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**A Process Assessment Framework for Rural ICT Projects in Developing Countries:  
An Exploration of the Siyakhula Living Lab, South Africa**

**A thesis submitted in fulfillment of the requirements for the degree of**

**MASTER OF SCIENCE**

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**By**

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## **Abstract**

Rural development can be supported by information and knowledge which are key strategic resources for socio economic development. ICTs enable the facilitation and communication of information between remotely dispersed individuals or groups and more developed regions. While it has become common place that ICTs possess capabilities to potentially support rural development, the concept of ICT for development (ICT4D) is still fraught with challenges and barriers, which impede the success and sustainability of ICT4D projects. It is therefore essential to evaluate rural ICT projects, as such an analysis may aid in revealing information related to the need, effectiveness, impact, and sustainability of these projects.

This research seeks to further the implementation and exploration of the Rural ICT Comprehensive Evaluation Framework (RICT-CEF), through the application of the Process Assessment domain in a real life rural ICT project environment. The RICT-CEF framework consisting of 7 evaluation domains has the primary objective of evaluating rural ICT projects from their inception stages to post implementation. A process assessment seeks to determine whether or not a rural ICT project is operating to implement its intended functions in the intended way specified in the projects plan. Such an assessment is invaluable to a comprehensive evaluation. Evaluation questions for a process assessment are centred around critical themes of project performance. Critical themes are aspects of a programme or projects implementation which must be enacted in order to achieve desired project outcomes.

This research study is aimed at identifying critical themes of process assessment relevant to rural ICT4D projects. To identify critical themes, assessment approaches on social programme process assessments, evaluation of information systems in use, and rural ICT4D project evaluation case studies are comparatively analysed. Fourteen assessment approaches from these three categories are selected based on criteria. To analyse selected assessment approaches, a template is created based on the research questions, foundational literature on process assessment and identified challenges applicable to process assessments of rural ICT4D projects. Comparing and contrasting critical themes from these assessment approaches highlight critical themes essential to assess in the iterative implementation phase of rural ICT projects. Accentuated critical themes include, service utilization, organizational function and external project factors. These themes, along with suggested guiding principles from literature for conducting process assessments enable the creation of a framework for conducting process assessments of rural ICT projects. The framework is labelled “the Rural ICT Project Process Assessment Framework (RICTP-PAF)”. The application of the RICTP-

PAF in a real life rural ICT project through a design science case study provides lessons learned (suitability and shortcomings) from applying the framework. This essentially demonstrates the sensitivity of the RICTP-PAF to rural contexts in which it is implemented in. For instance, the implemented prototype of the RICTP-PAF reveals that the framework places a great deal of emphasis on rural beneficiary perspectives. A practice which has been lacking in such evaluation exercises. Furthermore, the guiding principles elucidated, bring to mind best practices to deal with issues such as stakeholder conflict, unreliable data elicitation and unethical assessment practices. The RICTP-PAF represents a fundamental tool for process assessments of rural ICT projects, and may be adopted and customized to various rural ICT project contexts in developing countries.

## Table of Contents

<b>Abstract.....</b>	<b>i</b>
<b>List of Tables .....</b>	<b>viii</b>
<b>List of Figures.....</b>	<b>ix</b>
<b>Acknowledgements.....</b>	<b>x</b>
<b>Chapter 1: Research Introduction.....</b>	<b>1</b>
1.1 Introduction.....	2
1.2 Research Context.....	2
1.3 Research Goals .....	5
1.4 Research Methodology.....	6
1.5 Summary of Results .....	7
1.6 Organisation of Thesis .....	9
<b>Chapter 2: Rural development and ICTs .....</b>	<b>12</b>
2.1 Introduction .....	13
2.2 Rural Development.....	14
2.3 Importance of Information and Knowledge as Rural Development Enablers.....	16
2.4 Constraints of Information Effectiveness in Rural Development .....	17
2.5 Uses of ICTs in Rural Development.....	20
2.6 Challenges that Impede Successful Employment of ICTs for Development .....	26
2.7 Conclusion.....	31
<b>Chapter 3: Evaluation of Rural ICT4D projects .....</b>	<b>33</b>
3.1 Introduction .....	34
3.2 Importance of Rural ICT Project Evaluation.....	35
3.3 Knowledge Gaps in Rural ICT Project Evaluation .....	36
3.4 The Rural ICT Comprehensive Evaluation Framework (RICT-CEF) .....	38
3.5 RICT-CEF Structure .....	38
3.5.1 The RICT-CEF Domains and Evaluation Life-Cycle .....	40
3.6 Process Assessment in Rural ICT Projects .....	41
3.7 Importance of Process Assessment in Rural ICT Projects.....	42
3.7.1 Replication of Successful implementation processes for similar ICT4D projects	42

3.7.2 Satisfying ICT4D Stakeholder interest.....	42
3.7.3 Equity of ICT Service Distribution amongst sub-groups.....	43
3.7.4 Linking project processes to outputs and outcomes.....	43
3.7.5 Understanding the relationship amongst various project components.....	43
3.8 Shortcomings of process assessments applicable to rural ICT projects.....	44
3.8.1 Disparate measures across project sites.....	44
3.8.2 Resource constraints limiting the amount of potential data which can be collected .....	44
3.8.3 Few Training opportunities to specialize.....	45
3.8.4 Criteria setting for acceptable performance.....	45
3.8.5 Not Enough Emphasis on Internal Stakeholder Perspectives.....	46
3.9 Rural ICT Process Assessment Questions and Critical Themes.....	47
3.10 Conclusion.....	47

**Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes.....49**

4.1 Introduction.....	50
4.2 Critical Themes of Programme Process Assessment.....	50
4.3 A Comparative Analysis of Critical Themes across Social Programmes/ Information Systems in Use and Rural ICT Cases.....	52
4.4 Template for Analysing Critical Themes of Process Assessment.....	53
4.5 Analysis of Critical Themes in Social Programme Process Assessment.....	55
4.5.1 Criteria for selecting assessment approaches which identify Critical Themes of process assessment in social programmes.....	56
4.5.2 Summary of Analysis of Critical Themes of Process Assessment in Social Programmes.....	62
4.6 Identifying Critical themes of Process Assessment from select Information Systems Evaluation Approaches.....	64
4.6.1 Criteria for Selection of approaches which identify Critical Themes of Process Assessment in Information systems projects.....	67
4.6.2 Summary of critical aspects to assess while information systems are in use.....	73
4.7 Identification of Critical Themes of Process Assessment from Select ICT4D assessment approaches.....	74
4.7.1 Criteria for Selecting Rural ICT4D cases to identify Critical Themes of process assessment.....	74

4.7.2 Summary of an analysis of ICT4D cases identifying critical themes of process assessment .....	81
4.8 A Comparative Analysis of Identified Critical Themes from all categories .....	83
4.9 Critical Themes Identified across assessment approaches .....	83
4.9.1 Critical Themes related to Project Recipients .....	83
4.9.2 Critical Themes related to Intervention Providers (Organisational functions) .....	93
4.9.3 External Project Factors .....	102
4.10 Conclusion.....	104

**Chapter 5: A Framework for Assessing Critical Themes of Process Assessment in Rural ICT4D projects .....** 105

5.1 Introduction .....	106
5.2 A Framework for Conducting Rural ICT Project Process Assessments using Critical Themes of Project Performance .....	106
5.3 Guiding Principles for Conducting Rural ICT Process Assessments .....	107
5.3.1 Collaborative Evaluator/Stakeholder Relationship.....	107
5.3.2 Programme theory specification.....	108
5.3.3 Validate evaluation questions .....	108
5.3.4 Quality Control throughout data collection and analysis phase.....	108
5.3.5 Ethical Consideration.....	109
5.4 Critical Themes of Process Assessment in Rural ICT4D projects.....	109
5.4.1 Service Utilization.....	110
5.4.2 Organizational Function .....	117
5.4.3 External Project Factors .....	122
5.5 Conclusion.....	124

**Chapter 6: Case study Research Methodology .....** 126

6.1 Introduction .....	127
6.2 Research Paradigm .....	127
6.3 Research Strategy .....	127
6.4 Scope of the RICTP-PAF Application .....	129
6.5 The Case Study Design.....	129
6.5.1 The Case Study Research Questions .....	130

6.5.2 The Unit of Analysis.....	130
6.5.3 The Research Instruments.....	130
6.5.3.1 Interviews.....	130
6.5.3.2 Participant Observation.....	131
6.5.3.3 Document analysis.....	132
6.5.4 Data analysis .....	133
6.5.5 Ethics.....	133
6.6 Conclusion.....	135

**Chapter 7: A Case Study Exploration of Process Assessment in the Siyakhula Living Lab..... 136**

7.1 Introduction .....	137
7.2 An Overview of the Siyakhula Living Lab .....	137
7.3 The SLL Presence in the Mbashe Municipality .....	138
7.4 Objectives of the Siyakhula Living Lab .....	140
7.4.1 Short Term.....	140
7.4.2 Medium Term .....	141
7.4.3 Long Term.....	141
7.5 ICT Infrastructure in the SLL .....	141
7.5.1 Software Platform and applications .....	143
7.6 The Programme Theory of the SLL .....	144
7.6.1 The Service Utilization Plan .....	144
7.7 Reflective Report on Applying the RICTP-PAF in the SLL .....	146
7.7.1 Application of guiding principles to the assessment process .....	147
7.7.1b Lessons Learned from Applying Guidelines .....	151
7.7.2 Reflection on Assessing Service Utilization in the SLL .....	154
7.7.2.1 Assessing Coverage and Bias.....	154
7.7.2.1b Lessons learned from assessing coverage and bias .....	158
7.7.2.2 Assessing User Perception of ICT Service Characteristics.....	161
7.7.2.2b Lessons learned from conducting User perception assessment .....	165
7.7.2.3 Assessing for the presence of sustainable use factors .....	167
7.7.2.3b Lessons learned from assessing for the presence of factors suggesting there will be sustainable use of ICTs in the long run.....	169

7.7.2.4 Assessing Training Units Received By Rural Beneficiaries .....	170
7.7.2.4 b Lessons learned from observed assessment of Units received .....	173
7.8 General Lessons Learned from Applying the RICTP-PAF .....	173
7.9 Reflection on Feedback.....	175
7.10 Conclusion.....	176
<b>Chapter 8: Revised RICTP-PAF .....</b>	<b>177</b>
8.1 Introduction .....	178
8.2 Revisions to the RICTP-PAF.....	178
8.2.1 Application of Guiding Principles .....	178
8.2.2 Assessing Service Utilization sub themes.....	180
8.2.2.1 Coverage and Bias .....	180
8.2.2.2 User perception of ICT service characteristics .....	183
8.2.2.3 Identifying the Presence of factors suggesting there will be sustainable use of ICTs in the long run.....	183
8.2.2.4 Units Received from Training.....	183
8.2.5 The Overall Structure of the Process Assessment Framework .....	188
8.3 An Overview of the RICTP-PAF Application.....	188
8.4 Conclusion.....	189
<b>Chapter 9: Conclusion and Future Research .....</b>	<b>191</b>
9.1 Introduction .....	192
9.2 Research Contribution .....	192
9.3 Future Research .....	197
9.3.1 Enhancing the RICTP-PAF.....	197
9.3.2 Application of Subsequent Domains of the RICT-CEF.....	197
9.3.3 Exploring other Process Assessment Approaches to identify more Critical Themes and principles.....	197
9.3.4 Applying the RICTP-PAF to other ICT4D Project Cases .....	198
9.4 In Closing .....	198
<b>List of References.....</b>	<b>199</b>



### List of Tables

Table 4.1: A template for analysing critical themes of process assessment .....	54
Table 4.2: A review of critical themes of process assessment in social programmes .....	57
Table 4.3: Six types of generic information systems evaluation types.....	67
Table 4.4: A review of critical evaluation aspects of Information systems in Use .....	70
Table 4.5: A review of critical themes of process assessment from selected ICT4D approaches .....	76
Table 4.6: Summary of service utilization themes.....	92
Table 4.7: A summary of organizational function and its sub-themes .....	101
Table 4.8: A summary sub-themes of external project factors .....	104
Table 5.1: Summary of service utilization sub-themes.....	116
Table 5.2: Summary of Organizational function sub-themes .....	121
Table 5.3: Summary of External Project Factor sub-themes .....	124
Table 8.1: Enhancements to guiding principles for conducting a process assessment.....	179
Table 8.2: An enhancement of the RICTP-PAF’s proposed methods for assessing coverage and bias .....	181
Table 8.3: An enhancement of the RICTP-PAF’s proposed methods for assessing user perception of ICT service characteristics. ....	184
Table 8.4: An enhancement of the RICTP-PAF’s proposed methods for assessing for the presence of factors promoting sustainable use of ICTs.....	185
Table 8.5: An enhancement of the RICTP-PAF’s proposed methods for assessing units received.....	186

## List of Figures

Figure 3.1: Changing focus of ICT4D assessment over time .....	37
Figure 3.2: Rural ICT Comprehensive Evaluation Framework (RICT-CEF) .....	39
Figure 5.1: Rural ICT Project Process Assessment Framework (RICTP-PAF) .....	107
Figure 7.1: Schools which serve as points of presence (connected schools) by the SLL.....	140
Figure 7.2: Network infrastructure of the SLL points of presence in Dwesa (connected schools).....	143
Figure 7.3: The SLL service utilization plan leading up to access of ICT services .....	145
Figure 8.1: The Enhanced Rural ICT Project Process Assessment Framework (RICTP-PAF) .....	188

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### **Declaration**

I acknowledge that all references are accurately recorded and that unless otherwise stated, all work contained herein is my own.

Osah Umeoniso Joshua

## Chapter 1 Research Introduction

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*This chapter introduces the research study. The research context is outlined to provide a background to the research. The goals of the research and the research methodology employed are described. Lastly a summary of results revealed by the thesis is presented.*

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### **1.1 Introduction**

The realization that ICTs possess the potential to underpin rural development has resulted in varying projects attempting to employ ICTs as a development support mechanism. ICTs offer essential support for providing and communicating information to and from rural areas. The value ICTs provide cannot be overlooked, as information is considered a key strategic resource for rural development. While ICTs possess enormous potential to support rural development, several challenges may impede attempts to successfully deploy and employ them for rural development. Such challenges relate to the implementation and use of ICTs as rural development tools. Dealing with these associated challenges necessitates suitable assessment approaches, more so at the implementation stages of such projects, where processes which affect outcomes are enacted.

This chapter provides an introduction to the research study. In retrospect of providing a background to the research study, the research context is outlined. This is followed by an outline of the research goals, including the research questions by which the research is structured. Subsequently, the research methodology employed is described. Following this is a summary of results attained. Finally, an outline of the thesis organization concludes the chapter.

### **1.2 Research Context**

Rural development can be described as systematic attempts to bring about social changes, which will consequently ameliorate the living conditions of the people whom these changes affect (Summers, 1986: 360). It is imperative that adequate attention is paid to rural development, as it is linked to social and economic growth of developing countries (Pade-Khene and Sewry, 2011). Rural areas are synonymous with poverty, as Heeks (2009) suggests, most of the world's poor are situated in rural areas. In an increasingly globalized world, neglect of the plights of the poor could result in challenges, such as, increased migration, terrorism, and pandemic spread (Heeks, 2009: 2). Poverty of the rural poor is intensified by their physical remoteness (McNamara, 2003). Results of remoteness experienced by rural dwellers, is evident with challenges such as poor access to markets, weak or non-existent physical infrastructure, dearth of relevant information, poor health, low quality education and poor access to government resources *etc* (Rose, 1999:1; McNamara, 2003: 41).

In retrospect of development challenges, their persistence globally, and an urgency to eradicate poverty, Information Communication and Technology for Development (ICT4D) was conceptualized (Heeks, 2009: 3). ICT4D was initiated in 1995, when the underlying concept was to unearth the potential of information systems and technology as instruments of development (McNamara 2003). ICTs are an array of technological tools employed to generate, store, process and communicate information (Tinio, 2003). The proliferation of information and communication networks over the last ten years, its innovative nature, the business processes it underpins and its perceived social impacts have sparked worldwide optimism about its potential to support the alleviation of poverty and advance social and economic growth in developing countries (Avgerou, 2010: 1; McNamara, 2003: 1).

While there is global optimism concerning the potential of ICTs to support rural development, Mhishi (2009) and Adam and Wood (1999) suggest that it is essential for ICT4D implementers to understand contextual factors of the particular rural communities in which projects will be implemented. ICTs provide valuable information (Hussain and Tongia, 2009: 55), which can potentially generate knowledge to tackle many socio-economic problems in rural communities (Pade-Khene and Sewry, 2011). Therefore, it is essential that information being generated, processed and communicated is relevant to the proposed audience or community (Hussain and Tongia 2009: 55, Foster, 2011).

Paradoxically, the above point on the essence of proper contextualization in ICT4D projects is a topic of concern, due to a lack of adherence to this rule in various ICT4D projects. Neglecting to recognise issues of contextualization, account for failed ICT4D projects in Africa which continue to outnumber success stories (Krauss, 2009: 247). Furthermore, a major incitement of failed ICT4D projects is careless enthusiasm by implementers of development projects to execute replicated “quick, off-the-shelf ICT solutions” in developing countries (Heeks, 2009:4). Such rushed solutions, do not take into consideration contextual challenges relevant to rural communities, which may impede the success of ICT4D project implementations. Challenges peculiar to rural contexts may include illiteracy levels in rural communities, socio cultural challenges, inadequate telecommunications infrastructure and political constrains (Langmia, 2005; McNamara, 2003:63; Pade-Khene and Sewry, 2011: 23). It should therefore be noted that, the availability of ICTs in such developing contexts, is not a solution or replacement for addressing the more complicated social, economic and historical predicaments faced by developing countries. Therefore, McNamara (2003) postulates that

ICT tools should not be viewed as solutions to development problems, but as enablers, which if used appropriately, can facilitate positive developmental change.

The issue of sustainability also requires critical consideration because as indicated by Batchelor, Evangelista, Hearn, Peirce, Sugden and Webb (2003) and Best and Kumar (2008), numerous studies consider sustainability as pivotal to long term development benefits for ICT4D projects. Considering there has been lack of success with numerous ICT4D projects in delivering and persisting, sustainability has become a vital area of concern in ICT4D projects (Heeks, 2009:4).

Amongst others, the challenges highlighted have brought about legitimate impetus for the evaluation of ICT4D projects. To support the need for evaluation, Gomez and Pather (2010) and Piatkowski (2006) postulate that despite large investments in ICT4D projects, there still remain questions about the impacts of ICT as a development enabler. Increasing attention is therefore being paid to evaluation of ICT4D projects, to account for the huge investments of informational and technological tools in rural development initiatives (McNamara, 2003: 9).

In a comparative study of evaluation approaches for ICT4D projects, Garrido (2004) stated that several evaluation models exist for evaluating ICT4D projects, which may be formulated, based on the specific development project, or constructed from theory. Existent ICT4D evaluation approaches though, are increasingly changing their focus to concentrate on impact assessments, as opposed to adopting a comprehensive approach, where all project phases are assessed. The paradigm shift in ICT4D evaluation may be as a result of the perceived difficulty present while attempting to account for impacts, thus prompting greater focus on impacts, in order to explore suitable approaches to account for them (Heeks and Molla, 2009). While it cannot be disputed that accounting for impacts is crucial, it must also be noted that ICT4D project impact assessments, are dependent on, and informed by earlier phases of a projects life cycle (Pade-Khene and Sewry, 2011). This suggests that accounting for earlier phases of an ICT4D project's life cycle, for instance, initiation, needs assessment and implementation are equally important. In retrospect of the neglect for earlier phases of a project's life cycle, Pade-Khene and Sewry (2011) propose a comprehensive evaluation framework referred to as, the Rural ICT Comprehensive Evaluation Framework (RICT-CEF). The development of the RICT-CEF framework was motivated by the lack of an all-encompassing structure to assess ICT4D projects from inception to conclusion. The RICT-CEF framework is comprised of seven domains (assessment areas) which are interrelated and

dependent on each other. The domains include in sequential order; 1) Baseline Study, 2) A Needs Assessment, 3) Program Theory Assessment, 4) Process assessment, 5) Impact Assessment 6) Efficiency Assessment, and 7) A Scalability Assessment (Pade-Khene and Sewry, 2011).

The first three domains which include: the Baseline Study, Needs Assessment, and Program Theory, in their respective stated orders have been investigated and implemented in a real-life ICT4D project case. This research therefore seeks to further the implementation and exploration of the RICT-CEF framework, through the application of the process assessment domain in a real life rural ICT project environment. A *Process Assessment* assesses how well a rural ICT project is operating to implement its intended functions in an intended way, as stipulated in its project plan (Pade-Khene and Sewry, 2011: 35; Bhatnagar and Singh, 2009: 110). Batchelor and Norrish (2006) state that as a requirement, in attempts to construct evaluation frameworks for ICT4D projects, evaluations must take into consideration the analysis of the *processes* involved in the project that lead to the impacts. This view is not only echoed by evaluation experts in the ICT4D field, but also by practitioners of evaluation in social programmes and information systems projects. Information concerning programme results produced by impact assessments will be incomplete and vague without an understanding of the programme activities and services that facilitated those impacts (Rossi *et al.*, 2004; Batchelor and Norrish, 2006). Predominantly, *Process Assessments* seek to answer a set of evaluation questions to aid in clarifying whether or not a project is performing as intended (Hudson, 2001). Rossi *et al.*, (2004) and Pade-Khene and Sewry (2011) suggest that evaluation questions of a process assessment are centered around critical themes of process assessment. Critical themes of process assessment represent the most essential aspects which necessitate assessment in the implementation phase of a project, it is essential that they are identified prior to conducting a process assessment (Century *et al.*, 2008). As such, there is a need for the identification and exploration of critical themes of process assessment applicable and common to ICT4D projects.

### **1.3 Research Goals**

This research seeks to identify and explore critical themes of process assessment essential for evaluating the implementation phase of rural ICT4D projects.



### Research Questions

1. What are the critical themes that should be assessed in process assessment of ICT4D projects?
2. What factors are assessed under each critical theme, and how is each critical theme assessed?
3. How can these critical themes be explored and applied in the process assessment of a real life rural ICT4D project (A focus on the application of the *Service Utilization* theme)?

### 1.4 Research Methodology

In undertaking this research study a qualitative design science research methodology is employed. The research study seeks to identify critical themes of process assessment essential for assessing the implementation phase of rural ICT projects. Furthermore, the study aims to apply critical themes identified in a rural ICT project environment through a developed framework. Hence, a design science paradigm is appropriate, as such a paradigm, seeks the enhancement of a developed ICT4D artifact, through its application and exploration in a real life project environment (Hevner, March and Park, 2004). The qualitative method uses descriptive words to relay intricate details of phenomena that are difficult to convey with quantitative methods (Irvine and Gaffikin, 2006: 117). The proposed framework is expected to be employed in a rural ICT context. Therefore, essentially it is required that the framework is sensitive to the rural context in which it is applied. As such, a qualitative approach seeks to understand the applied framework phenomenon, through observations and descriptive reflections of the researcher and assessment participants in the particular rural context (Pickard, 2007: 14).

The research is conducted as follows:

The framework is explored through a case study to identify its suitability and shortcomings. The Case study involves two levels of inquiry: 1) The actual process assessment of a rural ICT project, through applying a Rural ICT Project Process Assessment Framework (RICTP-PAF), to determine the extent to which the project is operating in relation to its specified plan; 2) An evaluative phase, where the application of the RICTP-PAF is observed and reflected on to identify useful lessons. The scope of the process assessment is limited to the service utilization theme. Chapter 6 expands on the case study research methodology employed, and the scope which the study is limited to. The rural ICT case explored is the

Siyakhula Living Lab (SLL). The SLL was initiated in 2005 as a joint effort between the Centres of Excellence in the Computer Science departments at the University of Fort Hare and Rhodes University. The underlying objective of the (SLL) was to develop and test a distributed, multifunctional community communication platform, to distribute to impoverished and semi-impoverished communities in South Africa (Pade *et al.*, 2009b). Siyakhula is a Xhosa word which means ‘we are growing’ as the project would desire (Pade *et al.*, 2009b: 7): It aims to grow in its innovation and sustainability. The SLL is currently located in the Mbashe municipality which is located in the rural Transkei of the Eastern Cape in South Africa.

### 1.5 Summary of Results

The key results of the thesis are organized as follows:

- *Rural development is vital to developing economies, as it seeks to expand the human capabilities of rural dwellers, which constitute majority of the worlds poor.* Information and knowledge transfer, when underpinned by ICTs are strategic tools which if employed suitably could enhance rural development. However, there are several existing challenges which impede the effective implementation of ICTs for rural development and the sustainability of such implementations.
- *The existing knowledge gaps about the effective use of ICTs for rural development indicate the need for ICT4D evaluation, to enable project planning and implementation effectiveness, provide documentation of proof of successful project implementations, and aid in deconstructing assumptions project implementers might hold when executing such projects.*
- *Several present challenges in ICT4D evaluation approaches influence the accuracy and relevance of evaluation results.* Challenges include, limited micro level evaluations that are sensitive to rural contexts, incomprehensive evaluation approaches which do not consider all life cycle stages of a project, a lack of understanding on how to properly account for impacts, and inadequate resources to conduct rural ICT project evaluations.
- *A comprehensive evaluation approach sensitive to the rural context that is implemented may aid in alleviating many of the challenges currently being faced by*

*ICT4D evaluations.* A domain in comprehensive evaluation is a Process Assessment, which seeks to assess how well a rural ICT project is operating to implement its intended functions in the specified way stipulated in the projects plan.

- *Various challenges may impede the realization of the advantages process assessments potentially contribute to rural ICT project implementations.* Such challenges may include: disparate measurement indicators across project sites, resource constraints limiting the amount of potential data which can be collected, few training opportunities to specialize as a process evaluator, limited concentration on rural beneficiary perspectives during such assessments and difficulty of criteria setting for acceptable performance due to varying stakeholder views.
- *Adhering to the following guiding principles may aid in addressing some of the highlighted challenges process assessments currently face:* Collaboratively conduct evaluation with internal/external stakeholders, specify programme theory, validation of evaluation questions, quality control throughout data collection and integration of ethical considerations.
- *Process assessment questions are centred around critical themes of process assessment.* Critical themes of process assessment represent the most essential aspects of a rural ICT projects implementation phase that necessitate assessment, based on their importance to project outcomes. Conducting process assessments of rural ICT projects necessitate the identification of critical themes of process assessment relevant to rural ICT projects.
- *Assessment approaches from three categories: social programmes, evaluation of information systems in use, and rural ICT project evaluation case studies* contribute to the identification of critical themes of process assessment relevant to rural ICT projects. The extensive analysis consisting of 14 assessment approaches reveal three critical themes of process assessment relevant to rural ICT projects. These include: *service utilization, organizational function and external project factors.*
- *Based on identified critical themes of process assessment and identified guiding principles to adhere to when conducting a process assessment,* a theoretical

framework is proposed for executing process assessments of rural ICT projects. The proposed framework is termed the Rural ICT Project Process Assessment Framework (RICTP-PAF).

- *The RICTP-PAF is applied in the Siyakhula Living Lab.* The application of the RICTP-PAF which is limited to *service utilization* sub-themes reveals the suitability and shortcomings of the framework. Service utilization sub-themes which are explored include, *Coverage and bias, user perception of ICT service characteristics, practices which promote sustainable use of ICT services and units received.* Lessons learned through reflections of the application of the RICTP-PAF enable enhancements to the framework.
- *Revisions to the RICTP-PAF are summarized as follows:*
  - a) A description of how instruments applied to assess sub themes could be applied appropriately. Furthermore, an indication of limitations of methods and instruments when employed to assess particular sub-themes.
  - b) A guiding principle (feedback to stakeholders) not previously outlined in the RICTP-PAF prior to its application in the SLL is identified and integrated into the framework.

### **1.6 Organisation of Thesis**

The thesis chapters in sequential order are organised as follows:

#### **Chapter 1: Research Introduction**

This chapter introduces the research study. The research context is outlined to provide a background to the research. The goals of the research and the research methodology employed are described. Lastly a summary of results revealed by the thesis is presented.

#### **Chapter 2: Rural Development, ICTs and Sustainability of ICT4D projects**

This chapter explains the relevance of rural development to developing economies, and the noteworthy role ICTs play in enhancing rural development processes. Furthermore, it outlines various challenges present where attempting to underpin rural development with ICT implementations. Finally, it concludes by highlighting the importance of evaluation to ICT4D projects to address outlined challenges.

### **Chapter 3: Evaluation of ICT4D Projects**

This chapter explains the need for evaluation in ICT4D implementations based on challenges present where attempting to employ ICTs as development support tools. It identifies knowledge gaps in ICT4D evaluation. It explains why a process assessment is key to a comprehensive evaluation. It also describes identified shortcomings relevant to rural ICT4D process assessments and guidelines to adhere to when conducting process assessments.

### **Chapter 4: An analysis of Assessment Approaches to identify Critical Themes of Process Assessment**

This chapter comparatively analyses 14 assessment approaches from Social programme process assessments, evaluation of information systems in use and rural ICT4D evaluation cases, in order to identify critical themes of process assessment relevant to rural ICT projects.

### **Chapter 5: A Framework for Conducting Process Assessments of Rural ICT Projects**

This chapter proposes a framework for conducting process assessments of rural ICT projects. The Rural ICT Project Process Assessment Framework (RICTP-PAF) is composed of critical themes of process assessment relevant to rural ICT projects, and guiding principles to observe when conducting a process assessment.

### **Chapter 6: Case Study Research Methodology**

The research methodology employed to explore the application of the RICTP-PAF in a real life rural ICT project is explained. The applied research strategy and case study design is also outlined.

### **Chapter 7: A Case Study of the Siyakhula Living Lab**

This chapter describes the process assessment of the Siyakhula Living Lab, through the application of the RICTP-PAF. The assessment process and results obtained are provided. The suitability and shortcomings of the framework are reflected on through observation of the application of the framework. Lessons learned are elaborated on.

### **Chapter 8: A Revised RICTP-PAF**

This chapter revises the RICTP-PAF in retrospect of lessons learned from the application of the framework in the real life project environment.

## **Chapter 9: Conclusion and Future Research**

This chapter concludes the research. The conclusions of the research are outlined and future research areas are highlighted.

**Appendix A:** Description of the overall evaluation plan, evaluation domains and the iterative design of the Rural ICT Comprehensive Evaluation Framework (RICT-CEF).

### **Appendix B**

B1: Assessment Approach Summaries which aid in identifying critical themes of process assessment relevant to rural ICT projects.

B2: The Siyakhula Living Lab programme theory assessment report for Access to Education and Knowledge.

### **Appendix C**

C1: Coverage community survey questionnaire.

C2: User perception quantitative questionnaire.

C3: User perception qualitative interview questions.

**Appendix D:** Transcribed qualitative interview proceedings from user perception qualitative interviews.

**Appendix E:** Interview Schedule for project team.

**Appendix F:** Interview Schedule for internal stakeholders (community members).

**Appendix G-** Informed Consent Form

**Appendix H-** Process Assessment Report

## Chapter 2

### Rural development and ICTs

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*This chapter explains the relevance of rural development to developing economies, and the noteworthy role ICTs play in enhancing rural development processes. Furthermore, it outlines various challenges present where attempting to underpin rural development with ICT implementations. Finally, it concludes by highlighting the importance of evaluation to ICT4D projects to address outlined challenges.*

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### **2.1 Introduction**

Rural development can be defined as a process which seeks to improve the living standards (Socio-economic status) of rural dwellers through equipping them to address the issues of poverty (Pade-Khene and Sewry, 2011: 15). Rural development has been recognised as a contributing factor to socio economic growth of developing countries (Pade-Khene and Sewry, 2011). This recognition has amplified interest in rural development by government agencies, private organizations and nongovernmental organizations. While previous rural development projects attempted to enable such improvements through advancing the agricultural sector of rural areas, current efforts emphasize the enlargement of human capabilities and functionings, as it is believed that human development should be central to rural development (Gigler, 2004).

Information provides great support for enhancing human capabilities, and as such, may be considered a valuable asset for rural development. This view can be attributed to the fact that information aids in developing the knowledge base of humans, and therefore, enhances human capabilities to think of better ways of addressing development challenges (Garai and Sahadrach, 2006). Recognizing the potential created by information, rural development projects seek to take advantage of this opportunity. However, due to factors such as physical remoteness, lack of necessary infrastructure and high illiteracy rates in rural areas, access to and use of information for development is challenging. As such, ICTs are presented as suitable tools for the facilitation of information transfer and communication of information to underpin rural development activities.

This chapter describes the essence of rural development, and motivates for the importance of information access in rural development efforts. Attributes of information that potentially constrain the effective use of information in rural development efforts are then discussed. This is followed by an exploration of the role of ICTs in facilitating the communication of development information for the enablement of rural development. Subsequently, common factors which constrain the employment of ICTs for development, and further hinder the sustainability of ICT4D projects are discussed. Finally, it is concluded that in order to identify issues which promote success and sustainability of ICT4D projects, evaluation is a necessary component.



## 2.2 Rural Development

Development in the rural context is characterised by the employment of financial, physical, and human resources to enable economic growth and social development of rural economies (Malhotra, Chariar, Das and Ilavarasan, 2007; 217). Rural development initiatives seek to improve the living standards of rural dwellers (Malhotra *et al.*, 2007: 216; Summers, 1986: 360), and as such, is an imperative factor for economic development, especially in developing countries (Singh, 2008). Previously, the importance of rural development to economic development was based on the dependence of rural economies on agriculture; this was based on the fact that agriculture was considered the largest employer, job creator and export earner in most developing countries (Bage, 2004). More recent rural development efforts focus on the enhancement of human capabilities, as opposed to agricultural advancements.

The importance attached to rural development in developing countries is intensified by the severity of poverty in rural areas (Centre on Integrated Rural Development for Asia and the Pacific, 2005: 8). It is estimated that about three quarters of the world's poor are situated in rural areas (Malhotra *et al.*, 2007: 216; McNamara, 2003: 41). Tackling the large scale poverty in these areas is no easy task, however, rural development provides a suitable platform for this ambitious task. The perceived potential socio-economic contribution that rural development can bring to developing economies has made policy makers of most developing economies realize the value of rural development (Singh, 2008). Furthermore, this potential has propelled policy and development agencies in underdeveloped countries to implement a host of programmes and measures to engage rural development. For example, the G8 (Group of eight countries with the largest economies) at its June 2003 summit acknowledged the need to increase investment in rural and agricultural development to achieve long-term food security (Bage, 2004).

Poverty of the rural poor can be largely attributed to their physical isolation or remoteness (McNamara, 2003). This isolation is evident with challenges, such as, poor access to markets, weak or non-existent physical infrastructure, a lack of relevant information, poor health, low quality education and poor access to government resources (McNamara, 2003: 41; Rose, 1999: 1). The urgency that poverty demands brought about an enactment of the Millennium Development Goals by the World Bank. Among eight millennium development targets, one of the goals was to reduce poverty levels by half, by the year 2015 (Millennium Development Goals Report, 2010). While the target timeline and optimism exhibited is a positive sign,

Malhotra *et al.*, (2007) reveals that millennium poverty targets set by Millennium Development Goals (MDG), will not be achieved if rural poverty is not dealt with.

As previously stated, recent studies on rural development have indicated that agricultural development should not be considered as the sole source of rural development. Ellis (1999) and Uitto (2004) state that while agriculture is still key to the functioning of rural economies, single-handedly, it will be unable to create a sustainable environment for rural dwellers. Therefore, to enable rural development that will be sustainable, there is a need for concentration on other aspects of rural development. A paradigm shift was therefore deemed necessary, from rural development that concentrated on a particular sector (agriculture), to one which concentrated on the complex livelihood strategies of poor rural dwellers and the many different facets of rural poverty (Carney, 2000).

