process of collaboration.

In the SANTED VCP, challenges related to different institutional rules and cultures affected the relationship between the partners. Issues such as students and facilitators coming late to lecture sessions, rewards and incentives for the facilitators participating in the project, and plagiarism presented challenges to the project that would only have been resolved if the partners had understood one another"s institutional cultures. Partners therefore need to understand and be aware of other partner"s cultures to facilitate a harmonious working relationship.

These findings are consistent with those of Kezar (2005), who noted that re-organizing higher education institutions for collaborative work was one of the primary challenges of inter-institutional collaboration. According to her, every institution coming to the partnership has its own bureaucracy, policies and cultures; it is therefore important that the differing institutional cultures are merged in collaborative partnerships, to form a single culture for the partnership (Kezar, 2005).

10.4.4 Need for SADC policy to guide the formation of partnerships and capacity-building initiatives in tertiary education

One of the problems that most hampered the progress and success of the SANTED VCP was the harmonization of qualifications between the two institutions. As discussed already, the only student who had met the requirements of registering at RU in 2009 could not be allowed to because he had missed a Statistics module to meet the minimum requirements for graduation at UNAM. When the module was finally completed in the first semester of 2009, it was only later discovered that the student actually had another second module of Computer Science missing from his academic record. The Project Coordinators negotiated for one of the modules done within the SANTED VCP to replace the missing module. At first, UNAM did not want to accredit any of the modules done in the project. Upon close examination, however, it was actually discovered that one of the modules done in the VCP was deemed equivalent in the UNAM Science Faculty prospectus to the students" missing module. According to the UNAM Rules and Regulations, the institution can accredit students if equivalent modules were already completed with other recognized institutions in the region. This automatically enabled the student to qualify for graduation. These ambiguities, however, were only eliminated because there was harmonization in the modules offered by both institutions. Most institutions in the region exempt students from equivalent modules that were done with other institutions in the region. It is therefore important that the region harmonizes and standardizes qualifications in tertiary education institutions in the region, in order not to hinder regional transferability of students and qualifications.

10.4.5 Integration with existing institutional activities to ensure sustainability of the partnership

Integration with existing institutional activities is important for three main reasons: to ensure support of collaborative activities by senior management and other offices in the institutions; to ensure the smooth operation of collaborative activities so that no new, extraordinary arrangements need to be made to accommodate the activities; and to ensure financial support and sustainability of the partnership.

Many of the institutions in the region are poorly funded and poorly resourced (Kotecha, 2010a). It would therefore be difficult for them to start and sustain collaborative ventures like

the one described in this thesis without external funding. A number of collaborative partnerships reported in the region received their initial funding from third parties (Parker, 2010). Funding of new partnership initiatives is therefore a challenge to most institutions in the region. At the start of the initiatives, the partners must try to secure funding from donors or make use of their departmental budgets available to them to fund these opportunities. Wheeler, *et al.* (Wheeler, Valacich, Alavi & Vogel, 1995) suggested that partners must see that they plan for early successes to convince their institutions that the partnership is a worthy cause that should be institutionalized, for them to be able to secure funding. In the SANTED VCP, the practicality of the partnership was acknowledged and appreciated by the management of both institutions. The institutions were not ready, however, to take over the sustenance of the project activities. Within the broader framework of the SANTED project, some of the partnerships between institutions in the regions were institutionalized after the management of the institutions proved the value of these partnerships in their institutions (Smith & Cross, 2010). As demonstrated in other partnership activities (Ilemobade & Ballim, 2005) however, the institutions can only own the process if it is integrated within the framework of the institution itself.

10.5 Suggestions for Future Work

Three possible areas for future research have been identified from this thesis:

1) The recommendations for the implementation of virtual partnerships suggested in this thesis were derived from the data analysed from the case study and the data analysis frameworks provided by Activity Theory and Legitimate Peripheral Participation. Although the case study methodology is widely used for several purposes, including deriving of the theories, several authors have also highlighted their concerns regarding the validity of results obtained from case studies (Yin, 2003). One of the ways to increase the validity of results in case studies is by using multiple sources. Although a variety of data sources was used and the data was triangulated, the combination of the involvement of the researcher with the research site could still have had an impact on the findings. This means that further research is needed besides this case study to validate and further test the recommendations for the region.