Some non-farm sectors linked with livelihood activities in rural areas include; social activities, exchange/enterprise activities (market centres), and non-market institutions (social networks and safety nets) (Mwabu and Thorbecke, 2001). Congruent to the Sustainable Livelihood framework, a livelihood is defined as the activities, assets and the access that jointly determine the living gained by an individual or household (Ellis, 1999: 2). People must be the focal point of development, as the primary rationale of development is to offer people more options to function (Garai and Sahadrach, 2006: 4). Amartya Sen's Capability Approach (CA), which is better known as the leading standard economic framework for analyzing poverty, inequality and human development, views development as the expansion of human capabilities (Clark, 2005: 2). Capabilities reflect the alternative set of functionings from which an individual can choose (Gigler, 2004: 5).

Attempts to expand human capabilities must also put sustainability issues into consideration. This is due to the fact that humans in their effort to expand their capabilities often times will exploit resources. On some occasions, resources or assets are exploited faster than they replenish (Garai and Sahadrach, 2006: 6). As such, sustainability considerations must ensure that development attempts satisfy the needs of the present population, without compromising the ability of future generations to meet their needs (Brundtland Report, 1987).

Creating a balance between resource exploitation and sustainable use of resources requires the acquisition of knowledge (Garai and Sahadrach, 2006: 14). Acquired knowledge enables

humans to make better decisions. As suggested by Garai and Sahadrach (2006: 14), a distinct characteristic of human agency, as opposed to other animals is the ability to scrutinize and re-evaluate our values and priorities when provided with fresh information and new understanding.

### **2.3 Importance of Information and Knowledge as Rural Development Enablers**

Information and knowledge are essential components for rural development activities. To understand the role information and knowledge play in rural development processes, it will be useful to get some insight into how knowledge enhances capabilities. Firstly, it is evident that the enhancement of capabilities relates to development of capital and assets. To support this view, Nussbaum (2000), when defining human capabilities and functionings emphasises that such a definition should include access to and development of five key assets and capitals. The five assets/capitals he highlighted include; human, economic, natural, social and physical capital. Hence, it can be said that the process of human development, seeks to enable access to and develop the aforementioned assets and capitals in rural people. Secondly, Garai and Sahadrach (2006) advice that attempts to enable rural peoples' access to and development of assets and capitals should be done according to their choices. Therefore, enabling rural dwellers to develop their capabilities requires that they are provided with information. As suggested by Garai and Sahadrach (2006: 12), wise and sustainable appropriation and exploitation of assets and capitals, only occur when human agencies are equipped with the necessary information to exploit resources optimally, to further enhance their capabilities.

Information aids in acquisition of knowledge, and no community can advance their capabilities without knowledge (Mansoor and Kamba, 2010: 1). As such, Meyer (2005: 2) proposes that for development purposes, information may be viewed as a resource. Information intended for development aims at educating people on better ways of achieving set goals, altering their negative values, imparting new ideas or knowledge and generally empowering development recipients to make better decisions that will improve their current state of affairs (Unagha and Ibenne, 2011). Examples of such information could include, information to enable agricultural extension, information on health, and educational related information (Chapman and Slaymaker, 2002).

While it has been established that rural dwellers need information to enhance their capabilities, it should be noted that in development efforts they are not the only stakeholders who require information. Stakeholders, such as development agencies, policy makers, and government agencies, also need information about the local and cultural context of rural communities they are intending to serve. Therefore, rural communities should contribute their knowledge towards development processes. Contributed knowledge from rural communities could potentially be tailored and translated by development agencies to meet wider audiences (Parikh, 2009: 59). While explaining the need for indigenous knowledge in development processes, Gigler (2004) suggests that, in efforts to design outcome indicators for empowerment, a high level knowledge of the development priorities and goals of marginalised groups from the perspective of the marginalised groups needs to be elicited. Failure to acquire such knowledge could result in interventions that prescribe the process of empowerment, consequently violating the essence of the development intervention (Gigler, 2004: 7; Kabeer, 1999).

Finally, it should be noted that while information does prove to be a valuable resource for rural development, certain constraints exist, which attempt to undermine the potential value information provides. Such constraints must be understood and overcome in order for information to play its role in rural development.

### **2.4 Constraints of Information Effectiveness in Rural Development**

It has been established that information is a useful resource to rural development initiatives, however, there are several attributes of information that constrain access or adequate use of information for the purpose of rural development. These attributes, if not given due consideration, could impede the positive effects of information as a rural development resource. As highlighted by Meyer (2005), attributes of information that require careful consideration while being used as a developmental resource include:

- **Intangibility:** Mansoor and Kamba (2010) state that ironically, many rural communities of less developed countries are aware of the existence and importance of libraries and information agencies, but are not conscious of the role of information in development. Due to the fact that information is not a tangible input resource like for example, money or technology, rural dwellers often do not view information as a valuable development resource utility (Meyer, 2005: 10).

- **Interdependence on technology:** In most development processes, where information is employed, information always forms part of technology. For example, understanding how an environmental information system can aid in the maximization of agricultural land, can only be understood by learning how to use the technology. As such, rural dwellers who do not value the use of technology may not be reached.
- **Culture dependence:** The cultural related attribute of information, is also a potential challenge information faces as a development resource. Meyer (2005) suggests that if it is agreed that information is socially conditioned and shaped by the social context from which it originates, then transfer of information to a rural community of a differing social context may result in a lack of understanding of the information, in the way it was intended to be understood. A lack of understanding may stem from a failure to include background knowledge to support information being transferred (Unagha and Ibenne, 2011). Therefore, it is essential to provide additional data about related aspects of information, which will potentially aid rural users to put information background into perspective (Meyer, 2005: 11).
- **Medium dependent:** Information stored in digital or written format is not accessible to people who are used to the oral tradition. As an illustration, word of mouth, as implied by Etebu (2009: 3) is often the preferred medium among rural people. In retrospect of this, information presented through digital mediums may not be easily accommodated by such rural dwellers. To avoid the medium dependent attribute of information impeding development efforts, it is imperative to avoid making assumptions about the preferred medium by rural dwellers for accessing information (Unagha and Ibenne, 2011). Rather, development interventions must investigate preferred mediums of rural dwellers and attempt to integrate such mediums to support information dissemination. A good example could be the use of community radio as an information dissemination medium in a rural ICT project.
- **Context and Conversion dependence:** Meyer (2005) states that the context and conversion attribute of information are closely related. Therefore, for the purpose of this research it will be grouped as one category. With regard to context and

conversion, it should be noted that in rural communities, people tend to store and use information in retrospect of specific situations. That is, they store and use information that is relevant to them. Dissemination of excess and complicated information could cause confusion and consequently result in rural dwellers losing interest in the information meant for development (Meyer, 2005). To deal with this potential challenge, it is essential for development agencies to provide information that is useful to a specific context and situation, and not provide more information than is necessary at any particular time (Meyer, 2005).

The highlighted points on the attributes of information and the potential of these attributes to impede transfer of information for development purposes in rural communities, indicates the need for development implementers to be cautious when using information for rural development purposes. Information indeed is power; however, if not employed effectively, it is of no value, and incapable of supporting development (Unagha and Ibenne, 2011). Hence, the extent to which information supports rural development is determined by its effective utilization in meeting local information needs (Pade-Khene and Sewry 2011: 17).

Employing information and knowledge for rural development necessitates communication. Rural communities often characterised as information poor, request the provision of information as a central component of development (Chapman and Slaymaker, 2002: 6). The physical remoteness experienced by the rural poor (McNamara, 2003: 41), presents a major barrier to the communication of information to them. Information and communication technologies, based on their abilities to facilitate communication between remotely dispersed individuals or groups, present a suitable platform, for communicating information to and from rural communities (Chapman and Slaymaker, 2002). Information is constantly exchanged between parties involved in the development process (Pade and Sewry, 2007). Therefore, ICTs have a dual role in rural development initiatives. Their dual function includes the supply of information required by the poor in order to practice sustainable livelihood strategies, and the provision of information required by institutions tasked with making decisions that affect those livelihood strategies (Chapman and slaymaker, 2002: 7). Thus, ICTs could be viewed as valuable tools capable of supporting rural development.

## 2.5 Uses of ICTs in Rural Development

ICTs are tools that facilitate communication between people, through electronic means, of capturing, processing, storing and communicating information (Garai and Sahadrach, 2006: 11; Gerster and Zimmerman, 2003: 9; Heeks, 1999: 3; Tinio, 2003: 4). ICTs consist of hardware and software, and are linked by a wide range of technical protocols (Garai and Sahadrach, 2006: 11). Furthermore, they consist of appliances such as network equipment, radio, mobile phones, television and applications that enable e-services (USAID, 2003: 3). According to Hamelink (1997) ICTs can be classified into five distinct categories:

- **Capturing Technologies:** These technologies are categorised as input devices. They can be used to collect and convert data to digital form. Some examples of capturing devices are; keyboards, mice and barcode readers.
- **Storage Technologies:** These devices aid in the storage and retrieval of information captured in digital form. Some examples of storage devices include; floppy disks and hard disks.
- **Processing Technologies:** These devices aid in the creation of system and applications that underpin ICT processes. A major example of a processing device is a central processing unit (C.P.U)
- **Communication Technologies:** These technologies enable the transmission of information stored in digital form. A major example of a communication technology is a modem.
- **Display Technologies:** These technologies, also known as output devices, are used to display information in digital form. Two examples of display technologies include; computer display screens, and television sets.

All of these technologies when integrated can support the flow of information to enable rural development activities. ICTs potential to enhance rural development, is based on certain attributes they possess. Some attributes common to ICTs as highlighted by Gerster and Zimmerman (2003: 9) in Pade-Khene and Sewry (2011: 19) include:

- **Interactivity:** ICTs enable effective bi-directional communication.
- **Permanent availability:** ICTs are available for use 24 hours a day.
- **Global reach:** Geographical boundaries do not pose a challenge to ICTs; therefore, individuals separated by large geographical distances can work together.



- **Declining Marginal costs:** Due to the digital and virtual nature of ICT products and services there is an advantage of declining marginal costs considering the replication of content is practically free regardless of the volume replicated. Furthermore, there are almost no marginal costs associated with circulation and communication of digital information.
- **Pervasive and Cross-cutting:** ICTs are flexible, furthermore, they serve several purposes and can be applied to the full range of human activity, hence allowing for tailored solutions to meet diverse needs.

The capability of ICTs to enable global exchange of information in a quick and efficient manner and its ability to facilitate communication regardless of geographical distance, potentially hold enormous opportunities to address the vital knowledge, information, and communication dimensions of poverty and low growth in developing countries (McNamara, 2003: 28).

While it has been established that ICTs do have a role to play in rural development processes, caution must be taken, when anticipating employment of ICTs for rural development purposes. Employing ICTs for rural development activities must begin with a rural development strategy. This should be followed by an information plan to implement such a strategy and subsequently a technology plan to support the use of information (Harris, 2004: 16). A balanced assessment of the potential of ICTs to underpin rural development strategies requires an in-depth understanding of rural development issues and an enhanced understanding of the capabilities of ICTs (Chapman and Slaymaker, 2002: 3). McNamara (2003) sums this up by stating that ICTs should not be viewed as a solution to rural development, but should be seen as a tool amongst many others that enable development. In this regard, ICTs should be viewed as a contributing factor to a larger development plan and not as the development plan itself. ICTs underpin rural development processes, they do not bring about development by themselves. Rural development and poverty reduction activities consist of webs of various processes (Gerster and Zimmerman, 2003: 22), which need to be applied systematically to improve the living conditions of rural dwellers. What rural communities and poor people need are better economic prospects, improved health, more hygienic environments, education, and other components related to better capabilities and sustainable livelihood. Therefore, McNamara (2003) suggests that the extent to which ICTs



can aid in the realization of the above mentioned goals, make them valuable tools of development. They however remain tools and not goals (McNamara, 2003: 4).

Rural development attempts require bottom-up interventions which are more favoured and effective in a rural context (Gigler, 2004: 5; Harris, 2004: 16). A bottom-up approach, as opposed to a top-bottom approach where ICTs are provided to rural communities just for the lack of it, addresses the deeper economic, resource, social and historical challenges which rural communities encounter (Pade-Khene and Sewry, 2011: 20). A bottom-up approach ensures the appropriate and strategic use of information and technology to facilitate development (Harris, 2004: 16). For instance, employment of a bottom-up approach necessitates that preferred traditional channels in a rural community are considered when attempting to integrate ICTs into a community.

ICTs can be classified as either 'traditional' or 'modern' (USAID, 2003: 3). Traditional ICTs are ubiquitous technologies commonly used by people in their everyday lives. Some examples of such technologies include; fixed line telephones, televisions and radios (Harris, 2004: 5; Pade-Khene and Sewry, 2011: 19). Modern ICTs on the other hand, include an integration of computers and communication systems between computers, for example, database applications, wireless technologies and the internet (International Development Research Centre (IDRC, 2003: 11). This distinction between ICT classes is important, because when ICTs are talked about, they are commonly understood to consist of only computers and communication systems (modern ICTs) and exclude the more traditional ICTs. Harris (2004: 5) states that while traditional ICTs are excluded from the commonly taught about concept of ICTs, they play a major role in providing information to the poor. McNamara (2003) suggests that newer (modern) is not necessarily better, therefore, where traditional ICTs are capable of getting the job done (development enablement), they should be employed. It should however be noted, that traditional ICTs are not capable of supporting development alone. As such, while some literatures suggest that traditional ICTs are well suited for the needs of the poor, it should be noted that traditional ICTs cannot enable the process of development alone. Modern ICTs also possess characteristics which make them more valuable than traditional ICTs in certain cases. For example, modern ICTs enable horizontal many-to-many communications on issues of public interest (Pade-Khene and Sewry, 2011: 19). It can thus be concluded that to derive optimal value from ICT investments

in rural development processes, it may be essential to integrate both traditional and modern ICTs (Gerster and Zimmerman, 2003: 31).

The expansion of human capabilities and functioning's facilitates the development of key livelihood assets and capitals (human, economic, natural, social and physical capital). The uses of ICT for rural development enhancement can be explored, based on how they provide information and communication capabilities to influence these livelihood assets/capitals (Chapman and Slaymaker, 2002: 8; Harris, 2004: 20):

- **Human Capital:** Human capital refers to knowledge gained, skills gained, ability to work and health status of an individual (Gigler, 2004: 15). ICTs enable rural dwellers to access improved training and education via distant learning facilities (Commonwealth Telecommunication Organization, 2009: 36; McNamara, 2008: 31). Advances in education quality arise from potential access to educational material. ICT sourced educational material could potentially enhance classroom activity, enable teacher training, enable educational administration and possibly support research in rural communities (McNamara, 2008: 31; Pade-Khene and Sewry, 2011: 22). Enhanced educational levels of poor rural dwellers, aid in improving their current livelihoods, through gained knowledge, to confront obstacles and vulnerabilities that impede people from seeking opportunities to improve their lives. It also enables them to participate in new sectors of the economy where greater skills are rewarded with higher incomes (McNamara, 2003: 50; Soriano, 2007: 8). The prospect of transmitting digital content to remote locations in various formats, combined with the numerous choices of storage devices which they could be saved to, decreases many costs associated with wide spread information access (Chapman and slaymaker, 2002: 8).

Another factor related to human capital functions of livelihoods is health. For humans to work productively, it is essential that they are healthy. As specified earlier, healthy living is a related attribute of development (expansion of human capabilities). ICTs have the potential to contribute to health improvement in rural communities. Firstly, this could be gained through the employment of ICTs for remote consultation facilitation, diagnosis, and treatment (Harris, 2004: 21). Furthermore, information concerning the relationship between hygiene and health can be disseminated more broadly (McNamara, 2003: 55). ICTs may also be employed to enhance the capacity

of health care providers in rural communities (Harris, 2004: 21). Further enhancements in ICT innovation and deployment, have made them more widely accessible to rural dwellers. For example, the increasing capacity of mobile networks to cover rural areas, make them a viable option. Due to its proliferation, ubiquitous, and cost effective nature, the mobile phone is becoming the preferred tool to combat health challenges in rural communities (Bhavnani, Chiu, Janakiram and Silarszky, 2008: 5; McNamara, 2003: 71, Vital Wave Consulting, 2009: 7) . Mobile communications are capable of supporting health related activities, such as, conducting of health examinations like tele-pathology and ultrasounds (CTO, 2009: 36). Other health needs that can be addressed by mobile health initiatives include remote data collection, remote monitoring of disease and epidemic outbreak, networking and training of health workers and diagnostic and treatment support (Vital Wave Consulting, 2009: 9).

- **Natural Capital:** Chapman and Slaymaker (2002: 8) suggest that natural capitals refer to natural resources and their effective management. Enhanced communication channels provided by ICTs can enable improved access to institutions responsible for various areas of natural resource management, including, administrative and legal information resources (Chapman and Slaymaker, 2002: 8). Furthermore, communities can source information from other communities on how they deal with land distribution and conflict resolution issues. Natural capitals also relate to environmental sustainability support. The employment of ICTs to support environmental sustainability in rural areas is particularly important because of a dependency of the majority of the poor on agriculture and subsistence farming for their livelihood (McNamara, 2003: 56). To enhance natural capitals and support environmental sustainability, ICTs can be employed for gathering and dissemination of information on crops, marketing, agricultural production, mapping and management of forests and land resources through GIS (Geographic Information Systems) (McNamara, 2008: 31).
- **Financial Capital:** ICTs provide a medium which supports the increased flow of information by local, financial, and micro credit lending institutions, on services available (Chapman and Slaymaker, 2002: 8). Services could include loan options

available to rural dwellers, and saving schemes (UNDP, 2001b: 21). Transparency on issues such as extremely high interest rates charged by lending firms could also be improved. Access to finances could potentially enhance entrepreneurial activities in rural areas. For instance, the Grameen project in India, which enables women to acquire loans to purchase mobile phones for business activity (UNDP, 2001b: 21). Furthermore, as related to business activity, ICTs, allow rural dwellers to access market information and services (Sife, Kiondo and Lyimo-Macha, 2010: 11). For example, farmers are getting better information on market prices, thus allowing them to negotiate better and avoid exploitation by middlemen (UNDP, 2001a: 32). Lastly, with its capability of easy and efficient information access and communication ability (Gerster and Zimmerman, 2003), ICTs act as a medium for rural dwellers to search for better employment (Harris, 2004: 32), for example, online job application processes.

- **Social Capital:** Refers to the ability of rural people to enhance their social networks beyond their geographic locality (Harris, 2004: 20). ICTs support improved networking both at the community level and with the wider global community (Chapman and slaymaker, 2002: 8). The ability to build social networks offers rural communities a platform to form new partnerships, and learn from other communities (Harris, 2004: 29). For instance, farmers in one community who form social networks with farmers from another community could acquire information related to more efficient farming methods. Bhavnani *et al.*, (2008: 19) to emphasize the value of social networks, state that economists are increasingly becoming interested in social capitals for its contribution to productivity. Some examples of social networks could consist of; network links from an individual to a group or from one group to another.

Social capital also potentially enhances good governance and political participation. ICTs can be effectively used to enable local participation of rural dwellers in political processes, which could subsequently lead to governance approved by the people (McNamara, 2008: 26). However, for ICTs to facilitate good governance, it should be noted that there must be willingness on the part of the government to share policy information and be transparent (Harris, 2004: 26). Government transparency can occur through the public display of governance information using ICTs (Hariche, Estelle and Ronan, 2011: 15). McNamara (2003: 63) states that research has revealed

that the poor feel isolated, powerless and abandoned. Therefore, ICTs, through facilitating contact and joint action among the poor and the societies that represent them legally, can aid in reducing the feeling of isolation experienced by the poor. Furthermore, ICTs can aid in communicating the needs of the poor to the government (CTO, 2009: 36).

- **Physical Capital:** Harris (2004) suggests that physical assets could refer to physical infrastructure, for example, roads, and network infrastructure. ICTs which increase information access provide a platform for rural communities to learn better production practices (Chapman and slaymaker, 2002: 8). Furthermore, rural communities are provided with a medium to lobby for improved physical assets and infrastructure (Harris, 2004: 20), for example, from governments and potential donors.

Development of the highlighted assets and capitals, represent the expansion of capabilities. Though it is evident from the points highlighted, that ICTs do have the potential to enable rural development through the increase of capabilities, it should be ensured that ICTs are used strategically. Strategic application of such tools is essential because, a number of challenges exist which could impede the potential of ICTs to support development in rural communities. Note, technology when applied cannot be categorised as good or bad, the outcome of its application will depend on how it is used (UNDP, 2001a: 27). To put into perspective potential factors which could hinder successful employment of ICTs as development support tools in rural communities, a number of challenges are highlighted.

### **2.6 Challenges that Impede Successful Employment of ICTs for Development**

As indicated, there are several potential benefits for rural development efforts through the employment of ICTs, however, care should be taken when attempting to plan, analyse, design and implement ICT4D projects. Such projects necessitate careful attention, as several inherent challenges exist which may potentially impede ICT implementations from enabling rural development or their sustainability. Common challenges include:

- **Illiteracy in rural communities:** While attempting to introduce ICTs to rural communities, resistance could be encountered as the introduction of these tools will require rural dwellers to acquire new sets of skills and competencies (Mansoor and Kamba, 2010, 3). Furthermore, in rural areas and among poor people, there are

concentrated levels of uneducated and illiterate people (Bhavnani *et al.*, 2008: 4; McNamara, 2003: 63). ICT utilization requires that potential users acquire basic literacy skills, also, it is often required that literacy skills possessed are in English (UNDP, 2001b: 9). To deal with this challenge to a degree, Heeks (2009) suggests that every community utilize the literate members present as intermediaries, responsible for ensuring that disseminated information becomes understood and useful.

- **Infrastructure requirements:** Rural areas which are characterised by poverty, seclusion and low population densities are less likely to benefit from investments required to provide an electrical infrastructure, extend telecommunications infrastructure and human capacity to maintain technology (UNDP, 2001b: 8). ICT Infrastructure levels in rural areas are often underdeveloped, as a result of, irregular and unreliable power supply, last mile connectivity and low priority given to ICT investments due to other urgent needs in the rural sector (Bhavnani *et al.*, 2008: 4; Langmia, 2005). To partly alleviate such challenges, mobile networks have expanded reach of telecommunication infrastructure to rural areas, due to their relatively low cost of integrating new subscribers to the network, and affordance rate (Bhavnani *et al.*, 2008: 5). However, while this reduces the infrastructure access challenge to some extent, McNamara (2008: 28) and CTO (2009: 43) still suggest that electricity availability could pose a challenge, as mobile phones need to be charged. The absence of electricity in many rural areas forces many rural dwellers to rely on solar energy, generators and batteries to utilize mobile ICT equipment. While such innovations provide some relief, these options can only be afforded by a few (McNamara, 2008: 28). As such, Garai and Sahadrach (2006) recommend the creation of appropriate political, regulatory and governance mechanisms that facilitate growth of shared ICT infrastructure in rural communities.
- **Socio-cultural Constraints:** Challenges ICT4D projects face with regard to socio-cultural aspects include gender and age bias, technophobia (fear of technology), and cultural chasm between the oral and virtual mediums of communication (Pade-Khene and Sewry, 2011: 23). Furthermore, cases of several development attempts exist, where equitable participation is compromised by bias to certain social groups. This

could be displayed in the form of cultural or political constraints, preventing true participative outcomes, by determining who can say ‘what’ and ‘how’ within any kind of group activity (UNDP, 2001b: 8). Kyabwe and Kibombo (1999) recommend that constant sensitization of the rural community should be practised to create better awareness and a sense of ownership as opposed to a one-shot sensitization exercise. Furthermore, constant project monitoring could be used to track beneficiary profiles and use (UNDP, 2001b: 8), thus reducing bias and ensuring fairness and equity.

- **Economic Resource Challenge:** ICT investments in rural areas are often not given high priority due to difficulty in deployment, perceived high costs, and the need for an extended time to reap potential benefits (Soriano, 2007: 11). While this is the case, several ICT4D projects succeed at being initiated and implemented. However, most of the implemented ICT4D projects are heavily government or donor sponsored and offer ICT services for free to rural dwellers at initial stages (McNamara, 2003: 71). UNDP (2001b) and Heeks (2009: 4) imply that very few donor funded ICT4D project implementations stand the test of self sustainability once external funding assistance has run out. Financial viability, which is described as the ability to generate sufficient funds to cover costs of operation and or costs of initially establishing ICT community centres (Harris, 2004: 43), can aid in dealing with this issue. Continued operation of ICT4D projects once sponsors have left the project, requires the establishment of viable business models. However, CTO (2009: 47) suggests that a primary concern is that most existing Internet kiosks do not possess business models due to the lack of essential affordable connectivity (wireless or wire-line access) and a lack of scalable business networks.
- **Political Challenges:** Political constraints are probably the most difficult challenges to deal with in relation to how they affect development efforts with the employment of ICTs. This is due to the fact that to a large extent, the success and sustainability of ICT4D projects is dependent on appropriate policy enactments. Even in the most affluent countries, the development and expansion of telecommunication services to rural and poor areas were initially dependent on proactive government policies and a variety of cross-subsidies, access funds, and other plans for supporting universal access (McNamara, 2003: 69). To retrospectively relate this to the rural ICT sphere in



certain underdeveloped countries, some governments in such countries do not see it as necessary to enact policy reforms that will improve accessibility of Internet growth. This could be attributed to the fact that control of information is viewed as a form of power in all societies (UNDP, 2001b: 6). To counter this challenge, liberalization of the telecommunications sector and policy reforms that promote better access to information must be implemented, if progress is to be made.

- **Technical Competence Transfer:** One of the many factors that potentially compound poverty experienced in rural areas is the lack of capacity building and lack of adequate training (McNamara, 2003: 50). Training is often challenging. As stated by the UNDP report (2001b: 3):

*‘The technological aspects of ICTs can be highly intimidating for most people – even for those privileged few who feel comfortable using a computer and the Internet’.*

Mastering how ICTs can be employed to support specific development goals requires both knowledge of appropriate technologies and an understanding of how these technologies can be deployed to address concrete problems (UNDP, 2001b: 3). Achievement of this mastery could be a problem in most African countries, because as, Sunden and Wicander (2006: 44) suggest, local skill base and staffing for the deployment of ICTs for development is limited in developing countries.

- **Communication and Goal Alignment among Stakeholders and Partners:** ICTs are one among many tools in rural development activities (Mcnamara, 2003). ICTs enable development when other factors necessary for development are in place. Simply put, ICTs are a means to other ends (McNamara, 2003:5). Furthermore, development and poverty eradication are complex processes of social, economic, political and institutional change, which empower more people to gain greater access to their desired ends, including participation in the process of deciding how those ends are prioritized and achieved (McNamara, 2003:5). As such, ICT4D project teams need to work in partnerships with other development organizations and the targeted beneficiary community, while facilitating development. Rural ICT projects should not operate in vacuums, but should operate as part of networked systems, as such networks are essential for project success (UNDP, 2001b: 16). Communication is



critical to organizations involved in a networked system which deals with a diverse group of stakeholders (Wells and Wells, 2007: 103). The emphasis on good communication stems from the fact that, while different organizations might have the common goal of development, their management systems, development approaches and organizational functions or culture might differ, and as a consequence, could compromise their common goal of sustainable development. Uncoordinated efforts between partners can lead to duplication of effort, incompatibility of technical solutions and consequently compromise sustainability (UNDP, 2001b: 15). Documents such as Memorandum of Understandings (MOUs) may therefore be instrumental for communication purposes amongst stakeholders of such projects (UNDP, 2001b: 17).

- **Lack of sustainability:** Projects sometimes succeed in the short term but are incapable of surviving once development implementers hand operations and management tasks to the community. Sustainability refers to a project being capable of persisting and thriving after development project implementers have left the project (Bailey, 2009: 1). Enablement of long term socio-economic development of rural communities through ICTs can only be possible, if mechanisms are put in place to ensure that ICT4D projects remain sustainable (Pade and Sewry, 2007: 46). Numerous implemented ICT4D projects face sustainability challenges (Ali and Bailur, 2007). This may be attributed to the fact that ICT4D project management, often faces a dilemma of deciding when to relegate ownership of the project to the community, and the need to get the project completed on time (Marais, 2010). In retrospect of this dilemma, most project managers opt to implement rushed projects, where the project team dictates the development agenda of the proposed project (Heeks, 2009). Though such an action may be induced by funding and time constraints, it may lead to unwanted project outcomes (Marais, 2010). Furthermore, in relation to that, it is often the case that once a so-called project plan has been implemented, the project team has left the project site and funding activities are stopped, then the community is left to manage a project which they are incapable of handling (Marais, 2010). This illustrates how most ICT4D projects fail to remain sustainable. To avoid such a pattern, Walton and Heeks (2011: 2) and Marais (2010), recommend that project teams attempting to implement such projects must realize that rural ICT projects should not be a rushed process as they take time. Walton and Heeks

(2011: 2), therefore, propose a process approach to ICT4D project implementations, which as they indicate, is a long-term approach which incorporates flexibility and experimentation throughout the project. Also, to enhance the chances of implementing sustainable projects, the project team is expected to involve potential rural beneficiaries in the design and implementation of the project (Marais, 2010; Walton and Heeks, 2011: 2). The voices and opinions of rural dwellers with ample knowledge of the local context needs to be heard in the implementation of such projects (Marais, 2010).

The challenges highlighted above, could potentially lead to ICT4D failed projects or projects which start out successfully, but do not persist in the long run. Hence, the advantages and challenges associated with ICTs in rural areas need to be questioned in retrospect of the relevance and actual impact of such projects on rural development (Pade-Khene and Sewry, 2011: 24). As suggested by (Butt, 2008: 40), despite the growing amount of data about the spread of ICTs in developing countries, there is little hard evidence about the sustained impact of ICTs on poverty reduction and economic growth in these countries. As such, there is an increasing need for the evaluation of ICT4D projects.

### **2.7 Conclusion**

Rural development underpins social and economic growth in less developed countries. While agricultural sector enhancement is important to rural development, it is increasingly being understood that development of human capabilities also make significant contributions to rural development, and in fact should be the core focus of rural development undertakings. Information has been found to be imperative to rural development initiatives, due to its ability to advance the knowledge base and develop human capacities. However, due to the physical remoteness experienced by rural dwellers, access to information could be a challenge. As such, ICTs enable the efficient transfer and communication of information and knowledge components to and from rural areas. However, to derive maximum value from ICT investments in rural development efforts, they must be used intelligently. Based on the existing challenges in rural ICT projects, and number of implemented projects which have failed to persist, there is growing scepticism concerning the ability of ICTs to support development. Key questions associated with ICT4D projects and their sustained impacts on communities where they are implemented in to a large extent remain unanswered. Credible evidence is needed to support the claims that ICTs enable development capable of being

sustained. As such, it is concluded that the evaluation of ICT4D projects are imperative, to account for the claims that ICTs are capable of supporting rural development.

## Chapter 3

### Evaluation of Rural ICT4D projects

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*This chapter explains the need for evaluation in ICT4D implementations. It identifies knowledge gaps in ICT4D evaluation. It explains why a process assessment is key to a comprehensive evaluation. It also describes the essentiality of a process assessment, identified shortcomings relevant to rural ICT4D process assessments and guidelines to adhere to when conducting process assessments.*

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### 3.1 Introduction

Researchers have started asking questions about the contribution of ICTs to development impacts (Gomez and Pather, 2010; Heeks, 2009). Undertaking evaluation of ICT4D projects may aid in answering such questions. Project evaluations are expected to reveal valuable information about a projects plan, implementation process, likely results and unexpected results. Successful programmes produce change and are underpinned by solid knowledge of what works and what does not (Craig, Fisher and Dawson, 2011; McNamara, 2003: 9). As such, evaluation activities contribute to project improvement and increased stakeholder confidence in a project amongst other benefits. To provide an overview of what a projects evaluation is composed of, a definition is adopted from Rossi *et al.*, (2004: 16) who define evaluation as:

*“The use of social research methods to systematically investigate the effectiveness of social intervention programs in ways that are adapted to their political and organisational environments and are designed to inform social action to improve social conditions.*

This chapter explores the need for evaluation in rural ICT4D projects. Firstly, varying levels of ICT4D project evaluation are highlighted. Subsequently, the need for evaluation at the micro level of ICT4D projects is explained. This is followed by a brief summary of the Rural ICT Comprehensive Evaluation Framework (RICT-CEF) which proposes a comprehensive approach to evaluating rural ICT projects. Following this, it is explained that the fourth domain of the RICT-CEF which consists of seven domains will be explored, based on the fact that the first three domains have been explored and applied. Subsequently, the fourth domain of the RICT-CEF which is the process assessment domain is described. This description includes, what a process assessment entails, its essentiality to a rural ICT project and an outline of potential challenges which may be encountered when attempting to conduct it in a rural ICT4D project environment. Furthermore, it is proposed that conducting a process assessment necessitates the identification of critical themes of process assessment, as evaluation questions of such an assessment are tailored around these themes. Finally, the conclusion summarises the findings and proposes that critical themes of *Process Assessment* should essentially be identified.

### 3.2 Importance of Rural ICT Project Evaluation

Customarily, rural ICT4D project evaluations are carried out in response to sponsor requirements that set to determine whether or not to carry on initiated projects (Grunsfeld, 2007: 2). While satisfaction of sponsor requirements is a valid reason for evaluation, other compelling motives for evaluation do exist. Rural ICT project evaluations aid in revealing project aspects where resources have not optimally been utilized (Reijswoud, 2009: 2). Millions of dollars are spent each year by public and private organizations on ICT4D projects (Ashraf, Swatman and Hanisch, 2007: 1; Heeks and Molla, 2009: 1). However, there is little proof to justify these ambitious project investments (Gomez and Pather, 2010: 1; Heeks and Molla, 2009: 1, McNamara, 2003: 3). Garrido (2004: 2) suggests that, there is a need to develop frameworks to evaluate the ways in which different ICT4D initiatives are impacting social processes. Without any proof of ICTs contribution to development, pessimism currently being exhibited by sceptics about the potential role ICTs play in enabling development may be increased.

ICT4D projects may essentially need to be evaluated for the following reasons (Butt, 2008: 41; Garrido, 2004: 2; Gigler, 2004; Hudson, 2001; Pade-Khene and Sewry, 2011; Wagner, Day, James, Kozma, Miller and Unwin, 2005):

- Programme/project planning effectiveness and public policy enactment could be improved by rigorous evaluation reports of the performance of project initiatives (Garrido, 2004: 2).
- Documentation and proof of successful project implementations can increase confidence in project ideas, and get other key stakeholders interested in ICT4D project initiatives, especially in projects where different actors compete for resources, for example, e-government initiatives (Garrido, 2004: 2).
- Evaluation can serve as a powerful tool for deconstructing the assumptions project implementers might hold while in the field, particularly if project efforts are implemented in partnerships with communities (Butt, 2008: 41). Simply put, it helps to avoid the unintended consequences which may arise from using a shared language (technology, development) but a language with different understandings and intentions between development practitioners and the community (Butt, 2008: 41).
- Evaluation can act as a medium to evoke the interest of the target community on the prospect of employing ICTs as change agents (Pade-Khene and Sewry, 2011; Wagner *et al.*, 2005: 42). The target community being the primary subjects of rural ICT projects, it is

essential to ensure that they are comfortable with the prospect of adopting ICTs. Evaluation aids in clarifying the role that information plays in a community, through the assessment of information needs amongst community members (Gigler, 2004: 11). Seeing parallels between their information needs and how ICTs can provide information to address these needs, community members are more inclined to accept ICTs as change agents. Furthermore, as indicated above, impact evaluation results which reveal positive changes attributed to the presence and employment of ICT as change agents could encourage various stakeholders to get involved more in project processes (Gigler, 2004: 29, Pade-Khene and Sewry, 2011: 30).

- Evaluations could prove valuable for monitoring the implementation process of rural ICT projects. Monitoring information which could be sourced and interpreted from logs, interviews, user samples, telephone or computer records and interviews with staff could aid the process of making modifications to projects and sharing experiences (Hudson, 2001: 173,174).
- ICT4D project evaluations enhance the prospect of such projects remaining sustainable. Heeks (2009: 4) suggest that many rural ICT projects have failed to persist or remain sustainable. As such, there is an increased focus on answering questions about sustainability of rural ICT projects in development contexts (Bailey, 2009: 1).

As Butt (2008: 42) postulates, regardless of whether or not people believe in the essentiality of ICT4D evaluation, there is a degree to which it is now unavoidable. Monitoring and evaluation allows ongoing learning and feedback throughout the design, planning and implementation stages of a programme (Wagner *et al.*, 2005: 33).

### **3.3 Knowledge Gaps in Rural ICT Project Evaluation**

ICT4D project evaluations could occur at three levels: the macro level, meso level and micro level (Ashraf *et al.*, 2007: 1; Grunfeld, 2007: 9). Evaluation at the macro and meso level respectively concentrates on ICT4D activities at national and institutional levels (Heeks and Molla, 2009). While there is an abundance of literature on ICT4D project evaluations at the national and institutional levels, few studies concentrate on micro level evaluations which take rural beneficiary perspectives into consideration (Ashraf *et al.*, 2007: 3). Micro level evaluations commonly conducted at the local or rural level, attempt to identify how best ICTs could contribute to the enablement of rural development and also determine the impact such ICTs have on the individuals in the community (Grunfeld, 2007: 1; Pade-Khene and Sewry, 2011: 68). Current studies on such evaluations have not paid adequate attention to

beneficiaries' perspectives (Ashraf *et al.*, 2007: 1). For instance, such evaluations have concentrated more on assessing the availability of infrastructure at the micro (rural) level, as opposed to assessing users willingness or capacity to use ICT services (Ashraf *et al.*, 2007: 1). This is not to downplay the significance of assessing the extent of infrastructure availability; however, it highlights the need for evaluation activities which also take user or beneficiary perspectives into consideration (Ashraf *et al.*, 2007: 3). In retrospect of this identified flaw, this research study will be limited to evaluation of ICT4D projects at the micro level.

Besides the need for rural or micro level ICT4D project evaluations that concentrate on users perspectives, it is also essential that such evaluation activities are comprehensive. A comprehensive evaluation approach considers all life cycle stages of an ICT4D project. Adherence to such an approach is lacking with current evaluation activities in ICT4D projects. Rather, there is increased neglect of specific aspects of a project's life cycle. For instance, there is an amplified focus on evaluating impacts of ICT4D projects, and reduced concentration on evaluating earlier life cycle phases of such projects (Heeks and Molla, 2009). A reason for this, as suggested by Heeks and Molla (2009: 4) is that as you gravitate from the right to left along the value chain of an ICT4D project, evaluation becomes more challenging and resource intensive. For instance, there is a perceived notion that evaluation is easier and less resource intensive when assessing the readiness of a community to accept ICTs, while being more difficult and costly when attempting to assess impacts. As such, the associated challenge with evaluating the latter phase (impacts) has influenced or brought about a change in evaluation focus, where projects majorly concentrate on evaluating impacts, while paying less attention to the readiness, availability and uptake levels of activity. The described changing focus is depicted in Figure 3.1.

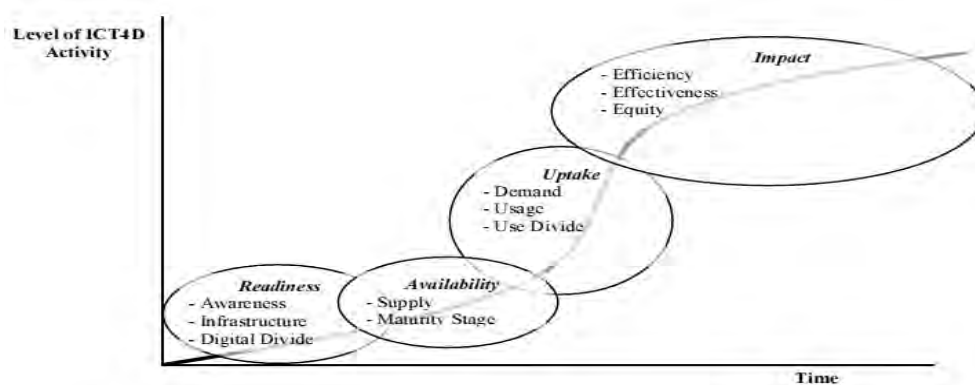


Figure 3.1: Changing focus of ICT4D assessment over time (Heeks and Molla, 2009: 4)



While the essentiality of impact evaluations cannot not be undermined, Pade-Khene and Sewry (2011: 25) suggest that evaluating impacts of rural ICT4D projects are informed by and based on an evaluation of previous phases of a projects life cycle, or as termed by Heeks and Molla (2009: 4), level of activity. As such, assessment activities of earlier phases of a project's level of activity or life cycle stage are as important as impact assessments.

Based on the above argument, a change in approach is necessary where projects are evaluated in a comprehensive manner, as opposed to a focus on only impacts. Evaluation activities of rural ICT projects should have, congruent to the varying life cycle stages of the project, an assessment of each life stage (Pade-Khene and Sewry, 2011: 141; Fortin, Gagnon and Lamothe, 2004: 518). A comprehensive evaluation, will contribute to the initiation, implementation, diffusion and sustainability of such projects (Fortin *et al.*, 2004). Pade-Khene and Sewry (2011: 141), in support of this view, propose a comprehensive evaluation framework, to evaluate a rural ICT4D project, from its inception stage to post implementation, with considerations for project sustainability. The proposed framework is referred to as the Rural ICT Comprehensive Evaluation Framework (RICT-CEF).

### **3.4 The Rural ICT Comprehensive Evaluation Framework (RICT-CEF)**

Rural ICT project evaluation exercises need to be comprehensive, to get a picture of the relevant impact and effectiveness of such projects, which are increasingly emerging in developing countries (Pade-Khene and Sewry, 2011: 141). Pade-Khene and Sewry (2011: 142) state that:

*“A Comprehensive Rural ICT Evaluation is the comprehensive application of all appropriate domains of evaluation throughout the life of a rural ICT project, in ways that are adapted to the social, political, cultural and economic rural environment, and designed to inform ICT interventions to improve and support rural development”*

The development of the RICT-CEF framework was motivated by the lack of an all-encompassing structure to assess ICT for development projects from inception to conclusion (Pade-Khene and Sewry, 2011). A description of the framework is relevant to this research project, as this project seeks to continue exploration of and application of the framework in real life rural ICT project environments.

### **3.5 RICT-CEF Structure**

The RICT-CEF is built around three essential components that guide the comprehensive evaluation of a rural ICT project or programme. The components include the overall

evaluation plan, the comprehensive evaluation lifecycle, and the iterative design of the framework (Pade-Khene and Sewry, 2011: 142). While the RICT-CEF is built around three components, this research will expand on the comprehensive evaluation lifecycle detailing the domains, as this is relevant to the research. Appendix A provides a description of the overall evaluation plan, the evaluation life cycle and the iterative design of the RICT-CEF. The RICT-CEF structure is depicted in Figure 3.2

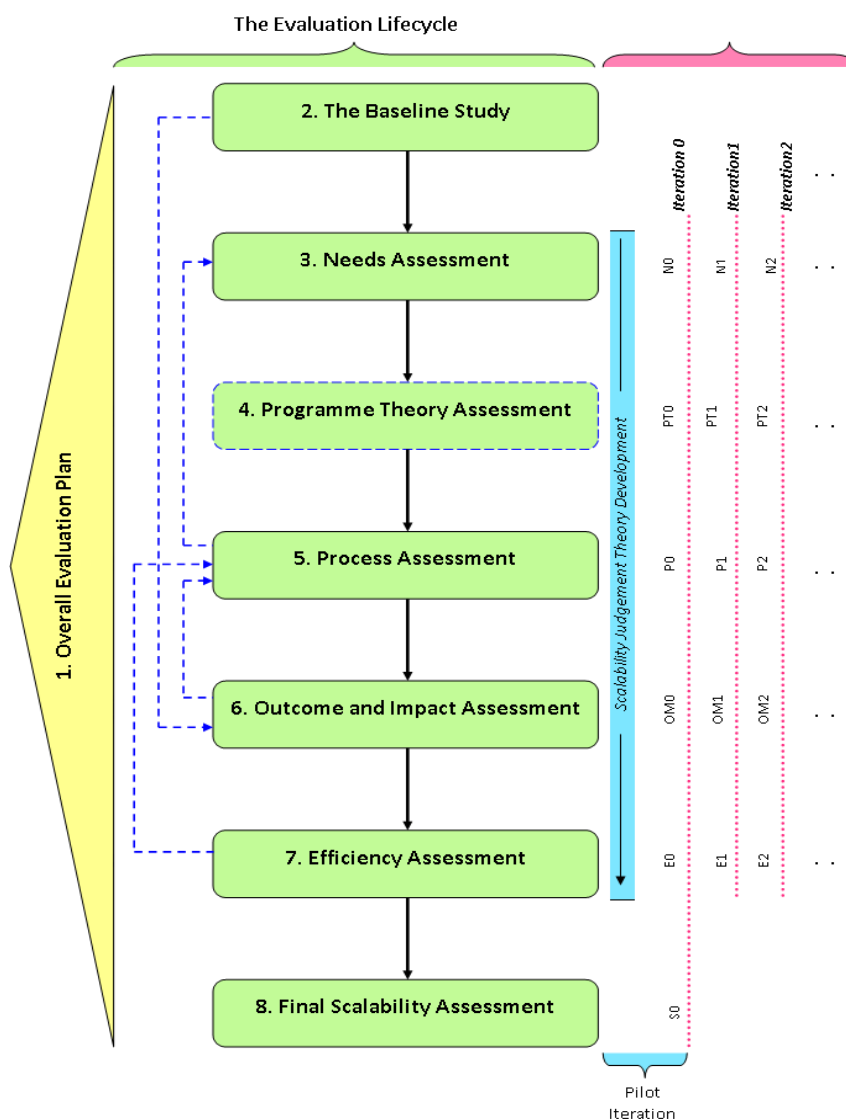


Figure 3.2: Rural ICT Comprehensive Evaluation Framework (RICT-CEF) (Pade-Khene and Sewry, 2011: 143)

### 3.5.1 The RICT-CEF Domains and Evaluation Life-Cycle

The Evaluation Life-cycle forms one of the central components of the framework, and it describes the processes and domains that a rural ICT comprehensive evaluation should go through (Pade-Khene and Sewry, 2011: 144). As stated earlier, evaluation of ICT projects should contribute to initiation, implementation, diffusion and sustainability of project efforts (Fortin *et al.*, 2004: 518). As such, it should be common practice for project investments in ICT4D to carry out evaluations throughout a projects life cycle (Davies, Owens and Lloyd-williams, 1999). Therefore, parallels can be drawn between a projects life-cycle and evaluation activities at each stage, thus resulting in an evaluation life-cycle consisting of several domains. Davies, Owens and Lloyd-williams (1999) suggest that one of the essential reasons for a comprehensive evaluation is that it integrates processes of evaluation more closely into the development activities of organizations.

The applications of the evaluation domains are parallel to various iterative phases in an ICT4D project life-cycle. A comprehensive evaluation is composed of various levels of assessment, with each assessment level congruent to a life-cycle stage in a rural ICT project. The evaluation domains are as follows (Pade-Khene and Sewry, 2011: 142): *Baseline study Assessment, Needs Assessment, Programme theory assessment, Process assessment, Impact assessment, Efficiency assessment* and a *Scalability assessment*. As depicted in Figure 3.2 each domain feeds into the subsequent domain. Below, each domain of the evaluation life-cycle is described (Pade-Khene and Sewry, 2011: 144):

- *The Baseline Study*: assesses the existing socio-economic state and readiness of the rural community for a rural ICT project initiation.
- *Needs Assessment*: assesses the desired priorities and information requirements for rural development efforts. This assessment aids in proposing suitable solutions that can be supported by ICT.
- *Programme Theory Assessment*: assesses the conceptual design of the ICT project to determine its suitability to support rural development programmes.
- *Process Assessment*: assesses how well the project is operating to implement its intended functions, as stipulated in the project plan. This study will concentrate on this assessment domain, as the preceding domains have been implemented and applied in a real life rural ICT project environment.
- *Outcome and Impact Assessment*: assesses the intended and unintended outcomes or effects of the ICT project on the conditions of the targeted population.

- *Efficiency Assessment*: assesses ICT intervention costs associated with the project effects or impact.
- *Scalability Assessment*: assesses whether a rural ICT project should be taken to scale. Therefore, this domain is only applied to ICT pilot projects.

The appropriate application of each assessment domain in a comprehensive effort to a rural ICT project constitutes good evaluation practice.

Currently, there is ongoing evaluation of a rural ICT project, to explore the feasibility and applicability of the RICT-CEF. Three of the evaluation domains outlined in section 3.4.2.2: The *Baseline Study*, *Needs Assessment* and *Program Theory Assessment*, have been implemented and applied in this on-going rural ICT project. Therefore, this research continues the comprehensive evaluation process, by subsequently implementing the process *assessment* domain of the RICT-CEF. The process assessment domain is an essential component of a comprehensive evaluation. A programme's progression from conception to full operation requires much input and several steps to ensure that it stays true to its original design and purpose, as well as adapting to changes in the project's environment (Rossi *et al.*, 2004: 170). A *Process Assessment*, which aids in determining how well a programme is operating in relation to the programme plan, helps in achieving the realisation of these steps (Rossi *et al.*, 2004: 170).

### **3.6 Process Assessment in Rural ICT Projects**

A programme's implementation becomes concrete through programme processes that are put in place (Rossi *et al.*, 2004: 170). Projects that directly influence livelihoods revolve around processes that lead to both the expected gains in assets and the mitigation of risk and vulnerability (Batchelor and Norrish, 2006: 18). A Process Assessment assesses how well a rural ICT project is operating to implement its intended functions in the specified way, as stipulated in its project plan (Pade-Khene and Sewry, 2011: 174). A Process Assessment concentrates on a project's operation, functions, activities, performance, component parts, and resources (Rossi *et al.*, 2004: 170).

Project process implementations can be largely grouped into two categories. They can be classified as *internal project processes* and *external project processes* (Batchelor and Norrish, 2006: 19). It is imperative for project implementers in a rural development effort to routinely conduct process assessments. Pade-Khene and Sewry (2011: 175) suggest that project process assessments must be continuous exercises, to allow for a progressive adoption

of appropriate mechanisms to fit the project as a supportive tool in rural development activities. Furthermore, continuous process assessments of such projects will allow for continuous learning and increased local experience, thus allowing the ICT project to effectively develop in a rural community. Where process assessments become continuous, involving repeated measurements overtime, they are referred to as process monitoring (Pade-Khene and Sewry, 2011: 175; Rossi *et al.*, 2004: 171).

### **3.7 Importance of Process Assessment in Rural ICT Projects**

While implementing An ICT4D projects concept may seem straightforward, pragmatically it could prove to be challenging (Century, Freeman and Rudnick, 2008: 2; Linnan and Stekler, 2002: 1; Rossi *et al.*, 2004: 170). Programmes or projects must contend with many undesirable influences that can compromise well intentioned attempts to conduct business appropriately (Rossi *et al.*, 2004: 170). An essential evaluation function, therefore, is to assess how satisfactory the ICT4D projects processes are (Rossi *et al.*, 2004: 170). As without explicit or clear descriptions and measurement of implementation, it will be impossible to identify whether ill achieved outcomes should be attributed to an inadequate model of change in a project, or due to poor or incomplete implementation (Century, Freeman and Rudnick, 2008: 2). In conducting a comprehensive evaluation of rural ICT projects, some of the following reasons indicate the essentiality of process assessments in such projects:

#### **3.7.1 Replication of Successful implementation processes for similar ICT4D projects**

Rural ICT projects are often implemented at multiple site locations. As such, conducting process assessments at one site of implementation could provide useful lessons which may be taken into consideration when undergoing implementation at other sites (Bliss and Emshoff, 2002: 1; Hudson, 2001: 169; Ogborne, Rush, Epping-jordan, Lalji and Hillebrand, 2000: 9; Linnan and Stekler, 2002: 1).

#### **3.7.2 Satisfying ICT4D Stakeholder interest**

Large sums of money are allocated to ICT4D project implementations (Ashraf *et al.*, 2007: 1; Heeks and Molla, 2009: 1; Linnan and Stekler, 2002: 2). However, often little or insignificant results are obtained (Linnan and Stekler, 2002: 2). Thus, an increased demand from various stakeholder groups, including, researchers, funders, policy makers, and the

general public, to understand why ICT4D interventions do not produce the intended effects exist (Bliss and Emshoff, 2002: 1; Linnan and Stekler, 2002: 2; Ogborne *et al.*, 2000: 9). Therefore, process assessments could be instrumental in explaining why positive, modest or insignificant results occurred (Linnan and Stekler, 2002: 2). For instance, a process assessment may reveal that services did not reach a particular target audience, due to accessibility issues. Furthermore, Grunfeld (2007) suggests that in ICT4D projects, such evaluations could aid in revealing to stakeholders, whether a project should be continued, and how it should proceed.

### **3.7.3 Equity of ICT Service Distribution amongst sub-groups**

One of the objectives of rural development is to reach the most underserved or marginalized groups in society (Ali and Bailur, 2007). Linnan and Stekler, (2002: 2); Rossi *et al.*, (2004: 172), and Pade-Khene and Sewry (2011: 174) suggest that in a rural ICT project, process assessments could aid in revealing service delivery biases in project interventions amongst selected sub-groups. For instance, biases against women or the illiterate in a community. Furthermore, clues about the influence of interventions among selected sub-groups can be determined (Linnan and Stekler, 2002: 2; Rossi *et al.*, 2004: 172). For instance, a process assessment may aid in determining the influence of computer skills class on a women's group.

### **3.7.4 Linking project processes to outputs and outcomes**

Process assessments in a rural ICT project are useful for explaining why certain results are achieved in project implementations (Batchelor and Norrish, 2006: 19; Bliss and Emshoff, 2002: 1; Linnan and Stekler, 2002: 2). This may specifically apply when interventions lead to significant desired outcomes (Linnan and Stekler, 2002: 2). Furthermore, without explicit and exact descriptions and implementation measurements, it will be impossible to know whether undesirable outcomes are a result of poor or incomplete interventions (Century *et al.*, 2008: 2). A process assessment, therefore, allows for the opening up of the implementation "black box" which is an exhibit of project processes taught to be responsible for desired outcomes (Century *et al.*, 2008: 10; Linnan and Stekler, 2002: 2; Rossi *et al.*, 2004: 179).

### **3.7.5 Understanding the relationship amongst various project components**

Hudson (2001: 171) suggests that rural ICT projects are intended to serve a variety of

functions in a community. For instance, some functions include ensuring access, capacity building and raising awareness about the ICT project (Hudson, 2001: 171). A specification of the various services offered by a project is essential for both planning and monitoring purposes (Rossi *et al.*, 2004: 195). Making distinctions between these various services or components will aid in disentangling the effects of various project activities a rural ICT project carries out in a community (Linnan and Stekler, 2002: 2).

While it has been established that process assessments are imperative to rural ICT4D project evaluations, there are a number of gaps in knowledge or shortcomings that must be addressed if the process assessment evaluation domain is to advance (Linnan and Stekler, 2002: 9). While the shortcomings highlighted are generic to varying programme and project types, they are applicable to rural ICT projects. Below are shortcomings of process assessments common to ICT4D projects:

### **3.8 Shortcomings of process assessments applicable to rural ICT projects**

#### **3.8.1 Disparate measures across project sites**

Century *et al.*, (2008: 1); Linnan and Stekler, (2002: 9) and Wagner *et al.*, (2005) suggest that due to the range of process assessment measures, data collection methods and reporting schemes, it is difficult to compare findings across different ICT4D or programme sites. For instance, there seems to be considerable overlap in how key process areas or themes are identified or labelled (Century *et al.*, 2008: 1; Linnan and Stekler, 2002: 9), and this could overwhelm or confuse researchers or evaluators who seek to undertake comparative studies (Century *et al.*, 2008: 1; Linnan and Stekler, 2002: 9). Therefore, a need exists to develop clear definitions of existing process assessment outcome measures or themes (Linnan and Stekler, 2002: 9).

#### **3.8.2 Resource constraints limiting the amount of potential data which can be collected**

Process assessments are heavily dependent on available resources. Though as a shortcoming, this challenge is not peculiar to only process assessments, but evaluation as a whole. As suggested by Pade-Khene and Sewry (2011), rural ICT project evaluations are constrained by resources. Considering that the information, which will be collected will depend on resources available for the evaluation exercise, it is imperative that evaluators make attempts to strike a

practical balance between the data that is critical to collect, and the data that is ‘nice’ to have (Linnan and Stekler, 2002: 9; Ogborne *et al.*, 2000: 10). Evaluators who conduct process assessments should adopt a “less is more” approach, which may be achieved by prioritizing the process assessment questions to be addressed (Linnan and Stekler, 2002: 9, 10; Rossi *et al.*, 2004: 179). Although all evaluation questions identified may seem essential, it may be necessary to further validate questions to reduce them. Furthermore, related to the issue of resources and its effect on the amount of data that can be collected, Rossi *et al.*, (2004: 179) advise that while theory suggests satisfying the information need of all stakeholders through evaluation results, pragmatically it might be impossible due to resource constraints. Decision making on which groups of stakeholder information needs to satisfy, may arouse conflict (Rossi *et al.*, 2004: 182). This stems from the fact that due to the diversity of stakeholder groups involved in a rural ICT4D project, there may be disagreement on issues, such as, the sensible amount of information to collect, collection formats, and frequency of collection (Rossi *et al.*, 2004: 182). Hence, it is essential for the evaluator to plan and conduct the evaluation collaboratively with all stakeholder groups (Linnan and Stekler, 2002: 15).

### **3.8.3 Few Training opportunities to specialize**

Wagner *et al.*, (2005) postulate that a major challenge ICT4D evaluation is facing is the shortage of evaluation research capacity in developing countries. Again, while this shortcoming is generic to evaluation as a whole, it does apply to process assessments. Linnan and Stekler (2002: 10) indicate that there are few training opportunities available for students or professionals who wish to specialize in the field of evaluation. Rossi *et al.*, (2004: 26) support this view by suggesting that while prospective or aspiring evaluation experts can become part knowledgeable in the evaluation field through study of structured text, a person can only truly master the evaluation field through practice and attention to the peculiarities of each case.

### **3.8.4 Criteria setting for acceptable performance**

To answer process assessment questions, an evaluator must not only describe a programme or projects performance, but also assess whether it is satisfactory (Rossi *et al.*, 2004: 172). Determining how satisfactory an evaluation result is could be achieved by comparing project results with established objectives, and in accordance with predetermined criteria (Office of Learning Technology, 2005: 6). Rossi *et al.*, (2004) suggest that setting criteria is not always



an easy task, due to the fact that there are several stakeholders involved in a project, all of whom might have different needs from an evaluation. Rural dwellers being the primary beneficiaries of rural ICT projects, Gigler (2004: 7) suggests that they be solely responsible for defining criteria of results deemed satisfactory. However, this might not be the best solution to the criteria setting challenge. Craig, Fisher and Dawson (2011) to explain this indicate that a potential problem that may arise from development recipients being solely responsible for defining criteria is that they may lack the knowledge to do this. Rossi *et al.*, (2004), therefore, suggest a participatory approach, where the definition of criteria and indicators are defined by the evaluators and representatives from all stakeholder groups involved with the project. The criteria setting challenge, amongst others, could have a negative impact on process assessment efforts. For instance, it could ignite stakeholder conflict. Rossi *et al.*, (2004: 173) suggest that specifying the programme theory which underlies a rural ICT projects implementation, may aid an evaluator in determining what criteria constitutes acceptable performance, where such criteria is explicitly outlined in the theory.

### **3.8.5 Not Enough Emphasis on Internal Stakeholder Perspectives**

As implied by Rossi *et al.*, (2004) project evaluation funders often dictate what aspects should be assessed or what results should be produced from a process assessment. Such a trend is common in rural ICT4D projects, where it is believed that sufficient emphasis is not given to rural stakeholder perspectives (Ashraf *et al.*, 2007: 1; Butt, 2008). Sponsors often preoccupied with their personal agendas, (such as, securing budgets, avoiding embarrassment and maintaining reputation), end up neglecting rural stakeholder perspectives and attitudes (Butt, 2008; Pade-Khene and Sewry, 2011:33). Thus, evaluation results may sometimes seem favourable but may not reflect issues which core internal stakeholders deem important (Wakelin and Shadrach, 2001:14 in Pade-Khene and Sewry, 2011: 34). This highlighted challenge highlights the unethical practices which often plague ICT4D evaluation and other social research. Kimmel (1988) suggests neglect of internal stakeholder perspectives and opinions may be due to the fact that they are often viewed as relatively powerless, and as such are taken advantage of. This highlights the need for evaluators to be more ethically conscious when conducting rural ICT4D process assessments, evaluation or any sort of social research. According to Delone and Mclene (2003), Dey, Newman and Pendergast (2010), and Heeks (2009) rural beneficiary attitudes may include, their perceptions towards services

offered by a project, reasons they find services offered to be valuable, service aspects they would like to see improved and their opinions on how services could be improved.

### **3.9 Rural ICT Process Assessment Questions and Critical Themes**

Amongst the components which make up a process assessment plan, the evaluation questions are the most relevant to this research. Process assessment questions are central to undertaking a process assessment. As such, it is essential to ensure that prospective questions are properly selected. Rosas (2005: 17) supports this view by implying that evaluation questions are the focal point of every evaluation effort. The questions represent gaps which project stakeholders are interested in. Furthermore, Rossi *et al.*, (2004: 53) suggests that a critically thought out set of process assessment questions give structure to an evaluation, lead to proper and articulated planning, and serve as a basis for important discussion about who is interested in answers and how they will be used. Process assessment questions seek to measure performance of the implementation process of a project. Such questions as indicated by Pade-Khene and Sewry (2011: 179) are tailored around key themes of project performance. Furthermore, Linnan and Stekler (2002) suggest that key themes of project performance, also referred to as critical themes are the most essential aspects of a rural ICT4D projects implementation phase which require evaluation. Critical themes are aspects of a programme or projects implementation which must be enacted to achieve desired project outcomes (Century *et al.*, 2008). As such, the identification of critical themes of process assessment in rural ICT projects is imperative to conducting such an assessment.

### **3.10 Conclusion**

Evaluation activities are pivotal to an ICT4D project's success. Monitoring and evaluation allows ongoing learning and feedback throughout the design, planning and implementation stages of a programme or project. While there is considerable amount of research on evaluation in the ICT4D field, there seems to be limited research on the topic at the micro level. Furthermore, existing research on evaluation of ICT4D projects at the micro level have given little attention to local beneficiary perspectives. As such, there exists a need for such evaluation studies. To add on, evaluation of ICT4D projects need to be comprehensive, taking into account all phases of a project's life-cycle. A comprehensive evaluation caters for the assessment of all phases of a project's life cycle, for instance, from a projects inception stage, to post implementation. The need for a comprehensive evaluation is emphasised due to an observation of a shift in evaluation trend to a concentration on impact and neglect for

earlier phases of a project's life cycle. A proposed comprehensive evaluation framework (the RICT-CEF), demonstrates the need for evaluating all life cycle phases.

Though the RICT-CEF consists of seven domains (*Baseline Study, Needs Assessment and Program Theory Assessment, Process Assessment, Outcome and Impact Assessment, Efficiency Assessment and a Scalability Assessment*), the *Process Assessment* domain is particularly relevant to this study, as it contributes to ongoing research around comprehensive evaluation. The concluded application and exploration of the first three domains of the RICT-CEF, suggests the need for the application of the process assessment domain. The *process assessment* domain concentrates on a projects, operation, functions, activities, performance, component parts and resources. It attempts to assess whether a project is operating as planned. While the practice of such an assessment is vital to a comprehensive evaluation, it is not free of challenges. As such, adhering to certain guiding principles could aid in minimizing the effects of such challenges while conducting a process assessment. Finally, in conducting a process assessment of a rural ICT4D project, evaluators must particularly pay attention to evaluation questions to be asked, as they are central to the process. Evaluation questions are centred around key themes of project performance also referred to as critical themes. Therefore, it is concluded that there is a need for the identification of critical themes of process assessment in ICT4D prior to conducting a process assessment exercise.

## Chapter 4

# An Analysis of Assessment Approaches to Identify Critical Themes

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*This chapter comparatively analyses 14 assessment approaches from Social programme process assessments, evaluation of information systems in use and rural ICT4D evaluation cases, in order to identify critical themes of process assessment relevant to rural ICT projects.*

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### 4.1 Introduction

Critical themes of process assessment in rural ICT projects refer to the most vital aspects which necessitate assessment in the continuous implementation of such projects. In order to identify critical themes relevant to rural ICT project process assessments, this chapter analyses evaluation and assessment approaches from, social programmes, Information systems projects and rural ICT project cases.

Firstly, the role critical themes play in process assessments of programmes are elaborated on. Subsequently, a brief description is outlined of categories of assessment approaches which will contribute to the identification of critical themes of process assessment relevant to rural ICT projects. It is revealed that assessment approaches from social programme process assessments, evaluation of information systems in use, and ICT4D project implementation and evaluation case studies will be analysed. This is followed by the description of a template, which will be employed to analyse selected assessment approaches which will contribute to the identification of critical themes. Using the template, fourteen assessment approaches are analysed from the three categories outlined above. However, prior to the selection of assessment approaches, criteria is outlined to aid the selection of approaches to be analysed. Finally, all assessment approaches analysed are summarised, and critical themes of rural ICT project process assessment are identified, along with appropriate instruments for assessing identified themes. It is concluded that identified critical themes potentially contribute to the development of a framework to guide process assessments in rural ICT projects.

### 4.2 Critical Themes of Programme Process Assessment

Rural ICT project process assessments could draw from evaluation experiences of programme process assessments, considering they both function to improve socio-economic conditions (Pade-Khene and Sewry, 2011: 41). Programmes can be defined as interventions directed at improving the social, economic and political involvement of marginalized groups (Hopkins, 2011: 182; Pade-Khene and Sewry, 2011: 41; Rossi *et al.*, 2004: 17). Programmes necessitate process assessments for a number of reasons. These could include, programme improvement, learning of important lessons and accountability (Rossi *et al.*, 2004).

Evaluation of programmes are increasingly relying on programme theory (plans) to guide evaluation activities (Adedokun, Childress and Burgess, 2011: 480; Coryn, Noakes, Westine

and Schroter, 2011: 200; Saunders, Evans and Joshi, 2005: 136). A programme theory consists of programme components and the elements of a programme's logic model (Saunders *et al.*, 2005: 139). Programme theory proves valuable in describing what social interventions should look like once they have been implemented. Furthermore, they depict processes through which programme components are presumed to affect programme outcomes (Adedokun *et al.*, 2011: 481; Saunders *et al.*, 2005: 139). Programme theory is of particular importance to process assessments, because in highlighting an intervention's logical model, theories indicate project implementation processes that should lead to desired outcomes (Adedokun, *et al.*, 2011: 481; Sanchez, Rubio and Anzano, 2005: 23). A logical model consists of a sequence of statements which attempt to outline issues a programme is attempting to address, ways in which the programme will address these issues and the expected results of the programme (immediate and intermediate outcomes and long-term goals) (Bliss and Emshoff, 2002: 5). The purpose which a programme theory serves, highlights its ability to point out critical components of a programme's implementation. Programme critical components, should be part of the programme theory, include operationalisations of project implementer's beliefs (Century *et al.*, 2008: 4). Critical components are measurable elements of an intended programme's model, and as such, should be the focal point of process assessments (Century *et al.*, 2008: 4). There is no standard or accepted term for describing the measurable aspects of a programme's processes or the implementation phase of programmes. While some authors term such aspects components, others use words like elements, domains, and themes. For the purpose of this research, these measurable aspects of a programme's implementation process will be termed *themes*. The term *themes* will be adopted, because previous research by Pade-Khene and Sewry (2011), which this research is based on, utilized the term themes to describe measurable aspects of a programme's implementation phase. Therefore, using the term themes will provide some kind of consistency with previous research.

Prior to conducting a process assessment for any programme type, it is essential to identify critical themes of the programme's processes. Critical themes, as highlighted above, represent important aspects which necessitate assessment in the on-going implementation of the programme. Such aspects may require assessments because they often represent necessary components which affect programme outcomes (Century *et al.*, 2008: 1).

Project evaluation constraints highlight the essentiality of identifying critical themes when attempting to conduct process assessments. Process assessments may be constrained by time, scope and cost (Pade-Khene and Sewry, 2011: 142). For instance, W. K. Kellogg Foundation (1998) suggests that evaluation budgets are limited to between 5 and 7 percent of total project costs, thus implying limited budgets for evaluation. With such modest costs allocated to evaluation, it is imperative for evaluators who plan on conducting process assessment activities to identify the most important aspects of implementation which necessitate assessment, in the presence of such constraints. As this pertains to the concept of *critical themes*, it highlights the need to identify the most critical measurable aspects of a programme's implementation. Identifying *critical themes*, therefore, entails identifying critical areas on which data must be collected throughout the implementation phase of a programme, and leaving out data collection aspects that do not necessarily reveal much about programme outcomes. Furthermore, it is essential to note that while attempting to identify critical themes, varying key stakeholder perspectives on critical themes must be considered (Bliss and Emshoff, 2002: 3; Estrella and Gaventa, 1998). Estrella and Gaventa (1998) indicate that this is because varying stakeholders may have varying aspects they consider should be given priority in a process assessment. For instance, in a rural ICT project, the project team may view monitoring of project support functions as the most critical aspect to assess, while eligible rural beneficiaries not being reached may see the need to identify the reasons for bias against them.

On a final note, programmes may be implemented in varying contexts and, they may have differing opinions on critical themes as they relate to their particular programme (Century *et al.*, 2010: 204). Therefore, it may be essential to identify critical themes shared and common across varying programmes. Such an identification process could aid in efforts to compare findings across sites or similar programmes in different locations or contexts (Century *et al.*, 2010: 204).

### **4.3 A Comparative Analysis of Critical Themes across Social Programmes/ Information Systems in Use and Rural ICT Cases**

The comparative analysis begins by identifying critical themes common to social programme process assessments. This is attributed to the fact that both rural ICT projects and social programmes seek to improve the standard of living of marginalized groups (Pade-Khene and Sewry, 2011: 41). As such, critical themes of process assessment common across social

programmes may also be applicable to rural ICT project process assessments. Following this, an analysis of select information systems (I.S) in use evaluation models is conducted. The proposed analysis of I.S evaluation models, aid in identifying essential aspects to assess in projects which involve the use of information systems by humans, for instance rural ICT projects. Finally, select rural ICT evaluation case studies are reviewed, to identify from a pragmatic view, aspects which are considered imperative to assess when such projects are implemented. To identify critical themes of process assessment common across all three categories, a template is created to compare and analyse occurring critical themes deemed relevant to rural ICT project process assessments. Furthermore, criteria are specified to guide selection of assessment approaches to be analysed.

### **4.4 Template for Analysing Critical Themes of Process Assessment**

The template created is based on the research questions of this study, that is, identifying critical themes of process assessment in rural ICT4D projects and determining how they should be assessed in a real life rural ICT4D project environment. Furthermore, the aspects or categories highlighted in the template are also based on foundational literature on critical themes of process assessment. Lastly, the template is informed by identified challenges faced by rural ICT4D project process assessments. The template is applied to each Assessment Approach selected to provide a comparative analysis. The proposed analysis concentrates on identifying critical themes of process assessment from the varying assessment approaches, as opposed to analysing process assessment steps. To commence the analysis, a brief summary of each selected Assessment Approach is discussed. Summaries of each Assessment Approach analysed from all three categories may be reviewed in Appendix B. The template described in Table 4.1 aids in comparing and contrasting findings from the varying assessment approaches. The template is displayed in a Table format. Rows are used to list the various aspects or categories of the template, while each Assessment Approach analysed will be displayed along the columns.