2) This implementation was possible because the departments had financial support from SANTED. In other cases, where financial support to institutions is not guaranteed, different dynamics will be experienced in the partnership. They would need, for example, extra budgets to pay for modules that are taught by lecturers from other institutions. In addition, UNAM provides a generous staff development policy that enables the participants to go for studies while on full-time leave. When participants come back from their studies, they are guaranteed full-time employment, and will even be considered for promotion. In cases where staff development policies may not be available, other incentives may be necessary to convince staff to participate in such programmes. Further research could therefore look at virtual partnerships that are funded by institutions themselves, rather than by external funders.

3) Countries in the SADC region are now in the process of acquiring broadband internet connectivity. In addition, countries in Southern Africa are also busy establishing National Research and Education Networks (NRENs) which will act as bandwidth consortiums to ensure that institutions acquire more bandwidth at affordable rates (Twinomugisha, 2008). The technological recommendations in this thesis may no longer be necessary if there is "sufficient" bandwidth. Further research could therefore investigate how unlimited bandwidth in institutions could affect the activities of virtual partnerships between the institutions, and the impact of acquisition of fibre-optic cables in the region on virtual partnerships.

4) The virtual partnership implemented involved universities in Namibia and South Africa. There is a need for further case studies that involve tertiary institutions in the SADC region, but outside South Africa, to understand the dynamics outside the South African context.

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APPENDIX A: COURSES PRESENTED IN THE SANTED VIRTUAL CLASSROOM PROJECT

Real Time Multimedia

The Module offers a practical introduction to real-time multimedia in IP networks. It introduces transmission protocols used for the delivery of real-time multimedia as well as the protocols responsible for the setup, maintenance and release of communication sessions. Other topics covered included in the module were: Session Initiation Protocol (SIP), Transmission of real-time multimedia in packet networks using RTP/RTCP, Softswitches, and Asterisk. The Module has a strong practical component intended to reinforce and demonstrate the content discussed in lectures.

Computer Networks

The module enables students to gain hands-on skills relating to the operation, planning, installation and management of modern TCP/IP networks, based on core Internet protocols and standards. It exposes emerging technologies such as IPv6 and Wireless Networking. Other topics included in this module are : Advanced IP addressing and Subnetting, TCP/IP routing, Wireless (802.11 / WiFi) Networking, Ethernet Cabling and Networking, Virtual Private Network (VPN) technologies, Next Generation IP - IP version 6, Firewalls, proxy servers and network security, Domain Name Service and Internet Core protocols.

Java Enterprise

The Java Enterprise module places an emphasis on web programming and web development, looking at server development and using Tomcat as a server for practical work. The module examines in detail: Key Java web structures of Servlet, JavaServer Pages (JSP), JavaServer Faces (JSF). The module first presents an overview of middleware. It then focuses on Web Services and Ajax, with special reference to the Google Web Toolkit. The module also looks at XML technologies and programming in Java for mobile devices.

Human Computer Interaction

This module offers both a theoretical and practical introduction to the field of Human Computer Interaction. It begins with seminal work on interactive systems and moves through current and future research areas in interaction techniques and the design, prototyping and evaluation of user interfaces. Specific topics included in the module are: Introduction to HCI concepts, Seminal Work in the field of HCI, Vision based interaction, Multi modal interaction, Ubiquitous computing, Augmented Reality / Virtual Reality, and Mobile computing. The module also has a strong practical component to reinforce and demonstrate the content discussed in lectures.

Computer Security

This module enables students to gain a better understanding of the importance of Security within Information Technology and to provide insight into the effects of security on Information Systems. Emphasis is placed on the importance of holistic integration of security practices into Information Technology as a whole.

Computer Graphics

The module introduces students to computer graphics. It covers aspects of two-dimensional image generation and manipulation, and three-dimensional modelling, rendering and animation. Concepts covered are relevant to the fields of image manipulation, for computer gaming, for computer animated video, and for virtual reality.

Advanced Operating Systems.

The module provides an in depth analysis on modern operating systems, focusing on: concepts and principles of process management; memory management and shows how advances in technology have affected the operating system; it illustrate scheduling algorithms used in both uniprocessor and multiprocessor operating systems; and describes input and output and file management. A case study of the Windows operating system to illustrate the application of the lecture material is conducted in order to demonstrate how the different management components work together.

Advanced Computer Networks.