Table 4.1: A template for analysing critical themes of process assessment

<b>1. Title</b>	<p>The title of the Assessment Approach is outlined, to inform readers on the programme sector and topic of concern.</p>
<b>2. Organization/Author</b>	<p>This column or section indicates the author or organization responsible for identifying critical themes in assessment approaches analysed. Provision of the authors' profile will aid in giving identity to and distinguishing varying assessment approaches.</p>
<b>3. Purpose of Assessment Approach</b>	<p>The underlying purpose of the Assessment Approach will be highlighted or summarised in this section. The summary will also include the programme sector in cases where the Assessment Approach supports a particular programme type. For example, health or education related interventions.</p>
<b>4. Critical Themes</b>	<p>This section outlines critical themes identified by various assessment approaches. Critical themes, as specified earlier, are operational areas which data must be collected on while assessing the implementation phase of a project. Enlisting the critical themes will provide a base for comparing commonalities and differences identified by varying Assessment Approach. This is part of the core of the research.</p>
<b>5. Definition of Critical Themes</b>	<p>This section provides brief definitions of critical themes as indicated by each Assessment Approach. There are considerable differences in how key process assessment terms are used and the meanings attached to them (Century, <i>et al.</i>, 2010:201; Linnan and Stekler, 2002: 9). For the purpose of this research, such definition is necessary, as this research aims to identify consistent critical thematic areas of measurement across rural ICT project process assessments. In moving forward with process assessment, adoption of uniform critical thematic definitions would be necessary (Century, <i>et al.</i>, 2010:201).</p>
<b>6. Instruments and methods for assessing critical themes</b>	<p>This section highlights suggested data collection instruments and methods for assessing identified critical themes. Linnan and Stekler (2002: 10) postulate that very little is known about which instruments and methods are appropriate for certain situations. It will be interesting to see if it is proposed that common themes identified are assessed using similar instruments.</p>
<b>7. Aspect of Assessment Approach contributing the Identification of Critical Themes of</b>	<p>This section indicates how selected assessment approaches contribute to the identification of critical themes of process assessment in rural ICT projects. Furthermore, it highlights motive for the selection of the specific assessment approaches.</p>

<p><b>Process Assessment in Rural ICT projects.</b></p>	
<p><b>8. Contextual Themes identified (Moderating variables):</b></p>	<p>This section highlights potential assessment areas which may or may not be critical to a programme or projects implementation success. For such factors, their status as critical or non critical are dependent on the context of implementation of a project. Century <i>et al.</i>, (2010: 208) refer to these contextual factors as moderating variables. It is important to note that based on the idiosyncrasies of varying programmes, some of these factors might be considered critical (Century <i>et al.</i>, 2010: 208). For example, a teaching programme might highlight the need for facilitators to possess certain behavioural characteristics they consider critical to desired learning outcomes. It should also be noted, that contextual factors which are considered critical to various programmes cannot be classified as standard measurement focuses. As implied by Mullany and Peat (2008: 505) this can be attributed to the fact that these contextual factors are specific to individual programme efforts, and as such cannot be used as a base for comparing results across sites.</p>
<p><b>9. Lessons Learned</b></p>	<p>This section highlights lessons learned from various assessment approaches. These could include best practices for conducting process assessments with identified themes, or important points to note.</p>
<p><b>10. Limitations of Assessment Approach</b></p>	<p>This section highlights various authors' acknowledgements of critical themes of process assessment they do not address. Furthermore, this section attempts to identify flaws in the varying Assessment Approach logics for considering a theme critical where such assessment approaches provide reasons. Finally, this section will highlight themes mentioned in assessment approaches which are not applicable to process assessments of rural ICT projects.</p>

#### 4.5 Analysis of Critical Themes in Social Programme Process Assessment

Linnan and Stekler (2002) suggest that social programmes necessitate process assessments for several reasons. Some highlighted reasons include, a need to identify key components of an intervention that propel effective implementations, for management purposes and to compare findings across sites of similar social programmes. The types of programmes analysed range, consisting of programme areas such as, education, health and criminal justice. However, selected assessment approaches must identify critical themes or aspects not only specific to their programme type, but themes or aspects which are applicable to varying programme types. This aids in identifying themes which are common across all of these programme types, and not only to specific programme sectors. The selected social programme assessment approaches are deemed sufficient for this initial identification of

critical themes, as these approaches may be viewed as representative of typical social programmes. However, it is essential to note that assessment approaches analysed are not an exhaustive list, therefore, further research may be conducted using the proposed template to analyse other programme types.

### **4.5.1 Criteria for Selecting Assessment Approaches which identify Critical Themes of Process Assessment in Social Programmes**

Based on the research questions, literature on process assessment, and literature on critical themes of process assessment, the following criteria is used for the selection of assessment approaches analysed:

- The assessment approaches selected to some degree should be able to be explained in terms of the template described.
- The assessment approaches selected should attempt to identify critical assessment areas or themes in their process assessment description.
- The assessment approaches selected, even if peculiar to a specific programme sector, should identify process assessment themes or aspects that are generic or can be considered across different programme types. For example, a health based process assessment, which identifies critical assessment aspects which could apply to an education programme.
- The assessment approaches selected should attempt to indicate instruments suitable for assessing identified critical themes highlighted.
- The assessment approaches selected should indicate the provision of some service to a target population. This is because; the research seeks to address critical themes of rural ICT initiatives, which constitute the provision of ICT services to a target population.

Table 4.2 below indicates and illustrates similarities and differences between various process assessment approaches in social programmes.

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

Table 4.2: A review of critical themes of process assessment in social programmes

	<b>Assessment Approach 1</b>	<b>Assessment Approach 2</b>	<b>Assessment Approach 3</b>	<b>Assessment Approach 4</b>	<b>Assessment Approach 5</b>
<b>1.Title</b>	Evaluation: A systematic approach.	Process Evaluation for public health interventions and research.	A framework for measuring fidelity of implementation: A foundation for shared Language and accumulation of knowledge.	Process Evaluation of a County Drug Court: An Analysis of Descriptors, Compliance and outcomes- Answering some questions, while raising others.	Monitoring and evaluating social programmes in developing countries.
<b>2.Organization/author</b>	Rossi, P.H., Freeman H.E & Lipsey, M.W. (2004)	Linnan, L., and Stekler, A (2002)	Century, J., Rudnick, M., and Freeman, C (2010)	Mullany, M.J., Peat, B (2008)	Valadez and Bamberger (1994) (The World Bank)
<b>3. Purpose of Assessment Approach</b>	The development of a comprehensive evaluation framework for social programmes is outlined. Amongst the components which make up the comprehensive evaluation is the process assessment component. Considering process assessment relates to the implementation stages of projects, critical areas to assess in the implementation stage of a social programme, and ways of assessing them are identified and discussed.	An overview of process assessment in the public health sector is described. Furthermore, gaps in process assessments are identified. The usefulness of critical theme identification for process assessments are highlighted. Finally a strategy with sequential steps for conducting process assessments is outlined.	Description of a project, which aims to define fidelity of implementation (Process assessment) measures, for science and mathematical educational interventions. Areas covered include the development of a conceptual framework for describing fidelity of implementation, and the need for the framework. It is suggested that this framework which is based on critical components/(themes) can be adapted to be utilized in other programme types or interventions.	This study describes the process assessment of a drug court programme. Findings from the assessment activities are discussed. Questions are also raised about the need for standard measures and measurement instruments across drug court programmes.	This Assessment Approach presents a comprehensive view, detailing ways in which information elicited from monitoring and evaluation studies of social programmes can be employed to facilitate improvement of such initiatives. This comprehensive view, seeks to inform research in developing countries, and as such it is specifically tailored for social programmes in developing countries. The study focuses on the organization of monitoring and evaluation at the national, regional and local levels of developing countries. While the approach focuses on evaluation at all three levels, aspects highlighted in this research will focus on what the study proposes at the implementation stage of local level projects.

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

<p><b>4. Critical themes of project process assessment</b></p>	<ul style="list-style-type: none"> <li>• <b>Service Utilization</b> -Coverage -Bias</li> <li>• <b>Organizational Function.</b> -Service delivery (<b>critical</b>). -Accessibility (Function of programme organisation)</li> <li>- programme support functions (fund raising, public relations to enhance programme image with potential sponsors, staff training, recruitment of staff and governance of the organization) .</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Reach (critical)</b> -Coverage and bias discussed</li> <li>• <b>Dose delivered (critical)</b> (Function of programme organisation)</li> <li>• <b>Dose received (critical)</b> (function of service utilization)</li> <li>• <b>Fidelity(critical)</b></li> <li>• <b>Context</b></li> <li>• <b>Recruitment</b> (Function of programme organisation) but used to assess bias.</li> </ul>	<ul style="list-style-type: none"> <li>• Exposure</li> <li>• Dosage</li> <li>• Quality</li> <li>• Participant responsiveness.</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Participant descriptors</b> (Service utilization)</li> <li>• <b>Service provision</b> (Organizational function) dose delivered,</li> <li>• <b>Participant compliance</b> (Service utilization)</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Converting inputs to outputs</b> (organisational function)/project management aspects</li> <li>• <b>Beneficiary participation (Bias).</b></li> <li>• <b>Project sustainability</b></li> <li>• <b>Level of Institutional support</b></li> </ul>
<p><b>5. Definition of critical themes/What each theme assesses</b></p>	<ul style="list-style-type: none"> <li>• <b>Service utilization:</b> Assesses the extent to which services reach the intended target population, measuring coverage and bias.</li> <li>• <b>Organizational function:</b> Assesses whether the program is performing well in managing its efforts and using its resources to accomplish its essential tasks. The key aspect to assess with regard to organizational function is <b>service delivery</b>. Delivered service units should approximate intended ones . Furthermore, service quality should be assessed. It is also essential to</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Reach:</b> The proportion of the target audience that participates in the intervention.</li> <li>• <b>Dose delivered:</b> The number or amount of intended units of each intervention or each activity delivered or provided.</li> <li>• <b>Dose received:</b> The extent to which participants actively engage with, interact with and are receptive to or use materials/ resources recommended by programme implementers.</li> <li>• <b>Fidelity:</b> The extent to which the intervention was implemented as planned (Quality and</li> </ul>	<p><b>-Structural Components</b></p> <ul style="list-style-type: none"> <li>• <b>Exposure:</b> Assesses the number of intervention units implemented by programme providers.</li> <li>• <b>Dosage:</b> A measure of the amount of content received by participants.</li> </ul> <p><b>-Process Components</b></p> <ul style="list-style-type: none"> <li>• <b>Quality:</b> A measure of qualitative aspects of programme delivery, that are not directly related to content (e.g. implementer enthusiasm, and attitude)</li> <li>• <b>Participant responsiveness:</b> A measure of participant response to program sessions, which may include indicators such as levels of participation and enthusiasm.</li> </ul>	<p><b>No definitions</b></p>	<ul style="list-style-type: none"> <li>• <b>Converting input to outputs (organisational function)/project management aspects</b> Assesses aspects such as; resource availability, causes of resource delays, causes of cost overruns, staffing issues and staff tasks, and effects of implementation delays on funding.</li> <li>• <b>level of institutional support</b> Relates to an assessment of partnering institutional agencies and community organizations (for example, N.G.O's, local government, and academia) efforts in relation to their roles towards achievement of project goals</li> </ul>

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

	<p>assess . An assessment of organizational function should also evaluate <b>programme support functions</b>. Programme support functions could include public relation to enhance programmes image with potential sponsors, staff recruitment and training, project management, accountability and finance.</p>	<p>integrity are measured).</p> <ul style="list-style-type: none"> <li>• <b>Context:</b> Measuring aspects of the larger social, political and economic environment.</li> <li>• <b>Recruitment:</b> assesses procedures employed by programme organisers to recruit staff and target groups.</li> </ul>			
<p><b>6. Instruments for assessing critical components</b></p>	<p><b>Assessing service utilization,</b> coverage (use of needs assessment reports, programme records, for example (screening criteria for programme intake), service records, programme participant surveys and community surveys, census data.</p> <p><b>Assessing organizational Function.</b> -Specification of services and programme support functions in operational terms through (observation, story-telling, document analysis)</p>	<p><b>Assessing reach</b> (programme records, census data)</p> <p><b>Assessing dose received</b> (participant surveys, observation)</p> <p><b>Assessing fidelity</b> (observation, checklist of core intervention components, observation guide, surveys).</p>	<p><b>Exposure</b> (Questionnaires, observation, interviews, logs)</p> <p><b>Dosage</b> (Questionnaires, observation, interviews, logs)</p> <p><b>Quality</b> (Questionnaires, interviews, logs).</p> <p><b>Participant responsiveness</b> (Intervention facilitator questionnaires, Observation, Teacher logs).</p>	<p><b>Assessing participant descriptors and compliance</b> (Client files, Programme records, participant assessment forms)</p>	<p><b>Assessing Organisational function :</b> Gantt charts, logical framework analysis, network based systems for physical and financial monitoring</p> <p><b>Assessing Beneficiary participation:</b> participant observation, rapid surveys, direct observation, and interviews with key informants.</p>
<p><b>7. Aspect of Assessment Approach</b> <b>Contributing to the identification of critical themes of</b></p>	<p>This approach while outlining the development of a comprehensive evaluation framework, reveal aspects of programme implementation processes which necessitate assessment. The approach</p>	<p>Due to the extensive process assessment carried out in this study, it made important contributions to the development of process assessment methods and theory. As such, while this</p>	<p>The primary aim of this approach is to identify common areas to assess in on-going programme implementation, to ensure fidelity of a programme to its plan. A rural ICT process assessment by definition, seeks to determine how</p>	<p>This approach differs from other programme evaluation approaches discussed. It differs in the sense that participation of target audiences is mandatory. Whilst participation is</p>	<p>Considering the previous linkages identified between social programmes and rural ICT projects, it could be useful to review and evaluate the aspects of rural ICT projects which correspond to aspects identified in this approach. For example, both social programmes and rural ICT</p>

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

<p><b>process assessment in Rural ICT</b></p>	<p>highlights the need to assess <i>service utilization</i> and <i>organizational function</i>. Considering that rural ICT projects consist of target audiences who are encouraged to utilize provided ICT services, this could be a useful theme to assess in rural ICT projects. Secondly, rural ICT projects, like every programme or project requires proper management. As such it could essential to assess how well a rural ICT project is organizing its functions, to ensure service provision and use of services.</p>	<p>approach is a health related programme intervention, it does aid in highlighting critical aspects to assess, in programmes where services are provided to targeted recipients. In addition, this text provides a variety of potential instruments which could be employed for the assessment of aspects identified which are applicable to rural ICT project process assessments. As such, considering rural ICT projects provide services to rural dwellers, they could adopt from aspects identified in this text. This text also aids in confirming whether or not critical aspects identified in other programme process assessment approaches are common across all programme process assessments texts analysed.</p>	<p>well a rural ICT project is operating to implement its intended function in an intended way as stipulated in the project plan (Pade-Khene and Sewry, 2011: 174). As such rural ICT projects could adopt common areas to assess while attempting to potentially achieve programme or project fidelity.</p>	<p>mandatory due to the nature of the programme (drug court programme), the approach through lessons learned does highlight useful factors which could affect any process evaluation attempt regardless of sector or programme type, including rural ICT projects. Furthermore, it does highlight potential instruments which could be used to collect data on participation rates of targets. Highlighted instruments could be compared with suggested methods and instruments for analysing similar themes found in other programme approaches discussed.</p>	<p>projects require the execution of processes, which will convert project inputs to outputs. Secondly both project types have target recipients. Furthermore, considering that this approach identifies necessary implementation areas specific to evaluation at the project level and projects executed in local contexts, similarities could be drawn to rural ICT projects. Appropriate instruments for assessing identified critical themes are also highlighted.</p>
<p><b>8. Contextual themes (Moderating variables)</b></p>	<p>None identified</p>	<p>-Physical, social and political environment that could affect intervention implementation.</p>	<p>-Programme facilitator attitude and administrative support for programme.</p>	<p>Social Factors e.g. family issues, health issues, employment, or emotional problems.</p>	<p>None identified</p>
<p><b>9.Lessons Learned</b></p>	<p>-Monitoring service utilization is particularly critical for programs that are voluntary or in which participants must learn new procedures, change their habits or take instruction.</p> <p>-In practice setting criteria for judging assessment findings is not that easy. In such cases, use of administrative standards, project objectives, professional standards, and ethical standards, could be useful.</p>	<p>-Reach, dose delivered, dose received, fidelity, context and recruitment are considered critical areas of data collection. However if there are constraints such as time and resources, data should at least be collected on reach, dose delivered, dose received, and fidelity.</p> <p>- Critical theme selection is essential for evaluation question selection.</p> <p>-Consistent measurement</p>	<p>-It is suggested that information about the critical components (themes) of a programme should be elicited from the programme developers, written materials produced by the developers, and those involved in the implementation of the programme.</p> <p>-Some define critical components/themes as the elements of the intended programme model as defined by developers and users, others define critical components as</p>	<p>-It was indicated that there was a great deal of missing information (about 20%) on any given variable that needed to be measured. Due to missing data points, usually on the first iteration of a process assessment, instrument options are forced or improvised. Consequently, it is suggested that realization of critical data elements to be collected in a process assessment is a learning area for most new programmes. Finally, it is indicated that</p>	<p>- At project implementation stages, it is particularly important to pay attention to the mobilization and procurement of financial, material, and human resources. This as it is indicated is because contracting of technical staff and procurement of resources are complex tasks.</p> <p>-In project implementations, the procurement phase is usually the cause of cost over-runs and delays that arise in projects.</p> <p>-Monitoring of inputs-outputs processes consist mainly of organisational functions</p>

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

		<p>terms (critical process themes) across sector programme efforts, will aid in comparing process assessment results across sites.</p> <p>-Answering all potential process assessment questions is not a feasible task, therefore, questions need to be prioritized, based on certain criteria.</p> <p>-Process assessment question identification should be done in collaboration with the project team.</p>	<p>those elements of interventions that have been shown through empirical studies to have a significant relationship to desired outcomes. While one point of view has to do with intent. the other has to do with proven effectiveness.</p> <p>Neither point of view is absolute nor are they mutually exclusive. Rather, the definitions complement one another in an iterative process.</p> <p>- With regard to programme enactment in varying sites, given that adaptation happens, the desire for parallel results across sites does not accommodate the dynamism of intervention enactment in the real world.</p>	<p>intervention implementers in subsequent iterations of a projects life cycle become better aware of needed data for a process assessment.</p> <p>- Moderating variable types which affect outcomes in a particular programme, if measured for similar programmes by different implementers might not indicate correlation to outcomes.</p>	<p>necessary to ensure implementation success. Aspects monitored here include; timeliness of equipment and material procurement, cost over runs, and staff recruitment issues. Consequently, findings from such monitoring processes should be used to prepare progress reports which will inform diagnostic studies.</p> <p>-In the implementation phase of projects, diagnostic studies or process assessments are conducted where problems are identified from progress reports. Aspects which could necessitate evaluation here include; beneficiary participation and beneficiary opinions on project activities, project bias towards certain groups, and service delivery aspects. Based on evaluation findings, appropriate adjustments are made to project implementation.</p> <p>-Projects are increasingly applying flexible participatory approaches to define project objectives. With this approach, elicited input from project beneficiaries aid in identifying project objectives over a period of time. As such, establishing objectives at the start of projects is difficult to achieve. Consequently, setting criteria for evaluation could become a challenge.</p>
<p><b>10. Limitations of Assessment Approach</b></p>	<p>-Text did not specify the most preferred or more effective instruments for assessing aspects of organizational function.</p>	<p>None identified</p>	<p>Assessment Approach did not address reach properly. Reach as indicated in other theories, is the extent to which the target population participates in the programme.</p>	<p>Instruments and methods for measuring themes are not properly covered.</p> <p>Data collected pertained to only participant characteristics and not programme characteristics.</p>	<p>None identified</p>



### 4.5.2 Summary of Analysis of Critical Themes of Process Assessment in Social Programmes

Reading through the definitions in table 4.2, it may be observed that critical themes of social programme process assessments identified can broadly be classified into three aspects or themes: Themes that relate to *programme beneficiaries*, themes that relate to *programme provider functions* and themes that are *external to a programme* but relevant to programme outcomes.

The following aspects across assessment approaches analysed relate to *programme beneficiaries*: service utilization (Assessment Approach 1), reach (Assessment Approach 2), dose received (assessment approaches 2 and 3), participant responsiveness (Assessment Approach 3), participant descriptors (Assessment Approach 4), participant compliance (Assessment Approach 4), and beneficiary participation (Assessment Approach 5). Although these aspects are labelled differently across assessment approaches, they are either attempting to assess the extent to which prospective targeted audiences are being reached or the extent to which these participants receive units they are meant to receive from the intervention sessions or services being delivered. As implied by Rossi *et al.*, (2004), assessing aspects related to programme participants is critical for programmes which are voluntary or in which participants must learn new procedures, change their habits, or take instruction. Considering that for potential beneficiaries, participation in rural ICT projects is voluntary, it may be assumed that it is critical to assess the following aspects identified which relate to programme participants.

The second aspect which came across as critical to assess from social programme process assessments analysed, are aspects which relate to *programme provider functions*. It can be observed through comparing definitions that the following aspects across assessment approaches analysed relate to programme provider functions: organizational function and programme support functions (Assessment Approach 1), dose delivered, fidelity (quality) and recruitment (Assessment Approach 2), exposure and quality (Assessment Approach 3), service provision (Assessment Approach 4) and converting inputs to outputs (Assessment Approach 5). Although labelled differently across assessment approaches, these themes either attempt to assess the extent to which programme providers perform their function with regard to delivery of services (units delivered), or assess how they perform their management and programme support functions. For many programmes or projects that fail to show impacts, the problem is a failure to deliver the interventions (service units) specified in the programme

design; a problem generally known as implementation failure (Rossi *et al.*, 2004). Furthermore, poorly managed projects are a major cause of rural ICT4D project failures (Walton and Heeks, 2011:7). Therefore, a critical aspect to monitor while implementing any programme or project are the service delivery aspects and management functions of programme providers.

From social programme assessment approaches analysed the third aspect which came across as critical to assess, are themes which are external to programmes, but viewed as influences on programme outcomes, and as such, deemed essential to monitor. These themes could either be classified as contextual factors, or level of institutional support. Assessment Approach 2 defines contextual factors as aspects of the larger social, physical or political environment, which may affect a programme's implementation outcomes. Two other assessment approaches analysed (assessment approaches 3 and 4) acknowledge contextual aspects as critical to assess. However, they do not explicitly define them as contextual factors.

An understanding of local context is an imperative factor to consider, while attempting to ensure that rural ICT projects provide services that are properly tailored to beneficiary needs (Musa, 2006: 213; Bailey, 2009: 12). Furthermore, rural ICT projects must continually adapt to specific local contexts which they are implemented in, if they are to remain sustainable (Bailey, 2009: 12). As such, it is considered useful to assess contextual factors in rural ICT projects, to gain an adequate understanding of social, economic and political factors to take into consideration while implementing such projects. Finally, one of the assessment approaches analysed (Assessment Approach 5) indicates the need to assess the level of institutional support provided to a programme, and considers this as a critical theme. McNamara (2003) and Walton and Heeks (2011) suggest that, ICT4D projects cannot operate in isolation. Such projects need to establish partnerships with local institutions and other type of institutions, if they are to remain sustainable (Walton and Heeks, 2011: 6). Therefore, it is crucial to monitor such aspects to ensure there is an adequate level of support from local partnering institutions.

Based on the analysis above, there are a number of critical themes in the process assessment of social programmes which may be applicable to rural ICT projects. The necessity to adopt themes from social programmes as indicated earlier on is based on the fact that the primary objective of both social programmes and rural ICT project's is to provide services to

marginalized groups, which will support development of such groups. Therefore, rural ICT projects need to assess themes related to programme participants, project functions and external project factors. A variety of methods and procedures are highlighted to assess identified critical themes. These methods and procedures are highlighted in the instrument for assessing critical theme section (No.6) of Table 4.2. Furthermore, these methods are compared and contrasted in a later section of this chapter.

### **4.6 Identifying Critical Themes of Process Assessment from select Information Systems Evaluation Approaches**

While rural ICT projects are social programmes, they are also considered to be information systems (IS) projects, as they involve the use of information systems as development enablers. Evaluation of information systems is a difficult and complex task (Cronholm and Goldkuhl, 2003: 65; Fortin *et al.*, 2004: 518, Gichoya, 2005: 178; Hallikainen and Chen, 2006: 57; Woksepp and Olofssen, 2008: 2). This may be due to the fact that the cost and benefits associated with I.S investments are uncertain and difficult to measure (Woksepp and Olofssen, 2008: 2). Furthermore, due to its context specific nature, what constitutes successful results or benefits from I.S investments may vary from one group of actors to another (Fortin *et al.*, 2004: 518). Thus, there exist many evaluation approaches to assessing information systems projects. While a multitude of approaches exist (Fortin *et al.*, 2004: 518; Woksepp and Olofssen, 2008: 3), it should be noted, that the variation or number of existent approaches do not validate some as right, and others as wrong. As suggested by Gichoya (2005: 178), no single information systems evaluation method can be applied to all situations. The type of evaluation implemented may depend on the stage in a projects lifecycle, theoretical model or concept, expected benefit (quantitative or qualitative), and stakeholders involved (Fortin *et al.*, 2004: 518; Hallikainen and Chen, 2006: 57).

In the past, I.S evaluation exercises concentrated more on quantitative methods, which sought to determine the ratio of cost to benefits produced by the information systems investments (Fortin *et al.*, 2004: 519; Woksepp and Olofssen, 2008: 2). While such assessments are necessary, they fail to account for intangible benefits (Woksepp and Olofssen, 2008: 2). As such, to account for other aspects not related to costs and benefits, there is a need for the application of evaluation approaches that take other project aspects not related to financial costs into consideration. Considering that information systems by themselves serve little or no purpose, but are only valuable when used by people, evaluation frameworks that look at

people and their situated use of technology is an imperative area to concentrate on in information systems evaluation studies. As suggested by Pade-Khene and Sewry (2011), a major part of rural ICT projects implementation phase, (the phase a process assessment concentrates on) is service utilization. Hence, it is imperative to focus on use aspects of IS evaluation, to determine themes which should be considered where rural beneficiaries are employing ICTs to support their livelihoods. As defined by Carlsson (2003:11), information systems evaluation exercises should involve the assessment of various aspects of real life interventions in the social life, where the information systems constitute critical means of achieving interventions anticipated goals. To assess human aspects related to information systems use, quantitative, as well as, qualitative processes or methods could be utilized (Cronholm and Goldkuhl, 2003: 65).

Theoretical frameworks may be used to guide evaluation of I.S projects, and the methodology chosen is closely related to the theoretical approach chosen (Fortin *et al.*, 2004: 521). Furthermore, based on the contextual situation of the I.S project, a triangulation of quantitative and qualitative methods could be employed (Fortin *et al.*, 2004: 521; Wagner *et al.*, 2005: 36). In the selection of theoretical frameworks to employ, evaluators should consider frameworks that take into consideration the fact that information systems projects are implemented to be used by humans in particular contexts. As empirical evidence indicates, people can and do redefine and restructure meanings, applications and properties of technology after development (Orlikowski, 2000: 405). Furthermore, while some researchers believe that there are enacted structures preconceived by technology developers, Orlikowski (2000: 405) suggests that technology structures only emerge or are brought about, by recurrent practices of social structures with technology use. Thus a look at technology must be complemented with a look at the social, structural and cultural context in which it is used.

As mentioned earlier, the stage of a projects life cycle is also a determinant of how an I.S project's evaluation should be conducted. Considering this research seeks to identify critical areas that necessitate assessment in a process assessment of rural ICT projects, it may be useful to identify I.S evaluation theories which relate to evaluation aspects of I.S in use. This is because for a process assessment of rural ICT projects, service utilization is a critical aspect to evaluate (Pade-Khene and Sewry, 2011: 174). Fortin *et al.*, (2004: 520) suggest that at the stages of emergence and implementation of technology, evaluation should involve an assessment of an I.S's potential for diffusion, and the conditions that will ensure

sustainability. Cronholm and Goldkuhl (2003: 65) refer to such evaluations as formative, and imply that they are useful for providing feedback to designers and implementers of the information systems.

Wagner *et al.*, (2005: 36) highlight the need to select monitoring and evaluation indicators when considering I.S evaluations. Furthermore, they suggest that the identification, selection and prioritization of these indicators or assessment areas are critical before evaluation of I.S investments can be conducted. Wagner *et al.*, (2005: 36) suggest two factors that are important for evaluators to consider when anticipating what aspects or assessment areas to focus on. Firstly, they indicate that due to factors such as cost, indicators must be prioritized, as all possible indicators cannot be measured. Secondly, they suggest that prioritization may be informed by, implementation plans, strategy documents or other project documentation. However, other schools of thought believe that critical areas of assessment should be determined as areas, which through empirical evidence have shown correlation to desired outcomes. In retrospect of the need for empirical evidence, Delone and Mclean (2003) suggest that process models or strategy documents should be complemented with causal models, to help identify indicators to be prioritized in I.S research. Smith (2006) dispels the postulation put forth by Delone and Mcleane. He Smith (2006) argues that information systems research theories that subscribe to total reliance on empirical evidence are flawed. Reason being, such empirical or positivist methods do not take into consideration the idiosyncrasies of various contexts and social dynamics that affect the relationship between input and output variables. For instance, some theories or models may indicate a statistical correlation between system use and worker productivity. However, this does not take into consideration that organizational culture (a social or context factor) could affect pattern of use and thus also affect worker productivity. This is not to completely rebuff the existence of scientific laws, as Smith (2006: 192) states

*“Rejecting any regulation of our knowledge by empirical data afforded us by the objective world, would mean giving up on the practice of science”.*

However, it means that I.S evaluation models or theories that subscribe to quantitative approaches should be better integrated with interpretative approaches, where attempting to explain phenomenon of I.S use. Therefore, just like the critical realism theory integrates positivist and interpretativist views, to close the theory practice gaps in information systems research (Carlsson, 2003; Smith, 2006), it may be useful to study various I.S evaluation

models and theories to aid in identifying critical areas that necessitate assessment in rural ICT for development project implementation and diffusion.

#### 4.6.1 Criteria for Selection of Approaches which identify Critical Themes of Process Assessment in Information Systems Projects

Cronholm and Goldkuhl (2003) provide a useful framework for selecting models or theories when evaluating I.S projects. Using a table format, they describe six different information systems evaluation types. Furthermore, they highlight factors that models or theories which guide each evaluation type should contain. Table 4.3 below highlights the six evaluation types.

*Table 4.3: Six types of generic information systems evaluation types*

	<b>IT systems as such</b>	<b>IT systems in use</b>
<b>Goal Free- Evaluation</b>	Type 1	Type 4
<b>Goal Based Evaluation</b>	Type 2	Type 5
<b>Criteria Based Evaluation</b>	Type 3	Type 6

The two strategies highlighted in the columns; “IT systems as such” and “IT systems in use” are a representation of what is to be evaluated. According to Cronholm and Goldkuhl (2003: 67) information systems evaluation can either involve evaluation of information systems by themselves (Information systems as such) or information systems used by people (Information systems in use).

With respect to the strategies displayed in the rows of Table 4.3; Cronholm and Goldkuhl (2003: 65) indicate that they represent how to evaluate. As Table 4.3 depicts, there are three strategies in this category; Goal Free Evaluation, Goal Based Evaluation and Criteria Based Evaluation. They are differentiated in relation to what drives the evaluation (Cronholm and Goldkuhl, 2003: 65):

- Goal free evaluation: Is an inductive type of evaluation and situation driven (Patton, 1990). Cronholm and Goldkuhl (2003: 67) suggest that this evaluation could be specific to an organization. However, it is not based on set goals. Rather, the aim of the evaluation is to gain a deeper understanding of the nature of what is to be evaluated and

to generate motivation and commitment from varying stakeholders (Hirschheim and Smithson, 1988) in (Cronholm and Goldkuhl 2003) .

- Goal based evaluation: This evaluation type posits that explicit goals from an organizational context will drive an evaluation (Patton, 1990) in (Cronholm and Goldkuhl 2003). These evaluations seek to measure the extent to which an intervention has attained clear and specific set goals (Patton, 1990) in (Cronholm and Goldkuhl 2003). Goal based evaluations are also referred to as formal rational, that is they concentrate on calculating likely costs and benefit derived from I.S investments (Cronholm and Goldkuhl, 2003: 66). Hirschheim and Smithson (1988) in Cronholm and Goldkuhl (2003) however suggest that a commonly associated flaw with this approach is that there is too much emphasis on economical aspects and little concentration on social impacts.
- Criteria based evaluation: Involves the use of some explicit general criteria as evaluation yardsticks (Cronholm and Goldkuhl, 2003: 67). Criteria based evaluation entails focusing on measuring certain qualities that are deemed important in interventions (Cronholm and Goldkuhl, 2003: 67). Criteria derived are not specific to a particular organizational context but are meant to be generic (Cronholm and Goldkuhl, 2003: 67).

### **Evaluation types**

- Type 1 is a combination of IT systems as such and goal free evaluations.
- Type 2 is a combination of IT systems as such and goal based evaluations.
- Type 3 is a combination of IT systems as such and criteria based evaluations.
- Type 4 is a combination of IT systems in use and goal free evaluations.
- Type 5 is a combination of IT systems in use and goal based evaluations.
- Type 6 is a combination of IT systems in use and criteria based evaluations.

As established earlier, information systems are developed to be used by people. Furthermore, this research is attempting to identify critical aspects relevant to the implementation and diffusion of I.S in rural areas. As such, the I.S evaluation theories or models chosen to be analysed will be those related to “information systems (I.S) in use”. Furthermore, the research



is attempting to identify critical areas of assessment generic to rural ICT projects and not those specific to a particular organization. Therefore, the criteria based evaluation strategy is used. This indicates that evaluation models or theories selected to identify critical themes relevant to rural ICT project process assessments will have characteristics of Type 6 evaluation.

Criteria identification could be grounded in and derived from one or more theories or models (Cronholm and Goldkuhl, 2003: 67). Therefore, to identify the relevant critical themes that necessitate assessment in the diffusion and use of I.S by rural dwellers, several I.S evaluation theoretical frameworks will be reviewed. Integrating frameworks may be challenging, but it will allow for a deeper understanding of ICT projects issues (Fortin *et al.*, 2004: 520). Firstly, the selected assessment approaches are briefly reviewed individually. Appendix B provides a summary of each reviewed Assessment Approach. The assessment approaches are analysed according to the template highlighted earlier on. It should also be noted that this is not an exhaustive list of information systems models which may reveal critical aspects to assess where information systems are being used. As such, further research may apply the outlined template to aid in identifying critical themes to assess where information systems are being employed. Other criteria for selection of I.S assessment approaches to be analysed are as follows:

- Assessment approaches selected to some degree should be able to be explained in terms of the template described.
- Assessment approaches selected should identify generic factors or aspects which necessitate evaluation at the implementation stages of ICT4D projects.
- Assessment approaches selected should identify critical themes relevant to the micro-level of ICT4D project implementations.

Table 4.4 below indicates and illustrates similarities and differences between selected assessment approaches and aspects they consider critical to assess where information systems are being used.



Table 4.4: A review of critical evaluation aspects of Information systems in Use

	Assessment Approach 6	Assessment Approach 7	Assessment Approach 8
1. Title/Model	<b>The Delone and McIene model of information systems success: A ten year update</b>	<b>Technology Acceptance Model</b>	<b>Using Technology and Constituting structures: A Practice lens for studying technology in Organizations</b>
2. Organization(s)/ Author(s)	Delone and McIene (2003)	Chismar and Wiley- Patton (2002); Davis (1989); Malhotra and Galletta (1999); Park (2009); Lederer, Maupin, Sena and Zhuang (2000)	Orlikowski (2000)
3. Purpose of Assessment Approach	A summary of research contributions to the Delone and McIene Information systems success model developed in 1992. The Assessment Approach highlights research efforts that validate the model, and research efforts that challenge the model. Enhancements to the original model highlight how the model can be employed for measuring success of e-commerce systems. Overall it is suggested that many empirical studies have validated the model as a viable tool for measuring information systems success.	The model seeks to explain user behaviours primarily responsible for adoption and subsequent use of technology.	A proposed extension to structural perspective on technology. Through the development of a practice lens, the Assessment Approach attempts to examine how people, as they interact with a technology in their recurring practices, enact structures that shape their emergent and situated use of that technology.
4. Critical Themes identified	<ul style="list-style-type: none"> <li>• <b>Use</b> <ul style="list-style-type: none"> <li>- <b>Information Quality</b></li> <li>- <b>System Quality</b></li> <li>- <b>Service Quality</b></li> <li>- <b>Intention to use/ use</b></li> <li>- <b>User-satisfaction</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Use</b> <ul style="list-style-type: none"> <li>- <b>Perceived usefulness</b></li> <li>- <b>Perceived ease of use</b></li> <li>- <b>Intention to use</b></li> <li>- <b>Social factors</b></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• <b>Use</b></li> </ul>
5. Definition of critical themes/areas of assessment	<ul style="list-style-type: none"> <li>• <b>Information quality:</b> Assesses the degree to which information provided by the IS conveys the intended message in an intended way. Some success metrics include; information relevance, ease of understanding, accuracy of information, completeness, timeliness and usability.</li> <li>• <b>System quality:</b> Assesses the degree to which the system consists of attributes desired by the target user group. Identified measures include; perceived ease of use, system flexibility, system reliability, and response time.</li> <li>• <b>Service quality:</b> Assesses the extent to</li> </ul>	<p><b>Perceived Usefulness:</b> Assesses the degree to which the user believes using information will improve his or her performance, with regard to task performance.</p> <p><b>Perceived ease of use:</b> Assesses the degree to which the user believes the information system use is free of effort.</p> <p><b>Behavioural Intention to use:</b> A measure of the likelihood that a person will employ an information system.</p> <p><b>Social Factors:</b> Assesses an individual's social</p>	<b>No definitions</b>

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

	<p>which the information systems users receive support functions from the information systems creators or personnel. Some indicators of service quality are; empathy of I.S personnel, responsiveness and technical competence.</p> <ul style="list-style-type: none"> <li>• <b>Intention to use or use:</b> Assesses the degree to which the information systems are used by the target population. Some measurement aspects of use include; nature of use, frequency of use, and appropriateness of use</li> <li>• <b>User satisfaction:</b> Assesses the level of satisfaction from the user's perspective with the systems functionality. Use and user satisfaction are closely related, and while in a process sense use precedes user satisfaction, in a causal sense, positive experience with use will lead to greater user satisfaction and consequently greater use (Delone and McIene, 2003: 23). Some aspects to measure here include, support services, and satisfaction with system functionality.</li> </ul>	<p>motive for using an information system.</p>	
<b>6. Instruments for assessing critical themes</b>	<b>Surveys or Questionnaires</b>	<b>Surveys or Questionnaires</b>	<b>None Identified</b>
<b>7. Aspect of Assessment Approach contributing to the Identification of Critical Themes of Process Assessment in Rural ICT.</b>	<p>This approach highlights essential aspects to assess in the use of information technology by humans. While the main theme highlighted here is 'Use'. Sub-themes which influence the use of information systems are also highlighted. Considering rural ICT projects aim to encourage the use of information systems by rural dwellers, factors which influence use of information systems identified in this approach could aid in highlighting critical aspects which influence use of information systems in rural ICT projects. This approach is selected, because it is a widely popular approach for explaining factors which influence use of information systems.</p>	<p>Literature on Information systems acceptance and usage indicate that TAM is currently one of the most relevant models to employ in research relating to user acceptance of technology (Malhotra and Galletta, 1999: 1). For a rural ICT project, this implies the need to assess factors which contribute to sustainable use of ICTs. It accounts for 40 percent of variance, explaining user adoption of technology.</p>	<p>The technology in practice approach is an analytical approach. While it does not highlight any assessment areas per say, it does aid in analysing and explaining reasons for emergent structures formed by humans in their recurrent interactions with technology. For a rural ICT project, it could aid in explaining factors responsible for observed use patterns of ICTs by rural dwellers.</p>
<b>8.Contextual themes which influence information systems</b>	<ul style="list-style-type: none"> <li>• User Involvement</li> <li>• Top management support</li> </ul>	<ul style="list-style-type: none"> <li>• Self efficacy</li> <li>• System accessibility</li> </ul>	None identified

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

use (moderating variables)		<ul style="list-style-type: none"> <li>• Management support</li> <li>• Trust</li> </ul>	
<b>9. Lessons Learned</b>	<ul style="list-style-type: none"> <li>• Selection of measurement areas should be dependent on the objective and context of a study. However where possible, measurement areas should be chosen that have proven through empirical evidence to significantly affect outcomes.</li> <li>• An attempt should be made to reduce significantly, the number of measurement areas of Information systems success. This will consequently allow comparing results between sites.</li> <li>• Measures of use should not be limited to frequency of use, but should also capture aspects such as nature of use, level of use and appropriateness of use.</li> </ul>	<ul style="list-style-type: none"> <li>• Organizations are advised to create opportunities which allow end users to participate in the decision to adopt new technologies. It is suggested that such participation increases the possibility that the chosen information system fits their pre-existing values.</li> <li>• Considering that perceived usefulness is a major construct which affects use of information systems, organizations could potentially invoke a higher level of commitment from users, by educating them about the need and relevance of chosen information technologies and how they support organizational performance. For a rural ICT project process assessment, this requires an assessment of organizational efforts to orient rural dwellers about the potential of ICTs to support development.</li> </ul>	None identified
<b>10. Limitations of Assessment Approach</b>	<p>-Instrument not properly covered</p> <p>-While the approach seeks to identify factors which affect use, the primary purpose of identifying these constructs is to draw correlation between use and net benefits. As such in this approach, the most important construct is net benefit. Identifying net benefits should be conducted in an impact assessment. Therefore the net benefit construct identified is not applicable to this research.</p>	None Identified	This is an analytical framework, therefore the structuration model does not indicate a measurement process or measurement tools.

#### **4.6.2 Summary of Critical Themes to assess while Information Systems are in use**

The IS assessment approaches selected are those that mainly relate to the use of information systems. Though, *service use* is the major theme identified across all analysed I.S assessment approaches selected, each selected model contributes to the research, by identifying varying aspects which influence the use of an I.S by humans. Two of the three assessment approaches analysed (the Delone and Mcleane I.S success model and the Technology Acceptance Model) attempt to determine from a user's perceptual view, characteristics of an information system which may influence a user's intention to use such a system. It can be observed that assessment approaches 6 and 7, in their definitions of critical aspects, delineate and hypothesise on factors which influence the use of an I.S. Information quality, systems quality, and service quality from Assessment Approach 6 are presumed to affect use, while from Assessment Approach 7 perceived usefulness and perceived ease of use are presumed to affect use. Furthermore, it can be observed from their definitions that they attempt to elicit data on the extent to which these constructs influence use, from a user's perspective.

The last I.S Assessment Approach selected for analysis, does not attempt to hypothesise on the extent to which any constructs influence use. However, it uses a social science related theory to explain in an analytical manner, how structures (social, organizational, technological) may influence the use of ICTs in a particular context after data on ICT use has been collected. Considering that it is only an analytical framework selected to aid in analysing qualitative data on ICT use, it will only be referred to at a later stage of this research.

It can be concluded from I.S evaluation models analysed that critical aspects identified that may be applicable to process assessments of rural ICT4D projects could be considered sub themes of aspects related to programme participants, as ICT use in the rural development context is commonly referred to as use by recipients. Furthermore, aspects identified attempt to assess *a user's perception of ICT service characteristics*. The authors of assessment approaches 6 and 7 subscribe to the use of quantitative techniques (questionnaires) while attempting to test their models in varying contexts of use.

## **4.7 Identification of Critical Themes of Process Assessment from Select ICT4D Assessment Approaches**

Many development experts view ICTs as a tool which creates an opportunity to explore solutions to development challenges which will consequently result in significant contributions to equitable human development (Walton and Heeks, 2011: 1). As such, several rural ICT projects have been implemented. Amongst these implementations, several successful examples exist, which create opportunities for understanding how to approach the use of ICTs to support wide spread alleviation of poverty (Harris, 2004: 5). These examples could present insight into factors which determine success in rural ICT4D project implementations. For example, Walton and Heeks (2011) suggest that monitoring use levels of ICT services among beneficiaries could reveal whether or not services provided are responding to beneficiary demands. Identified success factors highlight implementation aspects which require evaluation. It is essential to note though, that rural ICT project implementations could also learn from failed experiences. Bailey (2009: 1) suggests that while an understanding of factors which underpin successful ICT4D projects is still emerging, implementations of such projects in developing contexts continue. As such, a high number of failure rates of ICT4D projects also exist (Walton and Heeks, 2011: 2). Though failures are often not viewed in a positive light, Walton and Heeks (2011) imply that they create opportunities to extract valuable lessons. Therefore, in addition to success factors, cases which highlight failed implementations could also be useful for identifying aspects that require monitoring in the implementation phase of rural ICT projects. Furthermore, critical aspects identified in this analysis will aid in validating or re-enforcing aspects identified from the social programme analysis and analysis of evaluation of information systems in use. Therefore, through a review of select ICT4D implementation and evaluation cases, critical areas which necessitate evaluation in the implementation phase of rural ICT projects (process assessment) are identified.

### **4.7.1 Criteria for Selecting Rural ICT4D cases to identify Critical Themes of process assessment**

The following criteria are employed, to select ICT4D assessment approaches (cases or frameworks) to be analysed:

- Assessment approaches selected to some degree should be able to be explained in terms of the template described.

- Assessment approaches selected should identify generic factors or aspects which necessitate evaluation at the implementation stages of ICT4D projects.
- Assessment approaches selected should identify critical themes relevant to the micro-level of ICT4D project implementations.

The selected criteria are based on the research questions, literature on process assessment, and literature on critical themes of process assessment. Finally, it should be noted that this is not an exhaustive list, of ICT4D project cases which could aid in identifying critical aspects to assess in the implementation phase of rural ICT4D projects. As such, future research could employ the template used here to further analyse other suitable assessment approaches.

A review of critical themes of process assessment from select ICT4D texts is presented in Table 4.5.

Table 4.5: A review of critical themes of process assessment from selected ICT4D approaches

	Assessment Approach 9	Assessment Approach 10	Assessment Approach 11	Assessment Approach 12	Assessment Approach 13	Assessment Approach 14
<b>1.Title/Model</b>	Can a Process Approach Improve ICT4D Project Success?	Critical Success Factors for Rural ICT Project Sustainability in Developing Countries: Exploring the Dwesa Case	Issues Affecting the Social Sustainability of Tele-centers in Developing Contexts	Ethnographic Approach to User Centred evaluation of Tele-centres	Tele-centre Evaluation: Issues and Strategies	The Development and Implementation of an Evaluation Framework for Rural ICT Projects in Developing Countries: An Exploration of the Siyakhula Living Lab, South Africa
<b>2.Organization(s)/ Author(s)</b>	Walton, M., and Heeks, R. (2011)	Pade, C., Mallison, B., and Sewry, D (2008)	Bailey, A. (2009)	Dey, L, B., Newman, D, R., and Prendergast, R (2010)	Hudson, H, E. (2001)	Pade-Khene C, and Sewry, D. (2011)
<b>3. Purpose of Assessment Approach</b>	This approach seeks to identify critical elements which facilitate success in the implementation of ICT4D projects. To accomplish this, four case studies are analysed. Analysis reveals five critical elements common across the four studies.	This approach seeks to identify management practices and critical factors that are sensitive to rural requirements and promote ICT project sustainability	Through the use of thematic content analysis of empirical observations, this field study seeks to explain the role and usage of tele-centres in developing contexts. Also, it seeks to explain the issues faced by tele-centres in their on-going operations as their roles evolve to address new issues that may arise in communities they serve.	This approach seeks to develop an evaluation framework that explains the dynamic nature of use and appropriation of services of tele-centres by rural farmers. Through the application of an ethnographic approach, the paper explores the services offered by two tele-centres in Bangladesh. The underlying aim is to try to gain an understanding of how target participants perceive the use of tele-centres for their benefit.	This approach seeks to explicate the essentiality of tele-centre evaluation. Furthermore, it attempts to indicate the most essential areas to evaluate.	Though the primary goal of this study is to develop a comprehensive rural ICT evaluation framework, it does discuss critical aspects or themes which necessitate assessment at the implementation stage of rural ICT projects.
<b>4. Critical Themes of process assessment identified</b>	<ul style="list-style-type: none"> <li>• <b>Beneficiary and user participation.</b></li> <li>• <b>Flexibility</b></li> <li>• <b>Learning from errors and experience</b></li> <li>• <b>Institutional support</b></li> <li>• <b>Effective programme management</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Critical success factors (Service Utilization and Organisational function) for sustainability</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Service utilization</b> -bias</li> <li>• <b>Flexibility of project staff to emergent community needs</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Service utilization</b> -Information relevance and service usefulness</li> <li>-ease of use</li> <li>• <b>Alignment of implementation with rural life style.</b></li> <li>-Reasons for non participation</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Users application of ICT services and usage trends:</b></li> <li>-Volume of users</li> <li>-User characteristics</li> <li>-usage trends</li> <li>- frequency of use</li> <li>• <b>Staff skills and performance</b></li> <li>• <b>Facilities</b></li> <li>• <b>Information content and traditional information flows.</b></li> <li>• <b>Organisational</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Service utilization:</b> -coverage</li> <li>-bias</li> <li>• <b>Organisational Function.</b></li> <li>• <b>Flexibility</b></li> </ul>

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

					<b>factors which promote sustainability:</b> (Cost and revenues, staff competencies, and stake holder commitment to telecentre continuity)	
<b>5. Definition of critical themes/areas of assessment</b>	<p><b>Beneficiary and user participation:</b> can be defined as the extent to which participants are involved in all aspects of the project. Also includes the extent to which beneficiaries use services.</p> <p><b>Flexibility:</b> The extent to which ICT4D projects adapt solutions based on feedback and experimentation.</p> <p><b>Learning from errors and experience:</b> A projects ability to learn from past errors and experiences.</p> <p><b>Institutional support:</b> The extent to which local institutions are involved in project activities.</p> <p><b>Effective programme management:</b> The extent to which a project maintains a flexible, creative, professional, motivated and well qualified leadership which ensures proper management of the project.</p>	None Identified	<p><b>Service utilization:</b> none identified</p> <p><b>Flexibility of project staff to emergent community needs:</b> As implied is the extent to which tele-centre staff acquire new skills based on emergent and changing community needs</p>	None Identified	None identified	<p><b>Service utilization:</b> assesses the extent to which the ICT services reach the intended target population.</p> <p><b>Organisational function:</b> Assesses how well the ICT project is effectively organizing its efforts and using its resources to perform essential tasks.</p> <p><b>Flexibility:</b> Assesses the adaptability of the rural ICT project to changes in the rural environment and demand driven needs in the community.</p>
<b>6. Instruments for assessing critical themes</b>	None Identified	Observation and Interviews	<p><b>Service utilization:</b> Interviews and Observation</p> <p><b>Flexibility:</b> interviews and observation.</p>	Informal interviews, focus groups and observation	<p><b>Service utilization:</b> Logs, programme records, interviews</p> <p><b>Information content and traditional information</b></p>	<p><b>Service utilization:</b> Questionnaires, storytelling, log sheets, records, observation and participant observation</p>



## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

					<b>flows:</b> Interviews.	<b>Organizational function:</b> Questionnaires, storytelling, log sheets, records, interviews, audio and video recording, photographs, observation and participant observation, document analysis ( <i>eg progress report, project proposal</i> ), workshops  <b>Flexibility:</b> Tracer studies
<b>7. Aspect of Approach Contributing to the Identification of Critical Themes of Process Assessment in Rural ICT.</b>	Common causes of ICT4D failure that are highlighted, suggest aspects which necessitate monitoring in the on-going implementation of rural ICT projects.	Critical factors that are sensitive to rural requirements and promote ICT project sustainability are identified. The identified critical factors aid in highlighting stakeholder practices that necessitate assessment in the implementation phase of the rural ICT projects, to support project sustainability.	This approach attempts to propose factors which affect social sustainability of tele-centres. It is suggested that an understanding of the social context in which a tele-centre is situated, allows for the identification and development of tele-centre staff capabilities essential for responding to community needs. It is further suggested that in addition to core competencies tele centre staff are expected to possess at the start of tele-centres, they are required to develop core competencies based on changing user needs. For this research, this approach therefore suggests the need to carry out an assessment of the social context in which a rural ICT project is implemented in. Furthermore, it suggests the need to compare elicited user needs with competencies possessed by tele-centre staff.	Use being identified as a critical aspect for tele-centre effectiveness, it is implied that certain factors affect use, and as such must be examined in tele-centre evaluation activities. For this research, this approach highlights the critical need to assess use issues and factors that affect target users adoption of technology in development efforts.	This approach attempts to indicate the most essential areas to assess in the on-going operation of tele-centres. As such, directly contributes to this research.	This approach highlights three critical themes of process assessment in rural ICT projects. As such, directly contributes to this research.

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

<b>8.Contextual themes (moderating variables)</b>	None Identified	None identified	None Identified	Social structures	None identified	None identified
<b>9.Lessons Learned</b>	- It is indicated that while aspects or elements identified here are critical to the success of ICT4D projects, they are not enough to guarantee success. Aspects such as government actions and policies which are external to the project, are also essential determinants of success.	-To be considered successful a rural ICT project needs to be sustainable in addition to being implemented.	- The role of tele-centre staff is pivotal to user involvement. Users have varying needs and as such, the need for tele-centre staff to have the ability to recognize the information and communication needs of the users and tailor the services offered to meet those needs is imperative.  - With the evolving and continuous use of tele-centres, information and communication needs will change. It is therefore essential for tele centre staff to identify changing needs and acquire the competencies relevant to changing needs.  -It is recommended that the dynamic capabilities theory could be useful in informing future research on tele-centres.	- The Technology acceptance model does not take into consideration social factors which could affect user adoption. It is therefore important to incorporate frameworks which identify social factors which affect user adoption. This is based on the fact that rural ICT projects are implemented in varying social contexts, and as such in addition to perceived usefulness and ease of use, highlighted as determinants of use by the TAM, there are varying social factors which affect user adoption.	None identified	None identified
<b>10. Limitations of Assessment Approach</b>	This approach is not necessarily centred on ICT4D evaluation. It attempts to highlight essential elements of ICT4D which could be responsible for success or failure of such projects. As such, while it does attempt to indicate the most essential aspects to monitor in ICT4D implementations, it does not indicate instruments which could be used to measure the performance of these elements	None identified.	For rural ICT project sustainability, there are five common discussed categories (financial, social, institutional, technological and environmental sustainability). However, this approach only highlights factors which affect social sustainability. As such, it only suggests the assessment of factors which promote social sustainability in the on-going operation of tele-centres.	Due to the context of the tele-centre being explored in this case (provision of useful information to farmers, on prices, weather conditions, and more efficient farming methods), it is presumed that provision of information is the only perceived usefulness attribute needed by rural tele-centre users. As such, it fails to take into consideration that perceived usefulness could also constitute communication or the use	Though this approach identifies important aspects to assess in the implementation phase of rural ICT projects, these aspects are not clearly defined or differentiated.	Service utilization theme suggests that <b>bias</b> is the only reason for lack of rural ICT service use by target participants. However as the TAM and Delone and McIene model propose, factors such as, perceived usefulness of ICTs, perceived ease of use, system quality, information quality, service quality and social factors could be responsible for the lack of service use by target participants.

## Chapter 4: An Analysis of Assessment Approaches to Identify Critical Themes

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				of web applications, for example, the use of an e-commerce site by rural dwellers to promote or sell their goods, or the use of a web-site to attract tourists to a rural community.		-The approach does not indicate why identified themes are considered critical.
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#### **4.7.2 Summary of an Analysis of ICT4D cases identifying Critical Themes of Process Assessment**

Analysis of select ICT4D cases help to validate or confirm critical themes identified from the analysis of social programme process assessments and analysis of evaluation of I.S in use. These cases aid in confirming, whether or not critical aspects identified from social programme process assessments, and evaluations of I.S in use, are applicable in pragmatic situations to process assessments of rural ICT4D projects. Furthermore, in addition to validating these aspects, analysis of these cases emphasise two essential sub themes not suggested or properly emphasised in the analysis of social programme process assessments or evaluation of I.S in use. Though critical aspects identified from cases analysed either relate to project participants, project implementer functions or external project factors, analysis of ICT4D cases further reveal the essentiality of assessing project *flexibility* and assessing for the presence of factors which determine *sustainability*.

The critical themes identified indicate that the following aspects relate to programme participants or potential beneficiaries: beneficiary and user participation (Assessment Approach 9), service utilization (assessment approaches 11, 12 and 14), user's application of ICT services and usage trends (Assessment Approach 13). Though some of the selected cases do not explicitly define these themes, they do indicate the need to assess or monitor these aspects in the implementation phase of ICT4D projects.

In order to confirm suggestions that aspects related to project implementer functions necessitate assessment in the implementation phase of rural ICT4D projects, Table 4.5 highlights a number of factors across cases analysed, which indicate that such an aspect is critical to rural ICT4D process assessments. As indicated in the critical theme identification section (No.4) of Table 4.5, the following aspects can be said to be related to project implementer functions, effective project management and project flexibility (Assessment Approach 9), flexibility of project staff to emergent community needs (Assessment Approach 11), alignment of implementation with rural life style (Assessment Approach 12), staff skills, staff performance and organizational practices which promote sustainability (Assessment Approach 13), and organizational function (Assessment Approach 14). Some assessment approaches do not explicitly define these aspects. However, they do indicate that they are critical to assess. Though names of aspects relating to project implementer functions vary across cases analysed, these aspects all indicate the need to assess the extent to which project implementers are organizing their efforts and resources to achieve their intended goals.

Though aspect which relate to project implementer functions from analysed rural ICT4D cases are similar to those identified in the analysis of social programme process assessments, it can be observed that cases analysed as part of their *project implementer functions*, indicate the need to assess project *flexibility*. As depicted in the identified critical theme section (No.4) of Table 4.5; assessment approaches 9, 11, and 14 all indicate the need to assess project flexibility. Referring to all of their definitions of flexibility, it can be determined that they all attempt to measure the extent to which rural ICT project have made necessary adaptations to ensure project implementation suits the local context it is being implemented in. Many rural ICT4D projects known for their rigid approach need to become flexible to the rural context in which they are implemented in (Walton and Heeks, 2011: 5). The suitability of rigid approaches for rural ICT4D implementation needs to be questioned, especially where little is known of a context prior to implementing an initiative, as is often the case with ICT4D projects (Walton and Heeks, 2011: 5).

Assessment Approach 10 outlines critical success factors, which promote rural ICT project sustainability. These critical success factors cannot be classified as either relating wholly to project participants or to project implementer functions. Rather, they are shared amongst both critical aspects, where some of the critical success factors relate to potential beneficiaries or project participants and some of these factors relate to project implementer functions.

With regard to external project factors, the only analysed case which suggests the essentiality of assessing such an aspect is Assessment Approach 9. Referring to the definition section (No. 5) of Table 4.5, it can be observed that congruent to social programme assessment approaches analysed, Assessment Approach 9, indicates the need to assess institutional capacity and support in the implementation phase of rural ICT4D projects.

Finally, to demonstrate the relevance of aspects identified from I.S assessment approaches analysed to a rural ICT project's process assessment, Assessment Approach 13, outlines an evaluation case of a rural ICT project in Bangladesh. This case highlights the need to assess aspects emphasised from I.S assessment approaches analysed. It is suggested in Assessment Approach 12, that it is critical in a rural ICT project process assessment exercises, to assess the relevance of information provided and perceived usefulness of ICTs provided to rural dwellers. Though, selected models of evaluation of I.S in use highlight more aspects, for example, perceived ease of use and system quality, Assessment Approach 12, does aid in

revealing that these aspects are relevant to assess in process assessment activities of rural ICT projects.

Methods and procedures employed to assess themes in these cases are highlighted in Table 4.5. It is essential to note though that methods and procedures selected will largely depend on funds available to particular projects (Linnan and Stekler, 2002). As such, decisions on what methods and procedures to employ are context specific to varying projects.

### **4.8 A Comparative Analysis of Identified Critical Themes from all categories**

This section reviews the critical themes identified from the process assessment of social programmes, evaluation of information systems in use and rural ICT project cases. The underlying aim of this review is to identify commonalities and variations among assessment approaches analysed. The identified commonalities and variations, aid in extracting critical themes relevant to assess in the implementation phase of rural ICT projects. Two aspects from the analysed assessment approaches are compared. These will include, the critical themes of process assessment identified, and their measurement instruments. Furthermore, lessons learned and identified limitations from assessment approaches reviewed will be incorporated into this analysis.

### **4.9 Critical Themes Identified across Assessment Approaches**

With regard to the various assessment approaches studied, three themes came across as critical to assess in process assessment activities of rural ICT projects. These include themes related to project recipients, themes related to intervention provider functions (organisational function), and themes that are external to a rural ICT project, but believed to affect project outcomes.

#### **4.9.1. Critical Themes related to Project Recipients**

All assessment approaches studied highlighted the need to assess themes related to project participants. In relation to project participants, the first theme which came across as imperative to assess was participant involvement in project or programme activities. The term participant involvement can be interpreted to mean the extent of attendance and involvement of potential project beneficiaries in programme or project services offered. Services as it is understood from the various assessment approaches analysed may refer to ICT services, educational classes or health services, amongst others.

All social programme assessment approaches analysed, indicate the need to collect data on participant involvement. Assessment Approach 1 by Rossi *et al.*, (2004), termed this as *service utilization*. It is imperative to assess *service utilization* for programmes which are voluntary, or programmes where participants are expected to learn new procedures, change their habits or take instruction. For such projects, it is essential that target participants use services provided, as this is one determinant of project success. Assessment Approach 1 classifies *service utilization* into two sub themes; *Coverage* and *Bias*.

*Coverage* assesses the extent to which target participants use the services provided by a programme or project. Though Assessment Approach 2 by Linnan and Stekler (2002) defines this theme as *reach*, their definition of reach corresponds to that of *coverage*. Assessment Approach 3 by Century *et al.*, (2010), suggest that the critical theme which relates to participant involvement should be labelled, *participant responsiveness*, which they define as a targets level of participation and engagement with provided services. Assessment Approach 4 by Mullany and Peat (2008) indicate the need to elicit data on *participant descriptors*. While Assessment Approach 4 does not explicitly define what participant descriptors should include, the term *participant descriptors* suggests that this theme attempts to identify if potential targets are using services provided. Assessment Approach 5 by Valadez and Bamberger (1994) specifies the need to collect data on beneficiary participation. However, they do not specify what aspects or sub topics necessitate assessment under this theme. Amongst rural ICT project cases analysed, assessment approaches 13 and 14 support the need to assess data on *reach* or *coverage*. Effective interventions aim to reach a sufficient number of participants, therefore, a measurement of *reach* is critical (Linnan and Stekler, 2002). Eliciting data on *coverage/reach* will keep project implementers informed on whether or not ICT services are being used by the intended beneficiaries.

Amongst assessment approaches that highlight the need to assess *coverage* or *reach* (1, 2, 4, 13 and 14), it is agreed that programme records, and log sheets are the preferred way to assess coverage. Programme records may consist of screening criteria for programme intake, service records, attendance records, and records describing participants (Linnan and Stekler, 2002: 13; Mullany and Peat, 2008: 498; Rossi *et al.*, 2004: 187; Saunders *et al.*, 2005: 143). It is essential prior to use of programme records to have an idea of characteristics or attributes which define a target audience (Rossi *et al.*, 2004).

While assessment approaches 1, 2, 4, 13 and 14 propose the use of programme records for assessing coverage, Assessment Approach 1 by Bailey (2009) indicates that many rural ICT projects do not maintain programme records. Furthermore, Assessment Approach 1 by Rossi *et al.*, (2004) suggests that often times such records may be subject to errors. Assessment Approach 2 by Linnan and Stekler (2002), goes on to identify another potential challenge with the use of programme records for eliciting data on *coverage*. In this approach, it is suggested that a potential challenge, is determining the exact levels of targets that participated in an intervention. This could be attributed to fluctuations in attendance, which could create a challenge for evaluators trying to obtain exact participant numbers that completed intervention units over a period of time (Linnan and Stekler, 2002: 13). Where complete programme records do not exist, Assessment Approach 2 suggests, that, a potential way to deal with fluctuations in attendance is to find averages of attendance over a period of time, to determine actual participation. However, another challenge may arise where there is missing data or incomplete programme records. This highlights the need for programmes to keep up to date complete records. To effectively manage programme records, Linnan and Stekler; (2002: 20) and Rossi *et al.*, (2004:188) suggest the use of management information systems (MIS), which are subject to regular audits and quality control checks. However, while suggestions about the use of MIS's in ensuring storage of up to date and quality data makes logical sense, pragmatically, resource constraints could impede the implementation of such systems (Rossi *et al.*, 2004:187), especially in rural areas.

Assessment approaches 1, 2 and 14 propose that questionnaires or surveys may be employed as a replacement for programme records when attempting to assess coverage. Survey questionnaires, as indicated in assessment approaches 1 and 2, may also be a more desirable option to programme records for programmes that target an entire community, and are not tailored for a narrowly defined group. Assessment Approach 4, does make mention of the use of survey questionnaires to assess *coverage*, however, it is not indicated under what circumstances they are preferred. Drawing from these suggestions on potential methods to assess *coverage* of rural ICT projects, it could be useful to develop survey questionnaires in cases where up to date and reliable programme participant records are not available or in cases where the rural ICT project is targeting an entire community.

Assessment approaches 1, 2, 11, 12, 13, and 14 all indicate the need to elicit data, which may be useful in revealing project *bias* to certain user groups. However assessment approaches 1,



2 and 14 emphasise this more. According to assessment approaches 1 and 14, *bias* can be referred to as the extent to which some potential targets participate in a project more than others (Pade-Khene and Sewry, 2011; Rossi *et al.*, 2004). For instance, if data elicited reveals that *reach* for an intervention is high, but only caters to a group of the targets with a pre-defined set of similar characteristics, evaluators could make suggestions for the inclusion of potential target participants that do not fit into such a category (Linnan and Stekler, 2002: 12). Assessment Approach 1 by Rossi *et al.*, (2004) suggests that to allow for the assessment of *bias*, before a project is implemented, project implementers should properly define their target groups. Properly defining target groups give evaluators attempting to conduct such an assessment a base with which to determine whether or not every defined target group is being reached, or determine that there is a balance amongst groups which participate in the project.

Amongst the assessment approaches which indicate the need to assess *bias* (approaches 1, 2, 11, 12, 13 and 14) only Assessment Approach 1 explains in detail the most appropriate instrument which could be used to measure this aspect. To assess *bias*, firstly, Assessment Approach 1 suggests that surveys should be designed to elicit questions on demographics of participants, socio economic conditions and attitudinal characteristics. Contrasting project participants with non-participants using community surveys, information on *biases* in a programmes coverage can be elicited (Rossi *et al.*, 2004: 190). Community surveys are usually the only way of identifying programme non participants who are eligible in a community (Rossi *et al.*, 2004:190). An example provided by Assessment Approach 12 by Bailey (2009) describes a scenario which implies how community survey questionnaires aid in revealing data on biases. As illustrated in approach 12, a scenario arose where it was discovered that a large percentage of the participants of a rural ICT projects literacy training class came from outside the community. However, it is subsequently indicated that education ministry surveys revealed that a large percentage of people inside the community were illiterate.

Assessment approaches 2 and 3 go on to indicate the need to collect data on *dose received* which they define as the extent to which the target participants engage with the programme or intervention being delivered. Assessment Approach 4 suggests that in addition to assessing participant characteristics, there is a need to collect data on participant compliance, which from their description corresponds to the definition of *doses received*. *Dose received* could be referred to as a sub set of coverage. The underlying thinking for the differentiation between

coverage and *dose received* is that scenarios may arise where participants attend intervention sessions without engaging and interacting with the services provided. While rural ICT case assessment approaches do not indicate the need to assess this aspect, it could be a useful theme to consider for such projects. This is because as indicated by Pade *et al.*, (2008), Bailey (2009) and Dey *et al.*, (2010), rural ICT projects commonly facilitate training of some sort to enable illiterate targets to become competent at employing ICT tools and services provided. As such, it might be useful for project implementers to be aware of the extent to which project target participants are engaging with training and use of ICTs being provided. Such an assessment may be used by project implementers to determine whether training techniques are appropriate, or if there is a need to refine or enhance training techniques.

Assessment approaches 2, and 3, suggest that to assess *units received*, or as Assessment Approach 4 refers to it participant compliance, participant survey may be employed. However, Assessment Approach 2 also suggests that in addition to participant surveys, some form of observation may need to be employed to ascertain the extent of *units received*. Assessment Approach 3, suggests the use of interviews and focus groups. While Assessment Approach 4 does agree with the potential application of questionnaires or surveys, to assess units received, the suggestion here relates to surveys for intervention facilitators. Furthermore, Assessment Approach 4 indicates that intervention session observation and facilitator logs may be used to elicit data related to dose/units received.

Assessment approaches 6 to 14 indicate other useful aspects on programme participant involvement, which necessitate data collection. In these assessment approaches, the need to assess use aspects is highly emphasised. Use is strongly emphasised due to the fact that as opposed to the social programmes analysed (assessment approaches 1-5), where services might have constituted intangible services (for instance, lesson sessions provided), these assessment approaches (6-14) all involve the use of information systems by the target audiences. As such, for some of these assessment approaches an assessment of participant involvement with project activities in addition to measuring participation levels, bias and doses received, seek to inform project implementers on factors which affect target audiences, as they interface with information systems to satisfy project objectives. For a rural ICT project, such objectives seek to encourage rural dwellers to employ ICTs to improve their capabilities, with the potential goal being to support their livelihoods. This research therefore adopts the term *Service Utilization* to associate with aspects regarding project participants

and their use of information and communication technology to satisfy development objectives. The term *service utilization* will also be used as a broad term to define aspects discussed previously, such as coverage and bias, and dose received. *Service utilization* for a rural ICT project serves as an appropriate label to categorise all aspects identified that relate to project participants, because these aspects (coverage and bias, dose received and use aspects) are all seeking to ensure effective and efficient use of ICT services by potential rural beneficiaries.

Assessment Approach 6 by Delone and Mcleone (2003), emphasise the essentiality of *use* of information systems in an I.S project or in an organization, by postulating that *use* of such systems by project participants will result in net benefits. However, while linking use to net benefits their model (Delone and Mcleone I.S success model) strongly posits the assessment of three antecedents of I.S use. These antecedents as postulated in Assessment Approach 6 are correlated to use of information systems by target groups. Antecedents identified include, *Information quality*, *System quality* and *Service quality*. In this approach, *Information quality* is defined as the success rate of provided information in conveying intended messages to users, in the manner intended. Metrics highlighted to assess this construct (*information quality*) include, information relevance, ease of understanding, accuracy of information, completeness of information, timeliness and usability of information provided by the I.S to the users of the system. The system quality construct relates to desirable attributes of an I.S. The *System quality* construct highlighted includes measures such as perceived ease of use (adopted from the Technology Acceptance Model (TAM)), system flexibility, system reliability, and response time. It is essential to note that standards for defining *system quality* should be specific to the organizational context or environment where the system is being used. The *Service quality* aspect relates to support functions that I.S users receive from the I.S staff or personnel. Some *service quality* metrics include empathy of I.S personnel, responsiveness and technical competence.