The course provides an extensive overview of computer networking principles. It covers areas of protocol design, explores standardization of computer network protocols, and examines in depth some network protocols commonly used in practice. Some conceptual material including network design, modelling and simulation are also covered.

APPENDIX B: STRUCTURED INTERVIEW SCHEDULE

[Survey instrument adapted from Netteland (2007)]

A. Facilitator's Questionnaire

1. Which courses did you facilitate in the SANTED Virtual Classroom Project?
2. What were your expectations of the project? Where they met?
3. What is the significance of a facilitator? Describe a facilitator's responsibility and tasks.
4. Do you think you were well prepared for the role?
5. What was your previous experience in this subject?
6. How many sessions did you attend? For how long? Why were you not able to attend them all?
7. How did you organize your class?
8. What do you think is important in a Virtual Class?
9. How did you collaborate with the lecturers and project coordinator at RU? What about the students?
10. Which learning platform did you use? What are the advantages and disadvantages of that platform?
11. Was the platform always available for use?
12. Did you have to make any decisions regarding the course content? Presentation? Do you wish you could?
13. Did you have any support structure for the Module to succeed?
14. How do you measure success of the project?
15. Did you gain any experience from the course? What experience?
16. Are you able to present the module yourself through the virtual class? Why? Why not?
17. Were the modules useful and relevant to your students?
18. Did you participate in any workshop, presentation of courses? If yes, how many?
19. How did the department benefit from the SANTED Virtual Classroom project? How will it affect the department in future?
20. What did you learn most from this project?
21. Do you think these types of initiatives can be replicated in other courses and other institutions in SADC region? What needs to change?

B. Student's Questionnaire

- Which course did you attend in the SANTED Virtual Classroom Project?
- What were your expectations of your lecturer, your facilitators, the project coordinator and the project itself? Where they met?
- What were your tasks and responsibilities in this course?
- Do you think you were well prepared for the Modules? What was your previous experience in these modules?
- How many sessions did you attend? For how long? Why were you not able to attend them all?
- How did you collaborate with the lecturers, facilitators and project coordinator in the project?
- Which learning platform did you use? What are the advantages and disadvantages of that platform?
- Did you have to make any decisions regarding the course content? Presentation? Do you wish you could?
- How do you measure your success in this project? Did you gain any experience it?
- Were the modules useful and relevant to you? What did you learn most?
- How did the department benefit from the SANTED Virtual Classroom project?
- Do you think such initiatives can be replicated in other institutions?

APPENDIX C: QUESTIONNAIRES FOR LECTURERS AND STUDENTS

Staff Questionnaire

[Survey instrument adapted from (Lander, Burns, & Spence, 1999)]

This survey is a critical part of a study aimed at identifying key issues in the operations of inter-institutional collaboration between Universities with different resources. Findings of the study will be used in a PhD research study, as well as to improve the SANTED virtual classroom project in 2009. You are receiving this survey because you have been involved in the project as a lecturer in 2008. The survey seeks to understand what was successful with the first phase of implementation in order to understand how the next phase can be structured. Thank you for participating in this study.

Please complete this survey by **Friday, 19 December 2008**. Thank you for your time and valuable input. Your participation is highly appreciated. If you have any concerns or would like to receive a summary of the key findings, please email tndakunda@unam.na.

1. Your name _____

2. Courses taught in the SANTED project_____

3. Did you have prior experience with virtual class solutions or other technology-assisted distance teaching before participating in this project? If yes, please name the solution and describe what situations you used them in, and type of experience.

   _____

   _____

   _____

   _____

4. How often did you conduct sessions on Wimba?

   _____

5. What kind of sessions were they? (e.g. Lecturing, discussion, meetings, chats, etc.)

    _____

    _____

    _____

6. Apart from those sessions, what other potential use of Wimba (or any other virtual classroom solution) have you identified?

    _____

    _____

    _____

    _____

7. What kind of training was offered to you before you started using Wimba? (e.g. A session with Chris, downloaded a book from Wimba's website, etc.)

    _____

    _____

    _____

8. Now that you know Wimba, what kind of training do you think should be given to future lecturers before using Wimba?

    _____

    _____

    _____

    _____

    _____

9. If you were asked to teach the same course using the same solution next year, how you would you react? (e.g. Interested, distressed, worried about it, etc). Why?