Considering a significant number of studies have applied the “Delone and Mcleone model” and acknowledge correlation between the ‘*System quality, Information quality, Service quality*’ and a system’s usage (Delone and Mcleone, 2003), it could be useful to adopt the constructs identified here as useful sub themes to assess under *service utilization* in process assessment activities of rural ICT projects. For instance, in a rural ICT project, when usage monitoring reveals that use of ICT services provided to the target population is low or usage

is inconsistent, it could be useful to assess antecedents proposed in Assessment Approach 6 to find out reasons for low usage.

While the Delone and Mcleane model provide useful constructs which may affect use of information systems, it has an underlying flaw, which makes it incomplete or prevents it from entirely explaining the ICT service characteristics that affect user adoption of such services. In their effort to explain factors which influence information systems use, it is suggested that information systems are only useful for providing information. As it is depicted in the model in Appendix B, the only usefulness aspect which is assessed in the Delone and Mcleane model is *information quality*. Hudson (2001) suggests that for a rural ICT project information systems usefulness includes more functions than just information provision. Other common utility aspects of rural ICT project centres include the use of e-government applications, and communication needs. For example, the use of an e-government website to pay taxes as opposed to commuting long distances to pay such bills, or the use of mobile services such as M-pesa (Mobile money transfer) to receive remittances. As such, while provision of information constitutes a valuable use of I.S, it may also be useful to assess other *perceived usefulness* aspects or reasons for use of information systems by target audiences. The *Perceived Usefulness* construct is therefore adopted from the TAM model to complement other aspects of I.S usefulness not accounted for in the Delone and Mcleane model. *Perceived Usefulness* as defined by Davis (1989) is the extent to which a user believes the use of an information system will improve his or her performance, with regard to task completion. It should be noted that at pilot stages or in cases of new rural ICT projects, it might be challenging to assess the *perceived usefulness* construct. To explain this, Assessment Approach 12 by Dey *et al.*, (2010) who supports the view that perceived usefulness and perceived ease of use influence I.S use, suggest, that at the implementation inception stages, rural dwellers might not be aware of the potential of ICTs. As such, they might not be able to address questions that require them to indicate what perceptual values ICTs contribute to their task performance. In such scenarios, it could be useful to have an idea of rural ICT needs as opposed to seeking their opinions on *perceived usefulness* of information systems. A proper understanding of rural target participant's needs could aid in tailoring rural ICT services to underpin how rural dwellers address their needs with information systems. For instance, eliciting rural dwellers tele-centre needs could reveal that they value its ability to support their social networking activities. Consequently, based on this perceived need, project activities could be redesigned to ensure that users have time to social network. To support the

above point, assessment approaches 9, 11, 13 and 14 all highlight the need to elicit data from target participants on their tele-centre needs and usage patterns.

The assessment method proposed for the above mentioned ICT service characteristic aspects, is quantitative analysis, which attempt to discover the extent to which these characteristic aspects influence the use of ICT services. To conduct such assessments, approaches 6 and 7 suggest the use of survey questionnaires. Furthermore, it is implied that where such assessments reveal positive correlations between these identified constructs and use, project implementers may need to improve on aspects whose results indicate are influencers of ICT use. An assessment of perceptual aspects of ICT service characteristics may also be conducted through qualitative approaches. Though approaches 6 and 7, do not subscribe to the application of qualitative interpretivist research methods, Leclercq (2007) motivates for the need to integrate such a methodology when conducting assessments of ICT service characteristics. According to Leclercq (2007), structured quantitative survey questions, as it is known require structured answers and allow little or no possibility for divergence, and as such, restricts respondents. Leclercq (2007) further adds that, while quantitative methods are preferred due to the fact that they are subject to systematic rules to guide collection of data, they do not give the user the opportunity to express how and why certain factors or indicators influence or lead to their satisfaction of system use. Irvine and Gaffikin (2006: 117) suggest that qualitative approaches allow for such inferences. As such, it could be useful to apply qualitative approaches in addition to quantitative approaches when assessing aspects related to user perceptions of ICT service characteristics. It should however be noted that while also advocating for the inclusion of qualitative approaches for the assessment of user perception aspects, qualitative approaches are themselves not free of challenges. For instance, with qualitative research, there is an absence of decision rules, accepted procedures, and common heuristics, all of which are present in a quantitative research approach (Leclercq, 2007: 38). The absence of such rules may put in doubt results obtained through qualitative approaches. As such, in applying qualitative approaches for perceptual evaluation, researchers must ensure the incorporation of principles which integrate validity (Leclercq, 2007: 38).

It has been established that the Delone and McIene I.S model and the Technology Acceptance Model provide useful constructs to assess in the adoption and use of information systems. Assessment Approach 12 by Dey *et al.*, (2010) however, argues that the identified constructs from these models are not the only factors responsible for technology adoption. It is essential

to note that, the TAM was developed under the premise that technology is readily available, and that the decision to accept or reject technology rests with the user (Musa, 2006). Therefore, aspects, such as, access to ICTs and social structures related to varying contexts which potentially impede use are not considered in the TAM model. Authors such as Malhotra and Galletta, (1999); Park, (2009) and Wu *et al.*, (2008) in response to this limitation highlight additional factors which have been integrated to updated models of TAM and which as they indicate, influence user attitudes to use of new information systems. Factors highlighted include social factors /subjective norms, self-efficacy, management support and trust (Malhotra and Galletta, 1999; Park, 2009; Wu, Shen, Lin, Greenes and Bates, 2008). Though, while it is implied that these factors do affect user adoption of technology, empirical evidence has not wholly accepted them as correlating factors affecting user adoption in all situations. As such, these additional factors and their effect on technology acceptance remain contextual constructs. However, relating to the rural ICT4D African context, *access* and *social factors* may also be useful aspects to assess as variables influencing use.

An assessment of *social factors* which influence use of I.S are particularly important, as such an assessment is a determinant of sustainable use. To elaborate on *social factors* which influence use, Malhotra and Galletta (1999) suggests three internal influences which affect an individual's choice to use technology. Influences highlighted include: a) Compliance, b) identification and c) Internalization. Compliance entails the adoption of technology as a result of coercion or avoidance of punishment. Identification entails a process whereby an individual adopts technology, to belong to a specific social group or class. Finally, internalization is the tendency of an individual to adopt technology based on its alignment with his or her values. It is then postulated that adoption of technology as a result of its alignment with an individual's values will result in commitment to use of technology by the individual (Malhotra and Galletta, 1999: 3), which is the goal of sustainable use. On the flip side, when use of technology is brought about as a result of compliance, users tend to have a negative feeling about using the technology in question (Malhotra and Galletta, 1999: 8). In retrospect of the above point, assessment approaches 11 by Bailey (2009) and 13 by Dey *et al.*, (2010) advise that for rural ICT projects, there is a need to ensure that use of technology is consistent with the rural life styles of the participants. To illustrate this point, Kayani and Dymond (1997) suggest that contrary to common perception rural dwellers are usually willing to spend between 1 and 3% of their earned income on telecommunication services

where they feel they will save on transportation cost. In a second evaluation example, it was revealed that rural farmers were willing to adopt the use of mobile phones to communicate with sellers whom they bought fertilizer from (Dey *et al.*, 2010: 33). This was possible because the farmers' traditional process which required communicating with various potential fertilizer sellers before making a decision on whom to buy from was not compromised by the mobile phones. Rather, the mobile phones supported the process of reaching various potential sellers in a more efficient manner while enabling them to save on transportation costs.

Other factors which may affect sustainable use should also be assessed. Where ICT services are being used at initial stages or pilot stages, assessment approach 10 suggest the need to assess for the presence of *project practices* which promote sustainable use of ICT services by the target audiences. Assessing for *sustainable use practices* attempt to elicit data which suggests that there will be continuous use of ICT services in the long term. Aspects to assess here could include; the extent to which socially excluded groups participate in the project, the extent of involvement of the rural targets in project activities, and training and capacity building of target audiences.

To assess for the presence of factors which promote sustainable use, Assessment Approach 14 suggests the use of the Rural Information and Communication Technology Project Life Cycle (RICT-PLC) critical success factors, as an observation guide.

While terms and definitions differ amongst assessment approaches, this analysis reveals that *service utilization* is a critical aspect to assess in the ongoing implementation of rural ICT projects. Aspects and sub-themes covered under service utilization, suggest that it assesses the extent to which ICT services are used by the intended target population with consideration for sustainable use. A summary of *service utilization*, its sub themes and measurement instruments is presented in Table 4.6 below

Table 4.6: Summary of service utilization themes

Theme	Sub-Themes	Description	Instrument for assessment
<b>Service Utilization:</b> Assesses the extent to which ICT services are used by the intended target population with consideration for sustainable use.	Coverage	Assesses the extent to which the proportion of the intended targets participate in the rural ICT project	<ul style="list-style-type: none"> <li>Programme records. For example, screening criteria for programme intake, service records, attendance records and records describing</li> </ul>



			<p>participants.</p> <ul style="list-style-type: none"> <li>• Community Surveys (Questionnaire)</li> </ul>
	Bias	Assesses the degree to which some target participants participate in the rural ICT project more than others	<ul style="list-style-type: none"> <li>• Comparing programme records to community surveys</li> </ul>
	Dose-Received	Assesses the extent to which rural target participants engage with provided services.	<ul style="list-style-type: none"> <li>• Participant surveys</li> <li>• Observation</li> <li>• Interviews with target participants</li> <li>• Interviews with project facilitators)</li> </ul>
	Users perception of ICT characteristics	Assesses an ICTs <b>information quality, systems quality and perceived usefulness</b> from rural dwellers perspective.	<ul style="list-style-type: none"> <li>• Surveys</li> <li>• Interviews</li> <li>• observation</li> </ul>
	Sustainable use factors/ Alignment of ICTs with user's values.	Assesses for the presence of sustainable use practices which suggests that there will be continuous use of ICT services in the long term.	<ul style="list-style-type: none"> <li>• Observation guide (Critical success factors)</li> </ul>

#### 4.9.2 Critical Themes related to Intervention Providers (Organisational functions)

The second theme which came across as critical to assess from the analysis of assessment approaches are themes related to intervention provider functions. This aspect as analysis suggests, assesses whether a programme is performing well in managing its efforts and using its resources to accomplish its essential tasks. Rossi *et al.*, (2004) and Pade-Khene and Sewry (2011: 174) term this theme as organizational function. *Service delivery* is the key component to assess with respect to *organisational function* (Rossi *et al.*, 2004: 191).

All social programme assessment approaches analysed indicate the need to assess *service delivery*. Assessing *service delivery* relates to monitoring the quantity and quality of services delivered to intended target audiences. While Assessment Approach 1 by Rossi *et al.*, (2004) employs the term *service delivery*, Assessment Approach 2 by Linnan and Stekler (2002) labels aspects related to *service delivery* measurement as *dose delivered*. According to Assessment Approach 2, *dose delivered* can be defined as the number or amount of intended units of each intervention or each activity delivered or provided. This definition is congruent with suggestions from Assessment Approach 1 by Rossi *et al.*, (2004) on the need to define every service provided in operational terms when assessing *service delivery*. According to Rossi *et al.*, (2004), definitions of services in operational terms should be referred to as *units*



*of service delivery*. It is further suggested that defined service delivery units should be consequently measured against actual service delivery units provided. Assessment Approach 3 by Century *et al.*, (2010) supports this view, and labels aspects of service delivery relating to units of provided services as *exposure*. While assessment approaches 4 and 5 by Mullany and Peat (2008) and Valadez and Bamberger (1994) highlight the need to assess service delivery aspects, they do not define what aspects need to be assessed neither do they emphasise it. Amongst the I.S assessment approaches analysed, only assessment approach 6 by Delone and Mclene (2003) indicate the need to assess service aspects. However, the service aspects highlighted in this Assessment Approach relate to support functions received from I.S support staff. This aspect in the Delone and Mclene model is termed as service quality.

With regard to the ICT4D assessment approaches or cases analysed, approaches 9, 11, 12, 13 and 14 indicate the need to assess *service delivery* aspects when conducting process assessment exercises. Assessment Approach 9 by Walton and Heeks (2011) propose that *service delivery* must be flexible, and as a consequence should be adaptable based on target user's needs. Approaches 11 by Bailey (2009) and 12 by Dey *et al.*, (2010), also suggest that services delivered must be aligned to user needs and rural life styles of rural participants. Assessment Approach 13 by Hudson (2001) further highlights the need to assess service quality and Assessment Approach 14 by Pade-Khene and Sewry (2011) indicate the need to monitor factors which may potentially impede delivery of services to the target audience.

It can be observed that while the majority of the assessment approaches analysed indicate a need to assess service delivery, social programme assessment approaches analysed emphasise the need to assess units delivered. However, ICT4D assessment approaches analysed do not stress this. It may be essential that rural ICT projects instigate emphasis on such aspects as critical, because as suggested by Bailey (2009: 6), computer literacy training is one of the fundamental aspects of service delivery at the beginning stages of rural ICT projects globally. As such, for a rural ICT project, it will be useful to assess the *dose/unit delivered* sub theme when assessing *organizational functional* aspects, to ensure that target beneficiaries are taught to completion, training component units outlined in project training manuals.

To monitor service delivery, assessment approaches 1, 2, 3, and 14 indicate it is firstly imperative to specify programme services, in operational terms. Each service, component or

activity provided by the intervention must be distinctly defined (Helitzer, Davis, Gittelsohn, Going, Murray, Snyder, and Stekler, 1999: 818; Linnan and Stekler, 2002: 17; Rossi *et al.*, 2004: 195). For instance, if a rural ICT project intervention is composed of five activity types, each activity type must be defined separately. According to assessment approaches 1 and 2, aspects to include when specifying service components could include tasks which take place in the services being described, participant descriptors and a description of what constitutes acceptable performance. Such components may be described in terms of units (Century *et al.*, 2010: 206; Linnan and Stekler, 2002: 12; Rossi *et al.*, 2004: 196; Saunders *et al.*, 2005: 140). Assessment Approach 1, however, suggests that in some instances, specifying components may not be a straightforward task. For example, a project in which service delivery constitutes a wide range of actions to be performed. In such scenarios, it is advised that services could be described in terms of the general characteristics of the service provider and the time spent in service activities. Assessment approaches 1 and 3, while highlighting the need to specify services, do not indicate the best way to go about it. Assessment Approach 2, however, indicates that programme implementers are in the best position to specify services and acceptable performance measurements. Furthermore, Saunders *et al.*, (2005) suggests that programme theory could aid in eliciting information on specification of services. Once services have been adequately specified, evaluators are then expected to describe the performance level of a programme's operation with respect to service delivery. Assessment Approach 1 does not indicate which instruments are best suited for such descriptions, however, they recommend the use of narrative accounts when analysing service delivery data. Assessment Approach 14 by Pade-Khene and Sewry (2011) suggest that narratives could be preceded by stories, where stories reveal service delivery specification aspects and narratives aid in describing the performance levels of service delivery aspects. Furthermore, assessment approaches 3 and 14 highlight other potential instruments which may be employed when attempting to describe how a project has performed with respect to service delivery. Other instruments identified include, media tools (photography, video and audio), document analysis, review of facilitator logs and observation methods. Such instruments could be employed to elicit service delivery performance information to be analysed. Assessment Approach 5 proposes the use of the projects' logical framework (Logframe) documents to describe intended implementation and operational processes. Logical frameworks as suggested by this Approach are documentations of explicit changes a project is expected to produce, and each step that must be taken to bring about these changes. They then suggest the use of Gantt charts to compare actual and intended progress for each

rural ICT project component or activity. Use of Logframes, however, may not be a good option to use in rural ICT projects, especially in scenarios where Logframes are designed without any inputs from rural beneficiaries. As Roman and Blattman (2001) suggest, in most rural ICT cases, user centred need elicitation can only be properly achieved once rural dwellers have made use of ICT services. Where activity specification based on a Logframe is pre-conceptualised by programme implementers in the design phase, it may not reflect revised activity design which should be based on elicited user needs.

While the methods discussed above provide alternative ways of eliciting data needed to assess service delivery, Assessment Approach 2 suggests that gaining clarity on methodologies to be employed in data collection must take into account the following factors; the type of data collection required (paper and pencil forms, electronic forms), the frequency of data collection, who is responsible for data collection, the reliability and validity of the data collection measures, the cost and the potential burden to participants and staff members.

Most analysed social programme assessment approaches, also necessitates that quality aspects of implementation should be assessed. In service delivery, Assessment Approach 2 by Linnan and Stekler (2002), indicates the need to assess quality aspects of programme delivery, which they term fidelity. According to this Approach, *quality or fidelity* is defined as, the *manner* and *spirit* in which intervention staff conduct their service delivery tasks. This they suggest could be evident in how enthusiastic intervention staffs are, and how they engage with programme participants or target beneficiaries. While Assessment Approach 3 indicates the need to assess *quality*, they oppose the inclusion of *spirit* (for example facilitators attributes) as part of quality aspects. Opposition to the addition of such aspects as they suggest, is based on the perception that literature indicates that quality should refer to pedagogical aspects only. For instance, teaching methods facilitators employ while delivering intervention sessions. This is based on the thinking that outlining every necessary attribute, expected from an instructor will involve too many broad constructs. As such, they propose that facilitator behavioural attributes should be considered as moderating variables, as they may or may not be critical components to assess depending on the type and context of an intervention. Based on this reasoning, this research will define an assessment of *service quality* as an assessment of the manner in which a rural ICT project is delivered. It should be noted though, that it could be challenging to assess quality as quality is a subjective notion (Linnan and Stekler, 2002: 13).

Though the service quality construct is covered under the user perception sub-theme of *service utilization*, aspects of service quality covered differ from aspects of service quality being referred to here. Service quality aspects highlighted under *service utilization*, majorly focused on aspects related to ICT service provision, while service quality aspects proposed here relate to assessing (but not limited to) the quality of training sessions provided by intervention facilitators.

Assessment Approach 2 suggests that quality may be assessed through observation of implementation sessions by a trained observer using a structured observation guide. Assessment Approach 3 suggests additional instruments which may be used to assess service quality aspects. They suggest that interviews with facilitators, facilitator questionnaires and facilitator logs may also be employed. Saunders *et al.*, (2005) suggest that to assess quality, evaluators could review facilitator reports, and/or engage in observation using an implementation checklist, to ensure the needed strategies are employed by facilitators.

Congruent with the view of Assessment Approach 1 on the need for described services delivered to match intended delivery plans, Assessment Approach 12, a rural ICT evaluation case study, indicates the need to describe services provided by rural ICT projects when conducting process assessments. However, for such an assessment, description of services may reveal that provided services do not fully approximate intended ones. This could be caused by projects being implemented in varying contexts (Century *et al.*, 2010). Based on contextual differences that may necessitate project adaptability, two assessment approaches indicate the need to assess *flexibility*. Assessment Approaches 9 by Walton and Heeks (2011) and 14 by Pade-Khene and Sewry (2011) define *flexibility* as the adaptability of rural ICT projects to changes in the rural environment and demand driven needs of the target community. While deemed a project provider function, the *flexibility* assessment aspect has a direct relationship with *service utilization*. For instance, understanding why users find ICT services relevant will aid project implementers in adapting project activities to meet identified user needs. Furthermore, it is essential to note that, maintaining a flexible phased implementation in ICT4D projects allows for contextual information to be incorporated into the initiative throughout implementation (Walton and Heeks, 2011: 24). According to Assessment Approach 11, *flexibility* also necessitates a need to assess evolving competencies of project champions. The need to assess such competencies is based on evolving user needs. Though a needs assessment, prior to a rural ICT projects' implementation does aid in

understanding the local context and users (Pade-Khene and Sewry, 2011), Bailey (2009) advises that, user needs are not static, but are constantly evolving. Consequently, there is a need for rural ICT project employees or local project champions to adapt their core competencies based on rural beneficiaries evolving needs (Bailey, 2009). For instance, at the initial stages of a projects implementation, tele-centre staff or project champions may require only basic competencies, such as, customer service skills and training skills (Bailey, 2009). However, with changing community needs, they may need to develop research skills, or knowledge on specific subjects like health, agriculture or water management (Bailey, 2009). Therefore, while assessment approaches 1, 2, 5, 11, 13, and 14 suggest that it is imperative to assess the core competencies of project champions, at the initial stages of project implementation, Assessment Approach 11 by Bailey (2009) advocates for constant reviews and assessment of such competencies based on evolving user needs. It is imperative to note that changes may require more than just staff or project champion competency adaptations, it may also require changes to technologies being employed or management processes. For example, Assessment Approach 14 by Pade-Khene and Sewry (2011: 175) propose that flexibility assessments should also take into consideration whether or not a rural ICT project is constraining or supporting traditional information flows. To support this view, Assessment Approach 10 which outlines critical success factors for rural ICT project sustainability, suggest the need to integrate implementation with traditional information flows in the community. Assessment approaches 11 by Bailey (2009) and 13 by Hudson (2001) also support this view. As such, when assessing *flexibility*, knowledge on traditional information flows, and how they may be supported or constrained by rural ICT implementations, are useful areas to assess in rural ICT process assessments.

Assessment Approach 9 highlights the need to incorporate lessons learned from past errors or projects to increase chances of project success. Therefore, it may be implied that an assessment of *flexibility* also necessitates investigating the extent to which a rural ICT project incorporates lessons learned from past failures. Furthermore, a learning approach should aim to continually elicit information from the environment in which it operates, in order to facilitate necessary and ongoing adaptations (Walton and Heeks, 2011: 6). While Assessment Approach 9 labels this as a separate critical aspect from project management functions, they do suggest that learning from experience may be considered as an organizational function. However, it is interesting to note that amongst all 14 assessment approaches analysed, Assessment Approach 9 was the only approach which made mention of *incorporation of*

*lessons* learned from past experiences or projects as a critical aspect which affects ICT4D project implementation.

Amongst assessment approaches which explicitly highlight the need to assess flexibility (assessment approaches 9, 11 and 14), only assessment approach 14 highlights a specific tool which may be employed to assess flexibility. According to Approach 14, *tracer studies* could be employed to elicit data on project flexibility towards the local context in which it is being implemented in. Tracer studies present qualitative remarks on ICT usage patterns overtime, consequently, they aid in the identification of services which have proven to be useful and how they have been applied (Pade-Khene and Sewry, 2011: 180). Findings from tracer studies should then be compared with services which a rural ICT project is providing to check if services provided are those which will potentially be useful to beneficiaries, or if modifications to the provided services are necessary. Though no analysed assessment approach suggests methods for comparing the extent to which provided services fit those which have proven to be useful, it may be useful to employ qualitative methods such as interviews and observation. Other aspects related to flexibility which may be necessary to assess using such methods are, emergent competencies which project facilitators should develop based on changing user needs, and the extent to which lesson learned from past failures have been incorporated into the projects implementation (Bailey, 2009; Walton and Heeks, 2011).

An assessment of organisational function, as suggested by several analysed assessment approaches also requires the assessment of programme management and support functions. Assessment Approach 1 indicates that support functions include, fund raising strategies, public relations to enhance the project's image with potential sponsors, staff recruitment and training of staff and governance issues. Assessment Approach 14 adds to this list of management functions; it indicates the need to assess project management and funder's accountability towards project objectives, ensuring local needs technology fit, and management capacity in the areas of human resource, technology, finance and politics. Furthermore, in assessment Approach 14, it is suggested that project champions or tele-centre staff should be evaluated on the practices they apply. Aspects related to practices applied by tele-centre staff, are congruent with quality or pedagogical aspects suggested by assessment approaches, 2 and 3. Lessons learned from Assessment Approach 5 indicate that experience has revealed that contracting of technical staff and resource procurement are complex tasks.

Hence, they suggest that management functions should concentrate on these aspects. Assessment Approach 2, with regard to management functions only make mention of *recruitment*. *Recruitment* as they suggest assesses procedures employed by project organisers to recruit staff and target groups. However, they indicate that this aspect should only be assessed where resources allow. Similar to this, Assessment Approach 1 indicates the need to assess accessibility. As it is indicated in this Approach, accessibility assesses the extent to which the project team organizes their effort to ensure participation of target beneficiaries in the project (Rossi *et al.*, 2004). While this is labelled as a separate sub theme from programme support functions, its function is similar to a programme support function. Therefore, for this research, such an aspect will be labelled as a project support function. Assessment Approach 9 also does indicate the importance of management functions. In their model, effective management is listed as one of three components necessary to provide proper ICT4D project support. However, while this Assessment Approach emphasises the essentiality of effective project management in implementing ICT4D projects, it does not indicate what effective management entails.

To monitor programme support functions, it is indicated in Assessment Approach 1, that similar measures as those taken to monitor programme service delivery are undertaken. Therefore, specification of each support function will have to be carried out and subsequently, a description of operation with regard to each support function. In specifying support functions, criteria for what constitutes an acceptable performance level for a support function should also be indicated.

Finally, with regard to organisational function, assessment approaches 5, 10, 13 and 14, highlight the need to assess for the presence of project practices which promote sustainable project operation. Assessment Approach 10 which particularly concentrates on sustainability aspects provides a comprehensive list of critical success factors which promote rural ICT project sustainability. Amongst the highlighted critical success factors which promote sustainability in the implementation phase of rural ICT projects, several of these factors are specific to service utilization, while others are related to organizational function. A list of project sustainability critical success factors can be found in Table 1.1 of section 3.2 in Appendix B. It is interesting to see that assessment approaches 5 and 13 contrasts each other, on when sustainability factors should be considered. In Assessment Approach 13, it is proposed that sustainability factors should be considered only after a rural ICT project has



achieved its objectives at the pilot stage and as such, is ready to be taken to scale. However, Assessment Approach 5 by Valadez and Bamberger (1994) suggest that many projects are unable to continue operation because they paid far less attention to sustainability than to implementation at the pilot stage. Assessment approaches 10 and 14 support Valadez and Bamberger's (1994) advice on the need to consider all categories of sustainability in the implementation and management phases of rural ICT projects. Hence, this will be a useful area to assess, both at the implementation phase of pilot stages of rural ICT projects and also when such projects have been taken to scale.

Amongst assessment approaches which advise on the need to assess for factors which promote sustainable organizational operation, only Approach 14 suggests an appropriate instrument. It is suggested by Pade-Khene and Sewry (2011) that the Rural ICT project life-cycle (RICT-PLC) may be employed as an observation guide to assess for the presence of outlined critical success factors believed to promote sustainable project functioning.

A summary of *Organizational function*, its sub themes and appropriate instruments for assessing it sub themes are presented in Table 4.7 below.

Table 4.7: A summary of organizational function and its sub-themes

Theme	Sub-Themes	Description	Assessment Instruments
<b>Organizational Function:</b> <i>Assesses whether a programme is performing well in managing its efforts and using its resources to accomplish its essential tasks</i>	<b>Service Delivery</b> <ul style="list-style-type: none"> <li>• <b>Units delivered</b></li> <li>• <b>Service quality</b></li> </ul>	<b>Unit's delivery:</b> <i>Assesses the extent to which delivered units of ICT services provided to target audiences approximate intended ones.</i>	<b>Units delivery:</b> <i>Narratives, media tools, document analysis used for (Programme description) and (Description of programme operation).</i>
		<b>Service quality:</b> <i>Assesses the manner in which services are provided by intervention staff.</i>	<b>Service quality:</b> <i>Observation, interviews with facilitators, facilitator questionnaires, facilitator logs.</i>
	<b>Flexibility</b>	<i>Assesses the adaptability of rural ICT projects to changes in the rural environment and demand driven needs of the target community.</i>	<i>Tracer studies</i>
	<b>Programme support functions</b>	<i>Assesses the extent to which rural ICT project support activities are coordinated to enhance success. For example fund raising activities, and public relation strategies to</i>	<i>Narratives, media tools, document analysis used for (Programme description and Description of programme operation.</i>



		<i>enhance projects image.</i>	
	<i>Sustainable practices</i>	<i>Assesses for the presence of sustainable practices which will promote continuous project operation in the long term, after the departure of the project team.</i>	<i>Surveys (RICT-PLC questionnaire)</i>

### 4.9.3 External Project Factors

The implementation phase of rural ICT projects is also influenced by factors, which are external to a project (Batchelor and Norrish, 2006). Analysis of assessment approaches broadly revealed two aspects which necessitate assessment under the category of external factors influencing the implementation phase of rural ICT projects. Aspects identified include, institutional support from assessment approaches 5, 9 and 10 and contextual factors from assessment approaches 2 and 10.

A shared characteristic common to both institutional support levels and contextual factors is that the effects both these sub themes have on a rural ICT projects implementation is largely beyond the control of a projects management. As suggested in Assessment Approach 5, institutional support and other contextual factors, for example, events external to projects are largely beyond the control of project management. Hence, an assessment of the level of *institutional support* and *contextual factors* while classified as being essential might not necessarily result in improvements from such aspects with regards to their contribution to rural ICT development goals. Given the above description of this critical theme, the assessment of project external factors for this research may be defined as follows: An assessment of the level of institutional support and an assessment of contextual factors, which to a large extent cannot be controlled by a rural ICT projects management but are critical to a rural ICT projects implementation. These assessments could aid in identifying factors responsible for project failures or success, after project management and rural beneficiaries have fulfilled their requirements for project implementation.

Success of a rural ICT project and its sustainability amongst other factors highlighted is dependent on institutional support levels (Walton and Heeks, 2011: 6). To emphasise this, Assessment Approach 5, suggests that in a development projects evaluation, institutional analysis should be employed to assess institutional capacity and performance of partnering institutional agencies and community organizations in relation to project goals. Partnering institutions for instance, consist of, NGOs, industry and local governments. Partnerships

between rural ICT projects and these institutions could include participation by the local community and project team in the co-creation of context-sensitive user driven ICT support solutions (Pade-Khene and Sewry, 2011: 232). Collaboration between institutions and rural ICT projects may also include partnerships with industries, which provide funding for the project (Pade-Khene and Sewry, 2011: 232). These elements or institutions though external are not necessarily separate but collaborate and interconnect to support the operation and performance of rural ICT projects (Pade-Khene and Sewry, 2011: 228). Though deemed important, assessment approaches analysed do not suggest any appropriate instruments for assessing this sub-theme.

Assessment Approach 2 emphasizes the need to assess social, economic, and political aspects which affect a programme's implementation. It labels this sub theme as *contextual factors*. Contextual factors could include, gender issues or literacy levels in a community (Bailey, 2009). An assessment of such an aspect is essential because, for a rural ICT project to be successful, it would be required to make changes based on the local context it is implemented in (Bailey, 2009). A rural ICT project in some cases may be able to make adaptations based on identified contextual factors. Such adaptations have to be achieved without compromise to a rural ICT project's quality. For instance, the enactment of a rural ICT project targeting both women and men in a community, which does not support female education would require that implementers identify measures to deal with such a local context. This is consistent with suggestions from Bailey (2009: 13) that integration between technology and context will vary according to context. Dealing with such a local context may include efforts to enlighten local traditional leaders on the importance of female empowerment, where such efforts might not have previously been part of a project's plan. A challenge with regard to context, however, is determining what contextual factors should be considered critical to programme success. They are as the name suggests "contextual", that is, such factors are related to specific cases or projects and thus, cannot be generalized as critical to every project. For example, Mullany and Peat (2008) highlight a case where a programme found certain contextual factors that were shown to influence programme outcomes. However, a similar programme in another city, when evaluating these factors revealed that these factors were found to be insignificant in their setting.

To assess contextual factors that affect the implementation phase of rural ICT4D projects, interviews using open ended questionnaires could be administered to project administrators, project staff, and project facilitators (Saunders *et al.*, 2005: 143). Such methods should not

only attempt to elicit information on contextual factors which affect a rural ICT project, but also attempt to explain how identified factors influence a rural ICT projects implementation. A summary of project external factors and identified measurement instruments are depicted in Table 4.8 below.

Table 4.8: A summary sub-themes of external project factors

Theme	Sub-Themes	Description	Assessment Instruments
<b>External project Factors:</b> <i>An assessment of institutional support levels and contextual factors which to a large extent cannot be controlled by a rural ICT projects management but affect a rural ICT projects implementation.</i>	<b>Institutional support</b>	<i>Assesses institutional capacity and performance of partnering institutional agencies and community organizations in relation to project goals. Some examples of partners include local governments, and N.g.o's</i>	<i>None identified</i>
	<b>Contextual factors</b>	<i>Assesses social economic and political aspects which affect a rural ICT projects implementation; for example gender biases</i>	<i>Semi structured interviews.</i>

#### 4.10 Conclusion

Critical themes of process assessment for rural ICT project implementations are identified through a study of social programme process assessments, evaluation of information systems in use and case studies of rural ICT project implementations. The analysis of 14 assessment approaches undertaken in this chapter, reveals the need to assess three broad themes in a rural ICT projects process assessment. Identified themes include, *service utilization, organizational function* and *project external factors*. Sub themes under each theme identified are described. Subsequently, appropriate tools which may be employed to assess identified critical themes and sub themes are identified and highlighted. It is revealed that a number of tools can be used to assess each identified theme. However, it is suggested that the selection of a tool or method will be dependent on resources amongst other factors. The themes of process assessment identified potentially contribute to the development of a framework to guide process assessments of rural ICT4D projects.

## Chapter 5

### A Framework for Assessing Critical Themes of Process Assessment in Rural ICT4D projects

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*This chapter proposes a framework for conducting process assessments of rural ICT projects. The Rural ICT Project Process Assessment Framework (RICTP-PAF) is composed of critical themes of process assessment relevant to rural ICT projects, and guiding principles to observe when conducting a process assessment.*

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### **5.1 Introduction**

Successfully implementing a rural ICT project requires that there are constant assessments throughout implementation, to ensure that implementation is being carried out as planned, as well as to identify changes needed. Process assessments seek to determine whether or not ongoing implementation of a project is satisfactory. Evaluation questions for a process assessment stem from critical themes of project performance. Critical themes of process assessment are important aspects in the implementation phase of rural ICT projects which require monitoring. An extensive analysis of social programme process assessments, evaluation of information systems in use, and ICT4D implementation and evaluation case studies aided in identifying critical themes which could be relevant to assess in rural ICT4D process assessments.

This chapter proposes a framework for conducting process assessments of rural ICT4D projects. Firstly, principles to take into account when conducting a process assessment are outlined. Subsequently, the critical themes are discussed along with proposed methods for measuring identified themes. It is concluded that to fully understand the application of the Rural ICT Project Process Assessment Framework (RICTP-PAF), it is necessary to conduct a case study to explore the suitability and shortcomings of themes identified and methods for assessing them in a real life project environment.

### **5.2 A Framework for Conducting Rural ICT Project Process Assessments using Critical Themes of Project Performance**

The proposed Rural ICT Project Process Assessment Framework (RICTP-PAF) is composed of guiding principles to apply when conducting process assessments of rural ICT4D projects, the critical themes of rural ICT4D process assessment, and methods and procedures employed to assess identified critical themes. The guiding principles suggest essential factors to take into consideration whilst assessing critical aspects of the ongoing implementation of rural ICT projects. Critical themes represent essential aspects on which data should be collected when assessing the ongoing implementation of rural ICT projects. Methods and procedures delineate how themes may potentially be assessed by outlining appropriate instruments and how they may be employed. Figure 5.1 depicts the components of the RICTP-PAF.

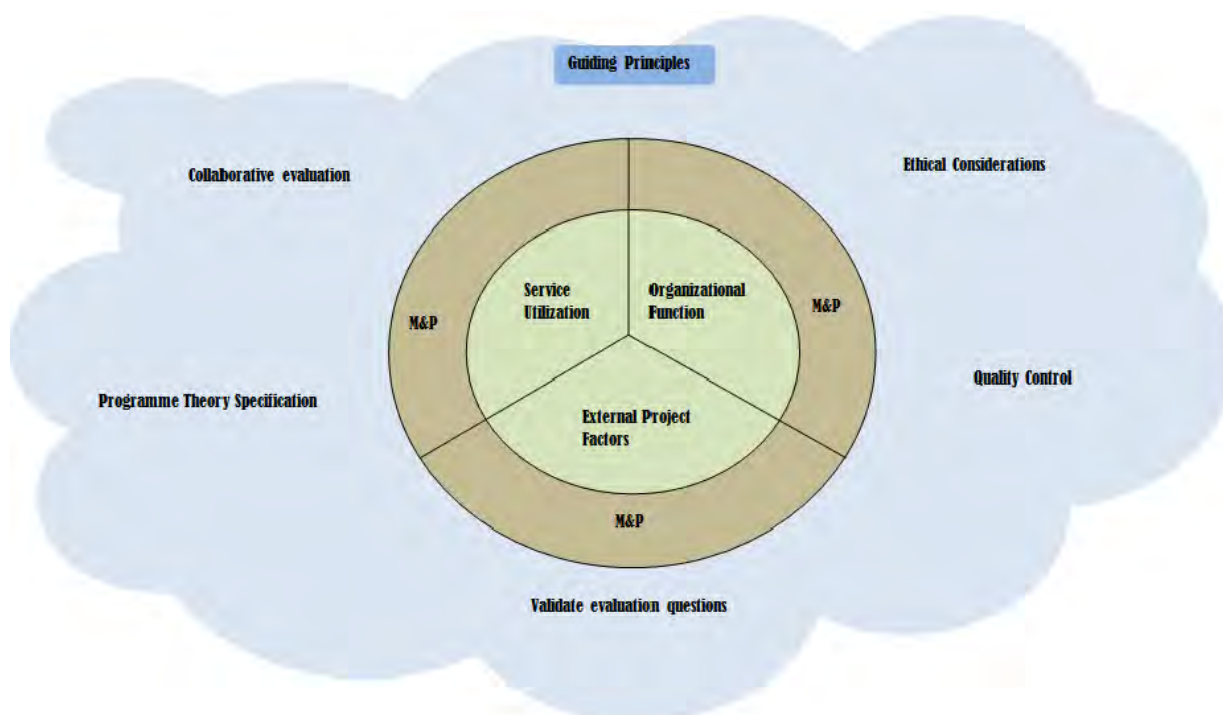


Figure 5.1: Rural ICT Project Process Assessment Framework (RICTP-PAF)

### 5.3 Guiding Principles for Conducting Rural ICT Process Assessments

Assessing critical themes of process assessment in rural ICT projects require the adherence to a number of guiding principles. These principles seek to ensure that process assessments are appropriately conducted and that results achieved are reliable and useful. The following are some guiding principles which serve to promote effective process assessment exercises in rural ICT project environments.

#### 5.3.1 Collaborative Evaluator/Stakeholder Relationship

Firstly, the planning stages of a process assessment should be conducted collaboratively with stakeholders (Pade-khene and Sewry, 2011). Furthermore, it is essential that an evaluator attempts to ensure that the entire process of conducting the process assessment exercises is carried out collaboratively between him/her and the project stakeholders (Linnan and Stekler, 2002: 15). A major reason for this is that varying stakeholders may require varying results from a process assessment (Estrella and Gaventa, 1998: Rossi *et al.*, 2004). As such, evaluations while attempting to provide reliable and useful results, should also attempt to satisfy varying stakeholder interests (for example, satisfying both the project team, and the rural stakeholders assessment needs). Furthermore, collaborative evaluations overtime should advance to empowerment evaluations, where internal stakeholders become primarily

responsible for evaluation processes, while the evaluator is relegated to such tasks as consultation and facilitation (Rossi *et al.*, 2004: 51). With such advancements, the intention is to empower the local stakeholders to become competent at conducting such assessments, as an evaluator's role in the project is temporary (Rossi *et al.*, 2004: 51).

### **5.3.2 Programme theory specification**

Prior to conducting a process assessment, evaluators should specify theory which underlies the implementation of rural ICT projects (Linnan and Stekler, 2002: 15). A programme theory is composed mainly of two components; a process theory and an impact theory. Though composed of these two components, the specification of the process theory is particularly relevant to process assessment exercises (Rossi *et al.*, 2004: 173). Specification of the process theory is relevant to process assessments, because it delineates what a rural ICT project should be doing and consequently what constitutes adequate performance (Rossi *et al.*, 2004: 173). A process theory aids in identifying critical themes of project performance that are most essential to describe and also provides some indication of what level of performance are acceptable (Rossi *et al.*, 2004: 173).

### **5.3.3 Validate evaluation questions**

Although all evaluation questions identified may seem important, it may be imperative to further validate identified process assessment questions. To do this, it may be essential to answer "yes" to the following questions (Will the data which stems from these questions be used, are there stakeholders interested in each of these questions, Is it feasible to answer this question given the available resources, and is this question worth the expense of answering it) (Bliss and Emshoff, 2002: 11).

### **5.3.4 Quality Control throughout data collection and analysis phase**

A process assessment for rural ICT projects must in addition to eliciting data on performance, indicate whether or not performance is satisfactory (Rossi *et al.*, 2004). Whilst collecting and analysing data collected for any process assessment activity, it is essential to incorporate quality control measures (Linnan and Stekler, 2002: 19). Four tests commonly employed to establish quality in any empirical social research are, construct validity, internal validity, external validity and reliability (Yin, 2009: 40). While it may not be practical for rural ICT projects to incorporate rigorous quality measures due to resource constraint factors, it will be

useful to have a number of quality control measures in place. For example, it will be useful to ensure that data collected do not reflect the biases of certain individuals or groups (Yin, 2009). Ensuring this may necessitate multiple sources of data collection. Furthermore, during the data collection phase it will be useful to check that data collected are not incomplete or subject to error (Rossi *et al.*, 2004). In the analysis phase or report generation phase, firstly it is essential to rule out rival explanations when attempting to explain causes of events (Yin, 2009: 41). While there are other quality control measures to consider, this topic is outside the scope of this research, as such it is not extensively covered.

### **5.3.5 Ethical Consideration**

Evaluation in the social research field which rural ICT projects are part of, often times may present certain ethical challenges (Kimmel, 1988: 30). This may be attributed to the fact that, often time's subjects of such research are selected from relatively powerless community of individuals (Kimmel, 1988: 37), who may be vulnerable to exploitation by the researcher. Due to this reason, in many cases where research involves or requires the participation of human subjects, it is required that the researcher conducting research agrees to and implements certain ethical considerations. Ethical considerations include, informed consent of human subjects who will be participating in the research (Reynolds, 1982: 8), an agreement to confidentiality and anonymity by the researcher concerning the subjects identity and confidential statements made by the subject (Tarling, 2006: 167), and a plan to protect the subject from undesirable effects or harm which may arise as a result of the research (Kimmel, 1988). These considerations are expanded on in the subsequent chapter.

### **5.4 Critical Themes of Process Assessment in Rural ICT4D projects**

Critical themes consist of project components which play a crucial role in attempting to achieve desired outcomes of rural ICT projects (Century *et al.*, 2008: 3). They are essential aspects on which data must be collected when conducting process assessments in the implementation of such projects. This entails finding out for whom a rural ICT intervention is effective, and identifying under what conditions the intervention is effective (Linnan and Stekler, 2002: 1).

Project stakeholders need to know rapidly and fully about problems which may surface in the implementation phase of rural ICT projects, so that changes can be made as soon as possible in the project's design (Rossi *et al.*, 2004: 182). To identify these problems, project implementers need to ask critical questions on implementation performance of a project.



Answers to these questions should be compared to intended processes specified in a rural ICT projects' programme theory.

To assess questions arising from identified critical themes of process assessment, a number of methods and procedures could be employed (Pade-Khene and Sewry, 2011: 180). Methods could comprise of both quantitative and qualitative techniques. Though it should be noted, that, while applying a mixture of quantitative and qualitative instruments strengthens the evaluation exercise, limited resources often require deciding which method is most cost-effective for answering a particular question (Linnan and Stekler, 2002: 10). Considering methods without a reflection on the potential resources needed to conduct a process assessment could make the evaluation challenging (Saunders *et al.*, 2005: 143). Other factors to take into account when considering methods and procedures to employ for data collection include the frequency of data collection, the reliability and validity of chosen methods, and the potential burden the collection process will have on participants and staff members (Dey *et al.*, 2010; Linnan and Stekler, 2002: 18).

Analysis of process assessment of social programmes, evaluation of information systems in use and rural ICT4D implementation and evaluation case studies revealed that critical themes of process assessment relevant to rural ICT projects can be broadly classified into three themes; *Service Utilization*, *Organizational Function*, and *External Project Factors*

### **5.4.1 Service Utilization**

Service Utilization assesses the extent to which ICT services provided in a rural ICT project are used by the intended target population with consideration for sustainable use (Pade-Khene and Sewry, 2011: 174; Rossi *et al.*, 2004: 183). Assessing service utilization (S.U) requires the assessment of the following sub-themes:

#### **S.u 1 Coverage and Bias**

Coverage assesses the extent to which the intended beneficiary population participates in the use of ICT services provided to them (Linnan and Stekler, 2002: 12; Pade-Khene and Sewry, 2011: 174; Rossi *et al.*, 2004: 183). Eliciting data on *coverage* will keep rural ICT project implementers informed on whether or not ICT services are being used by the intended beneficiaries. An assessment of coverage is critical because for interventions to be effective, it is required that they reach their intended audiences (Linnan and Stekler, 2002: 12). *Bias* which is closely related to coverage, assesses the degree to which some target beneficiaries,

participate in a rural ICT projects intervention more than others (Linnan and Stekler, 2002: 12; Pade-Khene and Sewry, 2011: 174; Rossi *et al.*, 2004: 183).

### **Assessing Coverage and Bias (Methods and Procedures)**

To effectively assess *coverage*, it is essential for project implementers to specify or properly define who the targeted audience is prior to conducting the assessment. Failure to undertake such specification may create problems while attempting to assess coverage (Rossi *et al.*, 2004: 197), as evaluators analyzing data collected may not be able to distinguish eligible participants from non-eligible ones. Furthermore, it is imperative for the project team to specify what coverage levels they deem satisfactory (Rossi *et al.*, 2004). For instance, it should be indicated whether or not a 70% coverage rate of an entire community constitutes successful coverage or not. To assess coverage, programme records and community surveys could be employed.

Programme records may consist of screening criteria for programme intake, service records, attendance records, and records describing participants (Linnan and Stekler, 2002: 13; Mullany and Peat, 2008: 498; Rossi *et al.*, 2004: 187; Saunders *et al.*, 2005: 143). Programme records typically include descriptions of, gender, age group, occupation, income bracket and usage patterns (Linnan and Stekler, 2002: 12; Mullany and Peat, 2008: 498; Pade-Khene and Sewry, 2011: 180). Such information aids in revealing whether the intended target audience is being served or not. Furthermore, such records may reveal *biases* in coverage (Rossi *et al.*, 2004: 187). While programme records are considered an appropriate choice for eliciting data on coverage, it must be noted that there are a number of potential challenges with employing such records for data elicitation on *coverage*. For example, rural ICT projects may not maintain such records (Bailey, 2009), or such records may be incomplete or subject to errors (Rossi *et al.*, 2004). As such, the use of programme records as viable sources for eliciting data on coverage or bias necessitates proper management of such records. To properly manage programme records, management information systems (MIS's) could be used (Linnan and Stekler; 2002: 20, Rossi *et al.*, 2004:188). MIS's where properly managed for effective project implementations necessitate that programme records are constantly updated. It should be noted though, that while suggestions about the use of MIS's in ensuring storage of up to date and quality data makes logical sense, pragmatically, resource constraints could impede such implementations (Rossi *et al.*, 2004:187), especially in rural areas. Therefore, a feasible solution may be to use applications such as Microsoft office Access or Excel to

create simple databases. However, this will require that rural beneficiaries are trained to design and use these databases.

Where programme records are not readily available, community surveys could be employed to elicit data on *coverage* (Linnan and Stekler, 2002; Pade-Khene and Sewry, 2011; Rossi *et al.*, 2004). Furthermore, such surveys may be a more desirable option than programme attendance records for projects which target an entire community, and are not tailored to a narrowly defined group (Linnan and Stekler, 2002; Rossi *et al.*, 2004). Designed survey questionnaires should contain information on demographics of participants, socio economic conditions and attitudinal characteristics. Similar to programme records, such descriptions could aid in revealing information on rural ICT project *biases* through a process of contrasting participants with non-participants (Rossi *et al.*, 2004: 190). Biases could either reveal that there are eligible participants who do not participate in the project, or, it may reveal data on potential beneficiaries who use services for a while but decide to drop out after a while (Rossi *et al.*, 2004: 190). Questionnaires are an appropriate instrument for conducting community surveys (Dietz, Venczel, Izurueta, Stroh, Zell, Monterroso and Tambini, 2004).

### **S.u 2 Units Received**

This sub-theme assesses the extent to which rural target beneficiaries engage with provided training services (Linnan and Stekler, 2002: 12; Saunders *et al.*, 2005: 139). The underlying thinking for the differentiation between coverage and *Units received* is that scenarios may arise where participants attend intervention sessions without engaging and interacting with the services provided. For example, rural ICT projects involve training (Pade *et al.*, 2008; Bailey, 2009 and Dey *et al.*, 2010), of some sort to enable illiterate targets to learn to employ ICT tools and services provided. Such training sessions necessitate strategies to assess that training content disseminated is being received by rural ICT target beneficiaries.

### **Assessing Units Received (Methods and Procedures)**

In order to assess *Units received*, it is vital to understand what behaviors indicate target participant engagement (Saunders *et al.*, 2005: 140). Observation of the participants, and interviews with them could be useful assessment instruments to employ. Furthermore, administering questionnaires to training facilitators may also provide knowledge on units received, further reinforcing or dispelling data elicited from participants.

### **S.u 3 User Perception of ICT characteristics**

Effective management of a rural ICT project requires that target participation be maintained at an acceptable level and corrective action be taken, if it falls below expected levels (Rossi *et al.*, 2004). An assessment of ICT service characteristics is particularly useful for rural dwellers currently using ICT services, but using them inconsistently, or for project drop outs who may employ ICT services at the beginning of a project but eventually drop out. Such assessments are commonly conducted out to test hypothesis. For instance, attempting to explore the extent to which certain ICT service characteristics are correlated to use of services and user satisfaction with services. It is essential to note though that such an assessment cannot be conducted amongst rural dwellers who have never attempted to make use of ICT services provided. As a point of logic, potential recipients who have never used a service cannot possess any perceptual views of the service characteristics. From a service utilization point of view in a rural ICT project, an assessment of ICT service characteristics will involve elicitation of data on four aspects of ICT services being used: information quality (Delone and Mclene, 2003; Dey *et al.*, 2010), systems quality (Delone and Mclene, 2003), service quality (Delone and Mclene, 2003), and perceived usefulness (Chismar and Wiley-Patton, 2002; Davis, 1989; Malhotra and Galletta, 1999; Park, 2009; Lederer *et al.*, 2000) and the influence of these characteristics on ICT service use. It is essential to note though, that such an assessment should be conducted from a rural ICT beneficiary's perceptual view and not those of the project implementers or evaluator. Each ICT service characteristic to be measured is defined below;

- a) **Information quality** (independent variable) assesses the degree to which information being provided by ICTs conveys an intended message to rural beneficiaries in the intended way (Delone and Mclene, 2003). Success metrics to employ while attempting to assess information quality include, information relevance, ease of understanding, accuracy of information being provided, completeness of information, timeliness and usability.
- b) **System quality** (independent variable) assesses the degree to which an ICT consists of attributes desired by rural beneficiaries (Delone and Mclene, 2003). Success metrics which could aid in an analysis of *system quality* include,

perceived ease of use, access, system flexibility, system reliability and system response time.

- c) **Service quality:** (independent variable) assesses the extent to which the level of support provided by ICT service personnel is deemed satisfactory by rural ICT service users. Success metrics to employ while attempting to assess *service quality* include, empathy of ICT4D personnel, responsiveness of ICT4D personnel to technical problems and technical competence of ICT4D personnel.
- d) **Perceived usefulness** (independent variable) assesses the degree to which a user believes employing an ICT service for task related issues will effectively aid him or her in completing their task more effectively.
- e) **System use** (Dependent Variable) refers to the degree to which the system is used by the target audience.

### **Assessing ICT Service Characteristics (Methods and Procedures)**

ICT service characteristic constructs highlighted are adopted from the Delone and McIene I.S success model and the Technology Acceptance Model (TAM). Authors of these models essentially suggest that adoption of these models should only be applied using quantitative methods. For instance, they suggest that these models should only be applied for conducting analysis such as, hypothesis tests, regression analysis, and factor analysis. This restriction may be considered as an associated flaw with applying such models to rural ICT process assessments. However, the underlying reasoning for advocating for quantitative methods as indicated by these authors is that when employing these models, for instance to test hypotheses between ICT service characteristics and use, reality should be grasped in an objective way, through quantifiable measures founded on a representative sample of a population (Leclercq, 2007). They also indicate that with such observance to statistical rules, results obtained may be deemed accurate and reliable. Furthermore, it is believed that due to the weakness of the methodological criteria associated with qualitative and interpretative methods they should not be considered appropriate for assessing such constructs.

It is agreed that adhering to statistical acumen, when conducting research aids in providing analysis which can be grasped in an objective way, through quantifiable and operational

measures founded on a representative sample (Leclercq, 2007: 35). However, the research of general laws capable of predicting behaviour is strongly called into question, when dealing with a context made up of human, social and political interactions (Leclercq, 2007: 35). Considering the fact that ICTs are used in contexts made up of social, human and political interactions, general laws capable of predicting behaviour cannot be relied on solely. When related to people and their social contexts, phenomena are not immediately perceptible (Leclercq, 2007: 35). While quantitative techniques may reveal through a number of samples whether there is correlation between ICT service characteristics and use of ICT services, they do not reveal why and how these characteristics influence use in a particular rural context. Qualitative approaches allow for such inferences (Irvine and Gaffikin, 2006: 117). Thus qualitative approaches may be employed to obtain insight into the deeper meanings attached to peoples words and actions. This is not to completely rebuff the existence of scientific laws, which quantitative techniques are founded on, but it does reveal that it is not without flaws. Therefore, to complement quantitative techniques employed to assess ICT service characteristics, it may be helpful to also use qualitative approaches. Methods such as observation and interviews may be employed to find out how and why a rural user in their situated context feel ICT service characteristics influence their use of such services. To design appropriate questions to ask, with regard to a user's perception of information quality, system quality, service quality and perceived usefulness, indicators highlighted for each of these constructs may be used as guidelines.

### **S.u 4 Sustainable use factors**

This sub-theme assesses for the presence of sustainable use practices, and target beneficiary indications which suggest that there will be continuous use of ICT services by rural beneficiaries in the long term. Aspects to assess here include, the extent to which socially excluded groups participate in project activities, the extent to which users opinions on services offered are considered, adoption of appropriate technology, training and capacity building of target audiences in the use and maintenance of ICT equipment, ensuring training is consistent with job market needs and other development needs, and finding out motivations for technology adoption by beneficiaries and whether or not such motives are in alignment with beneficiaries values (Baily, 2009; Pade *et al.*, 2008).

### Assessing Sustainable use factors (Methods and Procedures)

To monitor for the presence of practices which are believed to promote sustainable use of ICT services by beneficiary audiences, observation and interviews could be employed (Pade-Khene and Sewry, 2011: 180). The semi structured or informal interview tool may be considered an adequate tool to assess this sub-theme because with the semi structured interview approach, questions available will constitute an interview guide/schedule, with prompts in some topics to explore or probe for information (Pade, 2006: 118). Potential participants who may be interviewed in such an assessment could include; project team members, project champions and rural beneficiaries (Pade, 2006: 118). Observation may also be used to investigate and re-enforce information elicited from groups interviewed. Table 5.1 below summarizes Service utilization sub themes and appropriate methods/instruments for assessing them.

Table 5.1: Summary of service utilization sub-themes

Service Utilization sub-themes	Description of sub-theme	Method/instrument			
		Programme records	Questionnaires	interviews	Observation
Coverage and Bias	<i>Coverage assesses the extent to which the intended beneficiary population participates in the use of ICT services provided to them, and the extent to which some sub groups participate more than others in the project.</i>	*	*		
Units received	<i>Assesses the extent to which rural target participants engage with provided training services.</i>			*	*
User perception of ICT service characteristics	<i>Assesses an ICTs information quality, systems quality and perceived usefulness from rural dwellers perspective to find out the extent to which these quality aspects influence use.</i>		*	*	*



Sustainable use factors	<i>Assesses for the presence of sustainable use practices which suggests that there will be continuous use of ICT services in the long term.</i>			*	*
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### 5.4.2 Organizational Function

Assesses whether a rural ICT project is performing well in managing its efforts and using its resources to accomplish its essential tasks (Pade-Khene and Sewry, 2011: 174; Rossi *et al.*, 2004). Organizational management function is a critical theme in rural ICT project implementations because; effective organizational management potentially leads to effective ICT4D implementations (Walton and Heeks, 2011: 7). Organizational function (O.f) can be broken into four sub-themes which necessitate assessment. Amongst these sub-themes are service delivery, project support functions, flexibility, and sustainable organizational practices.

#### O.f 1 Service Delivery

This is the key component to assess with respect to organizational function (Rossi *et al.*, 2004: 191). For many programmes or projects that fail to show impacts, the problem is a failure to deliver the interventions (services) specified in the programme theory, a problem generally known as implementation failure (Rossi *et al.*, 2004). An assessment of service delivery entails assessing the extent to which a rural ICT project’s service delivery is consistent with intended specifications of service delivery in the projects plan or programme theory. Service delivery issues could further be broken down into questions about *units delivered* (Century *et al.*, 2010; Linnan and Stekler, 2002: 13) and *service quality* (Century *et al.*, 2010; Delone and Mclene, 2003; Linnan and Stekler, 2002: 13).

**O.f 1.1 Units delivered:** Attempts to elicit data on whether delivered units of ICT training or other services provided to the intended target beneficiaries approximate intended ones (Century *et al.*, 2010; Linnan and Stekler, 2002: 13).

#### Assessing Units Delivered (Methods and Procedures)

To assess *units delivered*, it is firstly expected that each service provided by a rural ICT project intervention is described in operational terms (Century *et al.*, 2010; Linnan and Stekler, 2002: 17; Rossi *et al.*, 2004: 195). For instance, if a rural ICT project intervention is composed of five service types, each service type must be distinctly defined. Aspects to



include when specifying service components could consist of the following: activities which take place in the service being described, participant descriptors and a description of what constitutes acceptable performance. Following an adequate specification of services provided, data must be collected to assess the extent to which project operation for each service matches project specification as intended (Rossi *et al.*, 2004). A rural ICT project's organizational plan, programme syllabus or training manual could serve as appropriate guides when attempting to specify services provided by the project. The programme theory more importantly, is a suitable guide because, it delineates the intended functions and activities that a project is expected to perform, as well as the human, financial and physical resources essential to enable such performance (Pade-Khene and Sewry, 2011: 228; Rossi *et al.*, 2004: 142). Potential instruments which may be employed to investigate and determine the extent to which units delivered match specification of units proposed to be delivered include, stories elicited from informal interviews, observation supported by media tools (photography, video and audio), facilitator questionnaires, facilitator logs and document analysis (Century *et al.*, 2010; Pade-Khene and Sewry, 2011: 180, 181; Rossi *et al.*, 2004; Saunders *et al.*, 2005: 143). However, as indicated earlier on, methods selected will largely depend on resources available, amongst other factors like the frequency of data collection and the potential strain on personnel responsible for routinely collecting such data (Linnan and Stekler, 2002: 18). Once data has been collected, evaluators are then expected to describe a project's operation and performance with respect to units delivered. This process of describing a rural ICT project's operation and performance forms part of the analysis phase of data collected on the projects operation (Rossi *et al.*, 2004). Performance may also be compared to other project sites or compared with results from different project implementation iterations (Pade-Khene and Sewry, 2011: 177; Rossi *et al.*, 2004).

### **O.f 1.2 Service quality**

Entails assessing the manner in which a rural ICT project is implemented. Such aspects are not directly related to the implementation of prescribed content (Century *et al.*, 2010: 208). An assessment of *service quality* is critical at the implementation phase of rural ICT projects, because, good *service quality* leads to increased community buy in and use of services resulting in increased user satisfaction which is considered a direct antecedent of project outcomes (net benefits) (Delone and Mclene, 2003). An assessment of service quality, for example, could include an assessment of pedagogical strategies (ICT training methods)

employed (Century *et al.*, 2010: 208) by the project team, project champions, or facilitators while administering training sessions to target beneficiaries.

### **Assessing Service Quality (Methods and Procedures)**

Considering that quality is a subjective notion (Linnan and Stekler, 2002: 13), it may be up to rural ICT project implementers, target audiences and evaluators to collaboratively decide on what acceptable levels of service quality should be. Potential instruments that may be employed when assessing service quality include, observation, interviews, questionnaires (serv-qual) and the review of facilitators logs (Delone and McIene, 2003; Linnan and Stekler, 2002; Century *et al.*, 2010).

### **O.f 2 Project Support Functions**

Assesses the extent to which rural ICT project support activities are coordinated to enhance success. Factors considered here mainly relate to project management functions. Examples of project support functions include, fund raising strategies, public relations to enhance the project's image with potential sponsors, staff recruitment and training of staff and governance issues, funder's accountability towards project objectives, ensuring local needs technology fit, management capacity in the areas of human resources, technology, finance and politics, equipment procurement, and accessibility measures (Pade-Khene and Sewry, 2011: 175; Rossi *et al.*, 2004: 197; Valadez and Bamberger, 1994 ).

### **Assessing rural ICT project support functions (Methods and Procedures)**

Assessing support functions necessitate similar measures as those taken to assess the *unit delivery* aspect of service delivery. Similar to units delivered, an assessment of project support functions will entail a specification of each support function. Subsequently, descriptions will be made of operation with regard to each support function and if performances of such operations are acceptable or suitable (Rossi *et al.*, 2004).

**O.f 3 Flexibility:** Assesses the adaptability of a rural ICT project to changes in the rural environment and demand driven needs of the beneficiary community (Pade-Khene and Sewry, 2011: 175; Walton and Heeks, 2011: 8). Examples of essential aspects to assess with regard to rural ICT project flexibility include, an assessment of the future adaptations a rural ICT project may be subjected to in a rural environment, and ensuring that these changes can be easily accommodated. An illustration of such an assessment may be to assess for

competencies, which rural ICT project champions may need to develop based on emergent needs of rural ICT beneficiaries (Bailey, 2009). Furthermore, an assessment of flexibility may also include, an assessment to determine whether the proposed rural ICT project is constraining flexibility (for example, gaining an understanding of how traditional information flows could be affected negatively or positively by the project (Pade-Khene and Sewry, 2011: 175). Lastly, an assessment of flexibility could entail an assessment to determine the extent to which a rural ICT project incorporates lessons learned from past failures (Walton and Heeks, 2011).

### **Assessing Flexibility (Methods and Procedures)**

Tracer studies could be employed to elicit data on a rural ICT projects flexibility (Pade-Khene and Sewry, 2011: 180). Tracer studies present qualitative remarks on ICT usage patterns overtime, consequently, they aid in the identification of services which have proven to be useful and how they have been applied (Pade-Khene and Sewry, 2011: 180). Once tracer studies have aided with identifying services which have proved useful to rural beneficiaries overtime, it will then be essential to investigate the extent to which a rural ICT project has incorporated changes to ensure that services which have proved useful are further enhanced, or how they plan to incorporate such necessary changes. Though texts analyzed do not suggest any appropriate methods to employ while attempting to investigate the extent to which a project has or plans to incorporate desired changes, it may be useful to employ qualitative techniques such as semi structured or informal interviews and observation. Interviews and observation methods may also be employed to elicit data on the extent to which ICT4D projects positively or negatively influence traditional information flows, and the extent to which lessons from past failures are incorporated into a rural ICT4D projects implementation.

### **O.f 4 Sustainable Organizational management practices**

This sub theme assesses for the presence of sustainable practices which potentially promote continuous project operation in the long term. The inability of many projects to persist in the long run is one of the major challenges being faced by rural ICT projects (Heeks, 2009: 4). As such, this is a critical aspect to assess in the implementation phase of such projects. A sustainable rural ICT project requires that there are organizational and financial arrangements for managing service delivery and for ensuring that ICTs and network infrastructure will be maintained on a regular basis (Valadez and Bamberger, 1994: 33). For example, it will be

essential to elicit data about operating costs and comparing such costs to revenue generation, elicit data on technical support available, and a project management's commitment to project continuation (Hudson, 2001: 179). It is essential to note though that while some of these factors may be assessed in other sub-themes of organizational function, it is still imperative to check that there is good performance for such aspects, as their presence is crucial to the sustainability of the project's operation.

### **Assessing Organizational Practices which Promote Rural ICT Project Sustainability**

To assess organizational practices which promote project operational sustainability, the rural ICT project life cycle (RICT-PLC) critical success factors (CSFs) applicable to a projects organizational function could be employed as a checklist or as an observation guide. Some questions which the RICT-PLC CSF's address in relation to organizational or project functional sustainability include:

- The extent to which an ICT project is incorporated to enhance existing rural development activities
- Whether or not project champions are being cultivated
- Whether or not there is a good understanding of the local political context,
- The extent to which the project builds on local information and knowledge systems.

Other aspects which may be considered include, ensuring that project operating costs do not exceed project revenue generation, the effectiveness and efficiency of technical support available, and the project management's commitment to project continuation (Hudson, 2001: 179). Qualitative instruments such as semi structured interviews, participant observation and document analysis could be employed to investigate these aspects (Pade *et al.*, 2008: 35).

Table 5.2 summarizes organizational functional sub themes and suggested methods/instruments deemed appropriate for assessing them.

Table 5.2: Summary of Organizational function sub-themes

Organizational Function sub-themes	Description of sub-theme	Method/instrument					
		Document analysis	Questionnaires	Semi structured/informal interviews	Direct observation supported by media tools	Facilitator logs	Tracer studies
<b>Service Delivery</b> <ul style="list-style-type: none"> <li>• Units delivered</li> <li>• Service quality</li> </ul>	<b>Units delivered:</b> <i>Assesses the extent to which delivered units of ICT services provided to target audiences approximate intended ones.</i>	*	*	*	*	*	
	<b>Service quality:</b> <i>Assesses the manner in which services are provided by intervention staff to enhance project success.</i>	*	*	*	*	*	
<b>Project support functions</b>	<i>Assesses the extent to which rural ICT project support activities are coordinated to enhance success. For example, fund raising activities, and public relation strategies to enhance projects image.</i>	*	*	*	*		
<b>Project Flexibility</b>	<i>Assesses the adaptability of rural ICT projects to changes in the rural environment and demand driven needs of the target community</i>	*		*	*		*
<b>Sustainable practices which promote project sustainability.</b>	<i>Assesses for the presence of sustainable practices which will promote continuous project operation in the long term.</i>	*		*	*		

### 5.4.3 External Project Factors

External project factors attempt to assess institutional support and contextual factors which to a large extent cannot be controlled by a rural ICT projects management but affect a rural ICT projects implementation. As the definition suggests, two sub-themes are essential to assess with regard to this critical aspect:

### **E.pf1 Institutional support**

Assessing institutional support, relates to an assessment of partnering institutional agencies and community organizations (for example, N.G.O's, local government, academia, local community art groups and community entrepreneurs) efforts in relation to their roles towards the achievement of rural ICT project goals (Valadez and Bamberger, 1994).

#### **Assessing Institutional Support (Methods and Procedures)**

Assessing the level of local institutional support, whilst a challenging task, is also essential to a rural ICT4D project success. The essentiality of such an assessment is based on the fact that local institutions play a crucial role in maintaining the sustainability of rural ICT4D projects (Walton and Heeks, 2011: 6). However, as indicated such an assessment might be difficult to conduct, because many of the causes of participation or, non-participation from local institutions are complex (Valadez and Bamberger, 1994: 135). For example, it is often not easy to determine whether lack of participation from a partnering institution is as a result of an exclusion policy or a lack of interest from such an institution (Valadez and Bamberger, 1994: 135). Methods on how to conduct assessments of such aspects are not sufficiently documented on. However, interviews and observation may be used.

### **E.pf 2 Contextual Factors**

An assessment of contextual factors relates to an assessment of social, political and economic aspects of a rural community, which affect a rural ICT project's implementation (Linnan and Stekler, 2002). Contextual factors play a critical role in determining outcomes of rural ICT projects. In some instances, a project may be able to make adaptations based on identified contextual factors; considering the integration between technology and context will vary according to context (Bailey, 2009: 13). For example, the enactment of a rural ICT project targeting both women and men in a community which does not support female education may require that implementers identify measures to deal with such a local context. Even though including such measures may not have previously been part of the projects plan.

#### **Assessing Contextual Factors (Methods and Procedures)**

To assess contextual factors which affect the implementation phase of rural ICT4D projects, interviews using open ended questionnaires could be administered to project administrators,

project staff, and project facilitators (Saunders *et al.*, 2005: 143). It is also critical to conduct interviews with local community members as they often provide valuable insight into the context which they live in. Such methods should not only attempt to elicit information on contextual factors which affect a rural ICT project, but also attempt to explain how identified factors influence a rural ICT projects implementation.

Depicted in table 5.3 is a summary of external project factors, its sub themes and identified methods for assessing them.

Table 5.3: Summary of External Project Factor sub-themes

External project factors sub-themes	Description of sub-theme	Method/instrument	
		Semi structured interviews	observation
<b>Institutional Support</b>	<i>Assesses institutional capacity and performance of partnering institutional agencies and community organizations in relation to project goals. Some examples of partners include local governments, and N.g.o's</i>	*	*
<b>Contextual Factors</b>	<i>Assesses social economic and political aspects which affect a rural ICT projects implementation; for example gender biases</i>	*	

## 5.5 Conclusion

A process assessment assesses how well a rural ICT project is operating to implement its intended functions as stipulated in the project plan (Pade-Khene and Sewry, 2011: 174). Evaluation questions of a rural ICT project process assessment are tailored around critical themes of process assessment. For a rural ICT project's process assessment, critical themes represent the most essential aspects which should be assessed throughout the implementation

of a rural ICT project. Critical themes of process assessment in rural ICT project consist of, service utilization, organizational function and external project factors. These critical themes are further broken down into sub themes which necessitate assessment. With identified themes, their assessment methods and procedures and guiding principles to apply when conducting a process assessment, a framework is proposed. The RICTP-PAF seeks to guide an evaluator in conducting a process assessment in a real life rural ICT project. In order to obtain a better understanding and application of the RICTP-PAF, a real-life case study investigation reveals the lessons learned (shortcomings and suitability) from applying such a framework in a rural environment.



## Chapter 6

### Case study Research Methodology

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*The research methodology employed to explore the application of the RICTP-PAF in a real life rural ICT project is explained. The applied research strategy and case study design is also outlined.*

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### **6.1 Introduction**

The RICTP-PAF can be explored in a real-life rural ICT4D project environment. Such an exploration aids in revealing the shortcomings and suitability of methods and procedures employed to assess critical themes of the RICTP-PAF. The proposed exploration is conducted by applying a rich case study strategy which enables an understanding of the phenomena being studied. This chapter is composed of an outline and description of the research methodology and employed strategy for exploring the RICTP-PAF in an existing rural ICT project.