    _____

    _____

    _____

    _____

10. What kind of preparation (technical and teaching) did you have to make to teach using Wimba?

_____

_____

_____

_____

11. Do you feel that your students were adequately prepared for learning through a virtual classroom solution?

_____

_____

_____

12. What do you think might improve the students' preparation (if anything)?

_____

_____

_____

13. How confident did you feel about using virtual classroom before you started ?

_____

_____

_____

14. What reservations or concerns do you have now about using a virtual classroom solution for delivering a module?

_____

_____

_____

15. What kind of teaching styles have you used to deliver your module?

_____

_____

_____

16. Have you had to adapt your teaching style to accommodate Wimba? If yes, how and to what extent?

_____

_____

_____

17. How would you rate the level of interaction between you and the students during a typical lecture?

_____

_____

_____

18. Do you think the students are disadvantaged by having the module delivered through a virtual classroom solution? Why / Why not?

_____

_____

_____

19. What aspects of Wimba did you find most difficult to deal with?

_____

_____

_____

20. What aspects did you find to be most useful?

_____

_____

_____

21. What lessons did you learn about delivering a module using this medium?

_____

_____

_____

22. Have you had the support of another member of staff present at the remote site during sessions?

_____

_____

_____

23. What advice would you give to anyone considering or asked to use a virtual classroom solution for teaching?

_____

_____

_____

----- The end. Thank you for your participation -----

Student Questionnaire

[instrument adapted from (Lander, Burns, & Spence, 1999)]

Thank you for your willingness to answer this questionnaire, which aims to identify key issues in the operations of inter-institutional collaboration between Universities with different resources, for capacity building purposes. The survey uses the SANTED virtual classroom project as a case study, and you are receiving this survey because you have been involved in the project as a student. The information you and other students are providing us will be reported as part of a PhD study, but it will also help us to understand what was successful with the implementation in order to understand how the next phase can be structured.

Your answers are confidential. It will not be used to identify you or against you.

We appreciate your time and participation. Once again, thank you for your input!

QUESTIONNAIRE INFORMATION

Risks and Benefits of Being in the Study

There are no physical, psychological, social or medical risks associated with your participation in this study.

Compensation

Participants are not compensated for participating in this study.

Confidentiality

The records of this study will be kept private. Report that might be published as a result of this questionnaire will not include any information that will make it possible to identify YOU. ALL completed questionnaires will be stored securely and only researchers will have access to them.

Voluntary Nature of the Study

Participation in this study is voluntary. Your decision to participate or not will not affect your current or future relations with your lecturers, department or institution. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

Contacts and Questions

If you have any queries or concerns, or would like to receive a summary of the key findings, please email tndakunda@unam.na.

Statement of Consent

I have read the above information. I have asked questions and have received answers. I consent to participate in the study.

Yes   No

BACKGROUND INFORMATION

1.   What is your gender?
    Male
    Female

2.   In which decade were you born?
     1990s
     1980s
     1970s

3. Prior to the SANTED project, did you participate in a course that was delivered by a lecturer or facilitator at a distance, using technology?
    Yes
     No - if No, go to section 1.

4. Approximately how many sessions in total did you participate in, in this course that was delivered by a lecturer or facilitator at a distance?
    Less than 5
    Less than 10
    Less than 20
    More than 20

5. What was the average number of students taking part in the above (Question 1 and 2) course (including yourself) was:
    Less than 5
    Less than 10
    Less than 20
    More than 20

Please answer all questions by CIRCLING one rating for each question.

The ratings are:

1 - very poor
2 - poor
3 - average
4 - good
5 - very good

SECTION 1 – CHARACTERISTICS OF TEACHING

1	The clarity with which lectures were conducted	**1**	**2**	**3**	**4**	**5**
2	The amount of time you spent per lecture	**1**	**2**	**3**	**4**	**5**
3	The degree to which your environment helped you to understand the content	**1**	**2**	**3**	**4**	**5**
4	The quality of the content taught in lectures	**1**	**2**	**3**	**4**	**5**
5	The degree to which the mix of instructional techniques (e.g. Lectures, group work, case study, etc) helped you to understand the content	**1**	**2**	**3**	**4**	**5**
6	The extent to which the virtual classroom lab was free of distractions	**1**	**2**	**3**	**4**	**5**
7	The extent to which you felt you were part of the class	**1**	**2**	**3**	**4**	**5**
8	Lecturer's communication skills over the virtual classroom	**1**	**2**	**3**	**4**	**5**
9	The organization of lectures	**1**	**2**	**3**	**4**	**5**
10	Lecturer's enthusiasm and patience	**1**	**2**	**3**	**4**	**5**
11	The extent to which the lecturer encouraged participation	**1**	**2**	**3**	**4**	**5**
12	Accessibility of lecturers outside the sessions	**1**	**2**	**3**	**4**	**5**

SECTION 2 – CHARACTERISTICS OF TECHNOLOGY

1	TThe quality of your computer screen, camera and headphones	**1**	**2**	**3**	**4**	**5**
2	The quality of the software used	**1**	**2**	**3**	**4**	**5**
3	The quality of internet access	**1**	**2**	**3**	**4**	**5**
4	The quality of video during sessions	**1**	**2**	**3**	**4**	**5**
5	The quality of sound	**1**	**2**	**3**	**4**	**5**
6	The brevity of delays during sessions	**1**	**2**	**3**	**4**	**5**
7	The promptness with which problems with technology were recognised by both the lecturer and the students	**1**	**2**	**3**	**4**	**5**
8	The degree of confidence you had that classes will not be interrupted or cancelled due to technical problems	**1**	**2**	**3**	**4**	**5**
9	The quality and accessibility of recorded sessions	**1**	**2**	**3**	**4**	**5**

SECTION 3 – MODULE MANAGEMENT AND COORDINATION

1	T Timely exchange of content between students and lecturers	**1 2 3 4 5**
2	The accessibility of lab facilities	**1 2 3 4 5**
3	The accessibility of lecturers and facilitators	**1 2 3 4 5**
4	The accessibility of support staff for technical problems	**1 2 3 4 5**
5	The accessibility of lecturer for solving module specific problems	**1 2 3 4 5**
6	The sequencing of and spacing between modules	**1 2 3 4 5**
7	Communication between students, lecturers and coordinators	**1 2 3 4 5**
8	Suitable lecture/exam times for both students and lecturers	**1 2 3 4 5**

SECTION 4 – GENERAL QUESTIONS

1. What technological solutions were used in this course?

   _____
   _____
   _____

2. Has the continued use of the above solutions increased your confidence in technology? Would you recommend continued use of this solution?

   _____
   _____
   _____

3. Do you feel you were adequately prepared for this course? Why / Why not?

   _____
   _____
   _____
   _____

4. Did you find it more or less strenuous to concentrate? Why / Why not?

   _____
   _____
   _____

5. How do you think you adapted to the course content, the lecturer, and the style of presentation? How long did it take you to adapt and why?

   _____
   _____
   _____

6. What aspects of this course did you found most difficult to deal with?

   _____
   _____
   _____

7. What aspects did you find to be most useful?

   _____
   _____
   _____
   _____

8. What advice would you give to other students considering or asked to join this project next year?

   _____
   _____
   _____
   _____

----- The end. Thank you for your participation -----

APPENDIX D: FACILITATORS' EXPECTATIONS

Role of Facilitators in the SANTED Virtual Classroom Project

[Guidelines adapted from AVU/RMIT Learning facilitators" guide]

As facilitators, you are responsible for ensuring that the module implementation falls within the guidelines and requirements of our agreement with SANTED and RU. You are the key contact between the students and their lecturers, and you play a key role in providing the students" learning experience: guiding and assisting students with their learning and course activities and materials provided by RU. Your tasks and responsibilities are:

- *Before the class*
    - o Ensure that there is an agreed time for the course between students and lecturers.
    - o Ensure that students show up on time
    - o Ensure that the chosen medium of classroom delivery is up and running
    - o Communicate to the main lecturer if there is a problem

- *During the class*
    - o Ensure that there is communication between the lecturers and students. If the students cannot hear the lecturer, call the extension indicated on the phone and in the manual, and inform the lecturer
    - o Ensure that students are following the lecture and not just wandering on the web
    - o Take class attendance
    - o Make necessary adjustments to the sitting arrangements as you deem fit

- *After the class*
    - o Review the main purposes and nature of the class with students
    - o Guide students through learning and assessment tasks
    - o Explain difficult concepts and course topics
    - o Answer students questions and help them to learn
    - o Ensure students hand in their assignments on time
    - o Identify students who are having learning difficulties and communicate these to the main lecturer
    - o Help in improving the course by providing comments and suggestion to the main lecturer