Firstly the research paradigm used is explained. This is followed by a discussion of the case study strategy. Subsequently, the scope of the application of the RICTP-PAF is outlined. This is then followed by a description of the case study design, and ethical considerations. The case study design described provides suitable strategies and techniques for collecting and analysing the case study data.

### **6.2 Research Paradigm**

The design science paradigm is employed to conduct the research. The paradigm is viewed as a suitable approach, as the research seeks to apply the RICTP-PAF (artifact) in a real life rural ICT project environment (Hevner *et al.*, 2004: 75). Furthermore, an evaluative exercise of the application of the RICTP-PAF, which presents the suitability and shortcomings of the framework, suggests the appropriateness of the design science paradigm (Hevner *et al.*, 2004: 77).

### **6.3 Research Strategy**

A case study research strategy is employed to explore how critical themes of process assessment are applied in a real life rural ICT4D project environment. A case study is conducted in natural settings, with the intention of comprehending the nature of a contemporary phenomenon (Andrade, 2009: 42). As such, it allows the researcher to grasp a holistic understanding of how the RICTP-PAF may be applied, and why it is applied appropriately in particular ways (Andrade, 2009: 42). Yin (2003: 13) defines a case study as an empirical inquiry that investigates a contemporary phenomenon in-depth and within its real life context, especially when the boundaries between phenomena and context are not clearly evident. Exploring and applying the RICTP-PAF in a real life environment enables the researcher to learn lessons from such an application. Lessons are learned through the identification of the shortcomings and suitability of applying the RICTP-PAF.

To conduct this research, a *single* rich case study is employed to explore and understand the framework. While there is scepticism about the possibility of generalizing from single cases, such cases contribute to knowledge, in that they are generalizable to theoretical propositions (Yin, 2009: 15). As such, a strong motive for applying a single case study is that it represents a unique case for applying a well formulated theory on assessing critical themes of process assessment in rural ICT projects. The development of the RICTP-PAF can be viewed as a continuous learning process, (for future research) into appropriately assessing critical themes of process assessment by employing appropriate methods.

The described case study investigated is the Siyakhula Living lab (SLL). The SLL is a rural ICT project located in the Eastern Cape of South Africa. The SLL represents an appropriate case, because prior to the application of the RICTP-PAF, no formalized process assessment has been conducted in the SLL. Furthermore, the boundaries between underlying theoretical propositions on assessing critical themes of project performance in a rural ICT project and carrying out such an assessment in the context of the SLL are not clearly evident. Therefore, application of the RICTP-PAF in such an environment facilitates learning for the researcher, the project and its stakeholders.

The in-depth case study will involve two levels of inquiry;

### **Level 1**

Firstly, the RICTP-PAF is applied. While applying the RICTP-PAF, both quantitative and qualitative methods are employed. Methods selected are, however, largely dependent on the sub-theme being assessed (Bliss and Enshoff, 2002: 8; Leclercq 2007; Rossi *et al*, 2004), and the resources available to the evaluator (Linnan and Stekler, 2002; Rossi *et al*, 2004).

### **Level 2**

Secondly a descriptive reflection on the application of the RICTP-PAF is carried out. This involved both detailing how suggested guidelines which also constitute part of the RICTP-PAF are applied, along with how instruments are employed to assess various sub-themes. Furthermore, integrated into this phase is a descriptive reflection of the application of the RICTP-PAF, detailing the appropriateness of the framework in the SLL. This approach is based on the design science paradigm, where the application of a developed artifact (RICTP-PAF) is observed, to determine its suitability and

shortcomings (Hevner, March and Park, 2004). Such a process produces lessons, through highlighting the suitability and shortcomings of applying the RICTP-PAF in the real life environment. The approach is appropriate for research of this nature, as it forces the researcher to overcome his apprehension about exposing his decisions, mistakes and shortcomings during the application of the RICTP-PAF (Irvine and Gaffikin, 2006: 115). Instead, the evaluator leaves such vulnerable spots open to criticism by the observant audience (Irvine and Gaffikin, 2006: 115). The descriptive and evaluative phases are conducted using a qualitative approach. The qualitative account, referred to here is not one about the living lab being studied, but one on the researcher's reflective account of his application of the RICTP-PAF in the SLL. The qualitative method uses descriptive words to relay intricate details of phenomena that are difficult to convey with quantitative methods (Irvine and Gaffikin, 2006: 117).

### **6.4 Scope of the RICTP-PAF Application**

The application of the RICTP-PAF is limited to the *Service Utilization* theme. The selection of this theme is based on suggestions by key stakeholders and observation by the researcher, which reveal the need for such an assessment at this point of the SLL's existence. These suggestions and observations indicate low usage of services by proposed beneficiaries. The assessment consists of four sub-themes of service utilization, Coverage and bias, user perceptions of ICT service characteristics, presence of sustainable use practices and training units received. Nonetheless, it should be noted that the assessment, where possible touches on the other themes (organizational function, project external factors), to set the foundation for future ongoing assessment.

### **6.5 The Case Study Design**

The case study design provides a logical map which links the case study data to be collected, and the conclusions to be drawn from the proposed case study questions (Yin, 2009: 24). The design serves as a guide whilst conducting the case study, to avoid a situation in which data collected and analysed fails to address the initial case study questions posed (Yin, 2009: 27). The RICTP-PAF specifies the design of the first level of the case study, which assesses the critical themes of process assessment in the SLL. While this forms part of the case study report, the design being described here relates to the second phase of the case study. The research design is composed of the following elements which guide the second level of the case study process.

### **6.5.1 The Case Study Research Questions**

The case study seeks to explore in depth, how critical themes of process assessment should be assessed in the SSL. The case study research questions that are addressed are as follows:

- a) How should the RICTP-PAF be applied to assess service utilization in the ongoing implementation of the SSL?
- b) Why is the RICTP-PAF applied to assess service utilization in the manner it is applied?

### **6.5.2 The Unit of Analysis**

The unit of analysis defines what the subject of the case study is. This represents what the case is (Yin, 2009: 29). For this research, the unit of analysis is the *application of the RICTP-PAF* to assess the *Service Utilization* critical theme (shortcomings and suitability) in assessing the SLL.

### **6.5.3 The Research Instruments**

Instruments employed to examine the application of the RICTP-PAF in the SLL primarily consist of interviews, participant observation and document analysis.

#### **6.5.3.1 Interviews**

Interviews are instrumental to the proposed case study, as they aid the researcher in gaining insight into project stakeholder views on the application and need for process monitoring in the SLL. This is mainly achieved through the employment of semi-structured interviews. Open ended by nature (Gillham, 2000: 41; Knox and Burkard, 2009: 2), semi-structured interviews allow the researcher to present a standard set of questions to which respondents answers may vary in the level of detail (Turner, 2010: 756). Answers of varying depth of details may then lead to further probing by the investigator (Knox and Burkard, 2009: 2).

Stakeholders interviewed consist of the SLL project management (external stakeholders) and rural project champions, teachers and community members (internal stakeholders). Interviews are either conducted in focus group settings or with individual respondents in one on one meeting sessions. The focus group setting is appropriate for answering questions which may require communication among stakeholders (Creswell, 2007: 133). However, one on one interview sessions are employed where it is found that individual stakeholders may be reluctant to voice their opinions in group settings. Interviews are likely to take place for a duration of 20 to 30 minutes.

The planning of the interview has also taken some guidelines into consideration to ensure that data elicited produces maximum value for the case study. The following guidelines are adapted from Gillham (2000: 41) and Yin (2009: 106) to guide a semi-structured interview process;

- The Questions are open ended, where the interviewer raises topics where specific kinds of answers are expected, but where the actual answers are entirely up to the respondents (Gillham, 2000: 41).
- Question orders follow some sort of logic, so that questions can be seen as following on from preceding ones (Gillham, 2000: 41).
- Questions are not designed in such a way that respondents are coerced to give specific answers (Gillham, 2000: 41).
- The Questions asked follow the line of inquiry of the case study (Yin, 2009: 106)
- Questions are designed to ensure that they are not threatening to prospective respondents (Yin, 2009: 107).

A draft of the proposed interview schedule can be found in Appendices E and F.

Turner (2010: 757) suggests that for an interview process, it is essential to not rely on memory for the interview process. Therefore, the following tools are employed to support elicitation and reinforcement of information provided by respondents:

- An audio recording device is employed. Such a device provides a more accurate option than any other method in enabling the recall of interview proceedings (Yin, 2009: 109).
- Stationary tools such as pencils, pens, highlighters and note pads are also employed. These tools are used by the researcher to record notes during the interview process.

It is also taken into consideration, that all potential respondents must be informed sufficiently about the interview process prior to their approval of participation (Knox and Burkard, 2009: 12).

### **6.5.3.2 Participant Observation**

Participant observation as a research instrument requires the researcher to have a role within the setting of the research environment (Yin, 2009: 111). In addition to participation, it is also required that the researcher simultaneously observes the social phenomena he or she is

attempting to document (Hume and Mulcock, 2004). Participant observation is useful to this research as it allows the researcher, who is applying the RICTP-PAF in the SLL, to observe how the assessment is conducted. Furthermore, such a method aids the researcher in reflecting on why particular sub-themes are assessed (Creswell, 2007: 138) in the way that they are. Many have argued that such an instrument may prove invaluable in producing an accurate portrayal of the phenomena being studied in the case study (Yin, 2009: 112). As such, a stepwise approach is adopted to guide the use of participant observation (Creswell, 2007: 134):

- **Identifying the subject of observation:** The subjects of observation for the case study are the methods and procedures employed while applying the RICTP-PAF in the on-going implementation of the SLL. Furthermore, observations are made of the reactions of various stakeholders' who are interacted with during the assessment process.
- **Articulating and specifying the role to be assumed by the observer:** The observer primarily assume a participatory role, as he plays a significant role in conducting the assessment.
- **Design of an observational protocol:** The observational protocol aids in recording notes on the assessment activities. Experiences, challenges and lessons learned are recorded. Notes are composed of descriptive and reflective aspects. Descriptive notes attempt to outline summaries of how particular critical themes are assessed. Summaries in descriptive notes are chronologically ordered. Reflective notes contain the researcher's reflection of the assessment. Such a reflection attempts to specify reflective articulations about why particular critical themes are assessed the way they are, experiences of trained data collectors and attitudes of project stakeholders to the assessment. Project management and local stakeholder opinions on the assessment are recorded.

The primary tools employed for the observation exercise include, stationary tools such as (pencils, pens, highlighters and note pads), and an audio recorder.

### 6.5.3.3 Document analysis

Systematic searches for relevant documents are essential in any data collection design (Yin, 2009: 103). Firstly, reports generated from prior assessment activities are reviewed. Such reports may reveal valuable information about the operation of the SLL and its context. Prior

assessment reports which are reviewed include the Baseline Study, Needs Assessment and the Programme Theory Assessment conducted in the SLL. Documents analysed are employed to corroborate or augment evidence from other sources.

### **6.5.4 Data analysis**

The analytical strategy for this case study is underpinned by the derived theoretical RICTP-PAF. Clearly, the proposition (RICTP-PAF) aids in directing concentration to certain data and disregarding other data (Yin, 2009: 130). As such, the RICTP-PAF may serve as a suitable guide for the data analysis phase. Furthermore, the 'Explanation building' analytical technique common to case studies is employed. Through explanation building, the researcher attempts to analyse the case study, through building an explanation about the case (Yin, 2009: 141). The explanation building approach is iterative by nature (Yin, 2009: 143). As applicable to this research, the researcher is tasked with continuously refining the proposed RICTP-PAF. The refining process is achieved through an application of the RICTP-PAF in the SLL. The findings from the application of the RICTP-PAF in the SLL are compared to the proposed theoretical RICTP-PAF, and subsequently, revisions are made to the theoretical framework (Yin, 2009: 143). The process is as follows (Yin, 2009: 143):

1. Review the proposed RICTP-PAF.
2. Compare the findings from the case study data collected through the application of the RICTP-PAF to the SLL.
3. Revise the theoretical framework.
4. Compare other details of the case against the revision (for instance details elicited from interviews, document analysis and observation).

Future research

5. Compare the revisions discovered through the case study findings to other case scenarios.
6. Repeat the process as necessary.

### **6.5.5 Ethics**

Social research evaluators often encounter ethical challenges due to the fact that they assume the responsibility of determining what is beneficial in social programmes and policies (Kimmel, 1988: 30). Furthermore, their work may influence people who receive benefits as well as programme sponsors (Kimmel, 1988: 30). As such, it is essential to address ethical issues whilst conducting research of this nature. Even more compelling, as it relates to this



research, subjects or participants of social research are often selected from a relatively powerless community of individuals (Kimmel, 1988: 37), who may be vulnerable and risk exploitation by the researcher. Therefore, in conducting the case study, the following ethical considerations are applied:

- **Ethical Approval Sought:** Prior to conducting the research, ethical approval is sought from the institutional and review board for ethics in the information systems department at Rhodes University.
- **Informed Consent:** This is considered a fundamental norm which governs the relationship between the investigator and the participants (Kimmel, 1988: 67). Ethical conflicts may arise where this rule is violated (Kimmel, 1988: 67). With regard to this norm, it is required that the researcher provides research participants with sufficient information for participants to rationally consent to or decline participation (Reynolds, 1982: 8). To ensure informed consent respondents are given informed consent forms to sign, prior to eliciting information from them. Forms employed, include brief descriptions of the purpose of the research and the expected uses of findings from the research. Furthermore, included on the forms are the rights of respondents as regards participation. Respondents are also verbally informed that they are well within their rights to ask questions or withdraw at any given moment. A copy of employed informed consent forms employed is available in Appendix G.
- **Confidentiality and Anonymity:** Based on the fact that research participants share their attitudes, thoughts and experiences it is essential to assure participants of their anonymity with regard to information offered in confidence (Tarling, 2006: 167). As such, names of participants who the researcher engages in interview proceedings with are kept anonymous.
- **Protecting Participants from Undesirable effects:** Participants of social research may be vulnerable to the following sorts of undesirable effects or damages (Kimmel, 1988: 37); a) actual changes in their characteristics, such as physical health, attitudes, personality and self-concept b), an experience that fuels anxiety or tension, c) collection of private information that might embarrass them or make them liable to legal action, d) receiving unpleasant information about themselves which under normal circumstances may not have been necessary to hear, e) Invasion of privacy through elicitation of certain types of damaging information. All of the above risks may not be pertinent to this case study, however where applicable, the investigator

takes precautionary measures to ensure such risks on participants are averted. For instance, there have been several accounts in the Dwesa region, of several investigations where community members have been falsely informed that an improvement in their livelihoods will automatically follow (Pade-Khene and Sewry, 2011: 218). As a result, community members become sceptical of research, or for the less informed, vainly overenthusiastic, such that they become discouraged and pessimistic when their expectations are not met (Pade-Khene and Sewry, 2011: 219). Thus, the researcher ensured that it was made clear to respondents that development is a gradual process, and often time's benefits from such research may not be immediately evident. This is repeatedly made clear to participants during the research process.

### **6.6 Conclusion**

The case study strategy is suitable for exploring the application of the RICTP-PAF in a real life rural environment. The in-depth case study involves two levels of inquiry. Firstly, the RICTP-PAF is applied in the SLL. Secondly, the application of the framework is evaluated through a description and reflection of the process. Consequently, this produces lessons learned through the identification of the suitability and shortcomings of procedures employed to assess critical themes. Qualitative instruments are primarily employed for the observation and reflective phase, which constitutes the main focus of the case study. Furthermore, the case study highlights suitable strategies and techniques for analysing the case study data, to enable the exploration and presentation of the RICTP-PAF in a real life context.

## Chapter 7

### A Case Study Exploration of Process Assessment in the Siyakhula Living Lab

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*This chapter reflects on a process assessment of the Siyakhula Living Lab, through the application of the RICTP-PAF. The suitability and shortcomings of the framework are descriptively reflected on through observation of the application of the framework. Lessons learned are highlighted.*

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### 7.1 Introduction

The application of the RICTP-PAF in a real life rural ICT project environment can highlight useful lessons (suitability and shortcomings) of applying the framework in a real life environment. This chapter details an in depth case study description of a process assessment conducted in the Siyakhula Living Lab (SLL) rural ICT project, by employing the RICTP-PAF. Lessons learned from applying the RICTP-PAF seek to inform research of its applicability and suitability in assessing critical aspects of rural ICT project implementation processes.

This chapter begins with an overview of the SLL, including its presence in a rural context, its underlying objectives, deployed ICT infrastructure and a detailed description of its conceptual design as depicted in its programme theory. This is followed by a reflective account of the application of the RICTP-PAF in the SLL, including lessons learned. The application of the RICTP-PAF, however, is limited to one critical theme (service utilization) and its sub-themes, as this represented a key aspect which currently requires assessment in the ingoing implementation and direction of the SLL. The sub-themes assessed include, coverage and bias, user perception of ICT service characteristics, the extent to which practices that promote the sustainable use of ICT provided services are applied, and an assessment of training units received. The conclusion from reflecting on the assessment process of these sub-themes summarises the findings and concludes that the results obtained aid in reflection and subsequent revisions to the RICTP-PAF.

### 7.2 An Overview of the Siyakhula Living Lab

The *Siyakhula Living Lab* (SLL) was initiated in 2005 as a joint effort between the Telkom Centres of Excellence in the Computer Science departments at the University of Fort Hare and Rhodes University. The underlying objective of the (SLL) is to develop and test a distributed, multifunctional community communication platform, to distribute to impoverished and semi-impoverished communities in South Africa (Pade *et al.*, 2009b). Siyakhula is a Xhosa word which means ‘we are growing’ as the project would desire (Pade *et al.*, 2009: 7): It aims to grow in its innovation and sustainability. The SLL is currently located in the Mbashe municipality in the rural Transkei of the Eastern Cape in South Africa. Dwesa forms part of the Dwesa-Cwebe area which encompass the protected area (nature reserve) and the extended frontline (Palmer, Timmermans and Fay, 2002). The SLL’s current site of operation provides long distance wireless telecommunications infrastructure, as well as, Internet connectivity. Furthermore, the SLL attempts to support local activities through

employing indigenous knowledge for the proof of concept of e-service applications such as; e-commerce, e-government and e-health. Attempts to support local activities are also complimented with the idea of research capacity building, where researchers from both Rhodes University and the University of Fort Hare are given an opportunity to conduct research in a real life environment.

In addition to relations between the Telkom Centres of Excellence (CoE) at Rhodes University and the University of Fort Hare, the SLL is also comprised of partnering agencies. These agencies include; The Cooperation Framework on Innovation Systems between Finland and South Africa (COFISA), South Africa Finland Knowledge Partnership on ICT (SAFIPA), Saab Grintek, Tellabs, Easttel, Khula Technologies, StorTech, GENBAND and the Grahamstown School project (e-Yethu). Relationships formed through these partnerships portray the essence of a living lab, which as indicated by Pade-Khene and Sewry (2011: 222), is to support the co-creation of new products, services, businesses and technologies in real life environments and virtual networks in multi-contextual spheres.

The SLL has evolved with its objective, and therefore, now includes a generic service integration platform to underpin services for rural and peri-urban parts of South Africa. This added dimension to the project seeks to transform the test of the service integration platform in the SLL into robust industrial products, which may be deployed throughout rural areas in South Africa. As such, a software development company (Reed house systems) has been developed solely for this purpose. Reed House systems, which commenced operations in 2010, is currently located at Rhodes University, and as one of its outputs has developed a service integration platform called TeleWeaver, to support the creation and deployment of applications particularly developed for rural and marginalized communities.

### **7.3 The SLL Presence in the Mbashe Municipality**

While there are plans to expand the project to other parts of South Africa, at present, the SLL is located in the Mbashe municipality. The project commenced operation with five schools located in surrounding villages in the Mbashe municipality. The initial schools where the project began operation include, Mpume Junior Secondary School, Ngwane Senior Secondary School, Mtokwane Junior Secondary School, Nondobo Junior Secondary School and Nqabara Senior Secondary School (Pade Khene and Sewry, 2011: 224). The Mbashe municipality was specifically selected due to previous ties formed between a researcher at Rhodes University (Professor Robin Palmer) and the community in a prior land claiming

process. To add on, it was anticipated that the area had potential for development due to its unspoiled natural scenic beauty and beaches which may serve to attract tourists, thus promoting eco-tourism in the region. Furthermore, the region also consists of a nature reserve with chalets, which serve to accommodate visiting tourists to the region. However, while it was anticipated that such opportunities for development could be exploited, it was also discovered that eco-tourism in the region was severely impeded by a dearth of knowledge and experience by the community on how to take advantage of tourism in the region (Pade-Khene and Sewry, 2011: 223). These reasons, coupled with other observed development challenges, such as, low quality of life, bad transportation infrastructure, high levels of migration, limited access to government services, poor education and health care facilities and high unemployment rates, made this site a potential target for development initiatives.

The selection of schools as appropriate sites to host the project was based on three major reasons:

- Schools in the area provide simplified neutral access to ICT infrastructure for the community members,
- Schools provide suitable teaching and learning structures for such marginalized groups,
- Finally, schools in the area are usually the first to be connected to the national electricity grid.

Though the project began with five schools, there has been a significant expansion exercise, where 11 more schools have been added as points of presence. Schools added include, Badi Senior Secondary School, Zwelidumile Senior Secondary School, Kunene Senior Secondary School, Mevana Senior Secondary School, Nquba Junior Secondary School, Hlabizulu Junior Secondary School, Ngqeza Junior Secondary School, Ntubeni Junior Secondary School, Lutwayizo Junior Secondary School, Lutwayizo Senior Secondary School and Ngoma Junior Secondary School. With the addition of these eleven schools, there are currently 16 connected schools in the region which act as points of presence for the SLL in the Dwesa region. Figure 7.1 below depicts a diagrammatic representation of the connected schools in the region as captured from a Google map image.



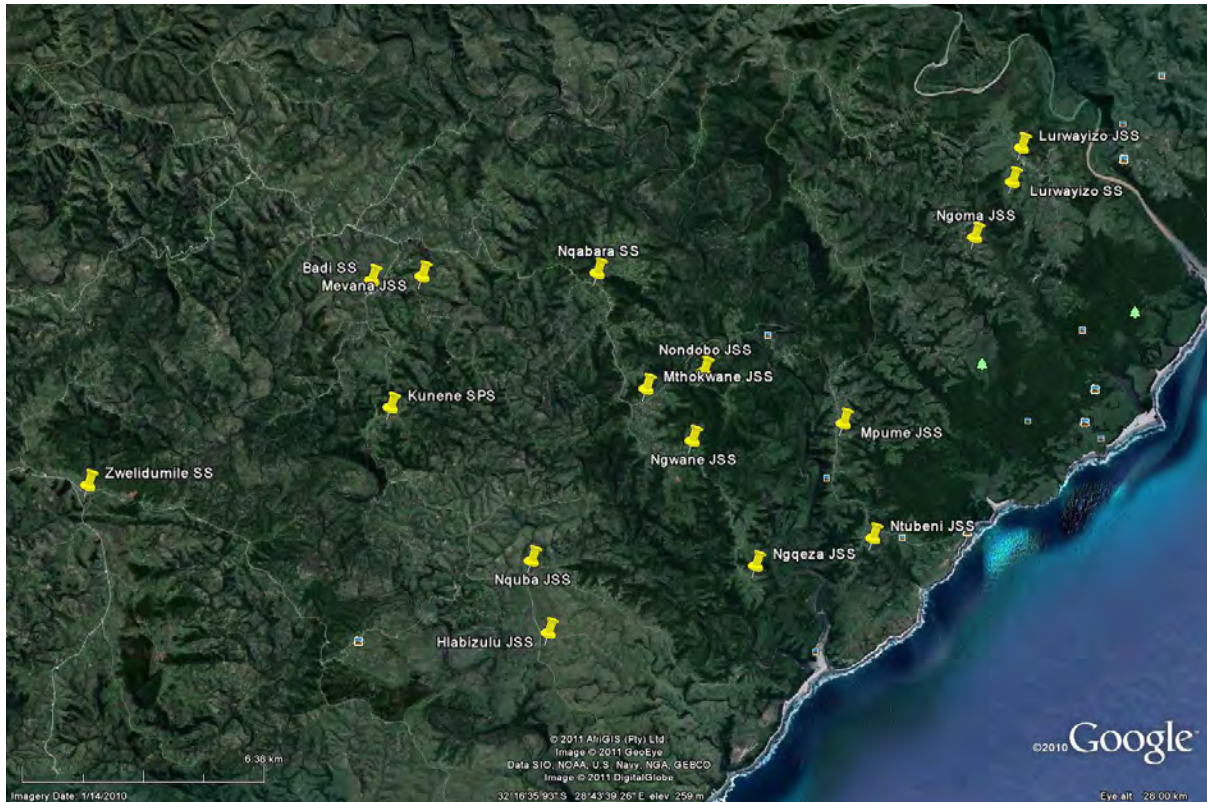


Figure 7.1: Schools which serve as points of presence (connected schools) by the SLL. (© 2011, Google Images. Used with permission.)

## 7.4 Objectives of the Siyakhula Living Lab

The SLL hopes to achieve several goals and objectives. These goals and objectives are categorised as short, medium or long term (The Siyakhula Living Lab, 2012).

### 7.4.1 Short Term

- Development of a low maintenance but effective service oriented architecture (SOA) network infrastructure to deploy in marginalized and semi marginalized communities.
- Capacity building in computer use, and promoting the culture of a train to train approach, where champions are trained and expected to train other community members.
- Provide cost saving services to the community, which also support local economic transactions, through employing both fixed and mobile terminals. For instance, the support of e-commerce and other e-service activities in the community.

- Provide a real life contextual environment for researchers involved in developmental research projects to carry out their research while supporting the community.

### **7.4.2 Medium Term**

- Extending provided telecommunication networks to support home connections in the community, while demonstrating benefits of ICT adoption, and attempting to accelerate the adoption rate.
- Potentially industrialize software prototypes developed in the SLL by Reed House systems.
- Developing a scalable standardized model of the SLL concept, which may be applied in other areas in Africa, and other developing countries.
- Offer opportunities of entry to government, companies, and NGO's seeking to develop new products or become partners in a networked and research primed marginalized community.

### **7.4.3 Long Term**

- A large number of target beneficiary households networked and active in the knowledge society.
- Participation of community members as co-creators and innovators of ICT services.
- Replication of the SLL model on a large scale in other marginalized communities in South Africa.

## **7.5 ICT Infrastructure in the SLL**

The 16 schools in the Mbashe municipality are connected to each other via Worldwide Interoperable Microwave Access (Wi-MAX) base stations. Two Wi-MAX base stations serve all 16 points of presence, and are hosted at Ngwane Senior Secondary School and Badi Senior Secondary School respectively. The selection of the two schools as hosts of the base stations is mainly due to their geographic locations. Both schools are situated at high points of sight, and as such, are capable of seeing surrounding schools in the region. Furthermore, Badi Senior Secondary school was also selected to host one of the base stations, due to the ICT infrastructure present at their school prior to being approached by the project. Both Wi-MAX base stations are positioned in such a way that they are capable of seeing each other. This strategic positioning provides a contingency plan when either of the base stations are down (not working), where all 16 schools could be connected to each other through one base



station. To enable access to either of the Wi-MAX base stations, all the other 14 connected schools have been provided with CPE's (Customer Premise Equipments) (The Siyakhula Living Lab, 2012). CPE's are terminal points located at a point in a subscriber's premises which enable subscribers to access communication service provider services and to distribute them around their compound via a LAN (local area network) (Pade-Khene and Sewry, 2011: 226). Both schools also host a VSAT (Very Small Aperture Terminal), which are earth bound stations that enable satellite communications of video, voice and data signals (Pagarkar, 2004: 1). The VSAT connection forms a very essential aspect of the network infrastructure, as they are responsible for enabling all connected schools to access the Internet.

While the SLL has 16 points of presence located across Dwesa, currently there are only a few sites that are fully operational. Currently functioning sites include the first five points of presence which the project began with (Mpume Junior Secondary School, Ngwane Senior Secondary School, Mtokwane Junior Secondary School, Nondobo Junior Secondary School and Nqabara Senior Secondary School) and the second school (Badi Senior Secondary School) which hosts one of the base stations. In some instances, the project provides computers for the points of presence; however, in most cases the schools provide their own computers, while the project provides Internet connection. As such, the number of computer terminals located at each connected school varies. In the installation of hardware equipment used in the various connected points of presence, the project advocates the use of thin clients and thick servers. Thin clients, are computer setups or processors which do not possess any hard disk or processing power (Doyle, Deegan, Markey, Tinabo, Masamila and Tracey, 2011: 587, 588). Whereas, central servers, are equipment which host all resources being shared by thin clients connected to it (Martinez-Mateo, Munoz-Hernandez and Perez-Rey, 2010: 120). The projects preference for the use of thin clients and thick servers is based on a number of reasons. Firstly in their opinion this is a more cost effective option for a lab set up as opposed to having all thick clients. Secondly, as they indicate, maintaining such a set-up is less cumbersome, as the server will be the only terminal which on most occasions may require attention or maintenance. While the thin client and central server set up is the preferred option by the project, some of the points of presence, specifically Mpume and Nqabara have some thick clients hosted at their schools. This variation from the preferred option is due to the fact that these schools were provided with these computers by the districts Department of Education, for administrative purposes prior to the project approaching them. Finally each connected point of presence has a router that allows them to connect to the Internet via

Ngwane and Badi. Figure 7.2 below, depicts a diagrammatic representation of the network infrastructure of the SLL points of presence in Dwesa.

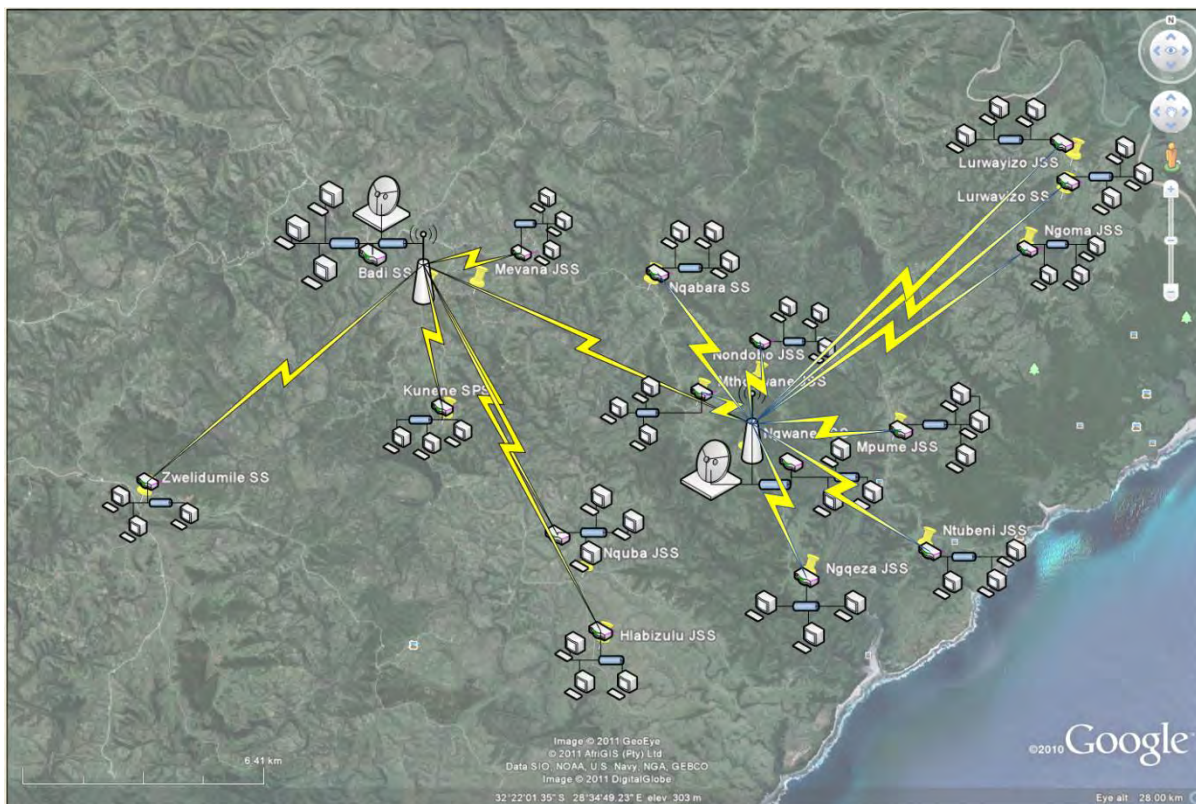


Figure 7.2: Network infrastructure of the SLL points of presence in Dwesa (connected schools) by the SLL.( © 2011, Google Images. Used with permission.).

### 7.5.1 Software Platform and applications

The servers which thin client are connected to at each point of presence are supported by the Edubuntu Operating System, an open source Linux based operating system designed for school environments (Pade-Khene and Sewry, 2011: 226). In addition, the routers at each point of presence are supported by FreeBSD, which is a UNIX based operating system. Though the thick clients located at Mpume and Nqabara were originally supported by the windows Operating System, their disks have been partitioned to include an Edubuntu operating system. The Edubuntu platform is designed for educational environments and as such, consists of applications such as open office suite, and fire fox web browser (Pade-Khene and Sewry, 2011: 227). However, other applications have been installed to support information access. For instance, the offline version of Wikipedia and the Gutenberg project which is a large collection of online educational books.

The SLL also recently integrated a middleware platform called TeleWeaver to support the deployment of various applications specifically tailored for marginalized groups. TeleWeaver was designed to be platform independent, hence, permitting its employment with varying standards. The platform independence capability TeleWeaver exhibits, can be attributed to the technology framework being used. TeleWeaver employs the Open Services Gateway Initiative (OSGI) framework. This framework which is Java based allows applications to be split into bundles. Therefore, bundles can be integrated and disintegrated without much effort. The deployment of this platform gives researchers and software developers interested in developing ICT4D applications an opportunity to deploy their applications on the platform, regardless of language or standards used amongst different developers.

### **7.6 The Programme Theory of the SLL**

The programme theory, similar to a project plan, outlines in detail what the SLL hopes to achieve as project objectives, and how they plan to achieve these objectives. The programme theory of the SLL is essential to the project, as it acts as a reference point for describing what the project should look like once it has been implemented (Saunders *et al.*, 2005: 139). This theory is particularly important, because it indicates processes which should lead to desired outcomes (Adedokun, *et al.*, 2011: 481; Sanchez *et al.*, 2005: 23). The SLL programme theory consists of three components. These include a service utilization plan, an organizational plan and impact theory (Pade-Khene and Sewrey, 2011: 227). For this research, more attention will be paid to the service utilization plan, as it represents a key theme which necessitates assessment at this point of the SLLs existence. However, a copy of the SLLs programme theory assessment report for ‘Access to Education and Knowledge’ provided in Appendix B2 contains detailed descriptions of the organizational plan and impact theory.

#### **7.6.1 The Service Utilization Plan**

The service utilization plan logically outlines, the process through which prospective beneficiaries will become engaged in the SLL project to the point of employing services to meet their needs (Rossi *et al.*, 2004: 142). Though it is expected that a separate service utilization plan be created for every component or every identified need (Pade-Khene and Sewry, 2011: 234), the steps leading up to the use of services for the SLL are consistent for all identified needs. As such, while the service utilization plan described here is specifically designed to address the need ‘access to education and knowledge’, it should be noted that the steps leading up to the use of ICTs for accessing education and knowledge are similar for all

identified needs. This may be attributed to the fact that schools were chosen as initiators in the community to support development. The user audience for the service utilization plan of the SLL can broadly be classified into two groups: school teachers and the community at large. The plan therefore outlines in sequential order how from a point of no ICT infrastructure or services, prospective beneficiaries begin to use ICTs to support their livelihoods. Depicted in Figure 7.3 is a diagrammatic representation of the SLL service utilization plan (leading up to the access to ICT services for all user groups).

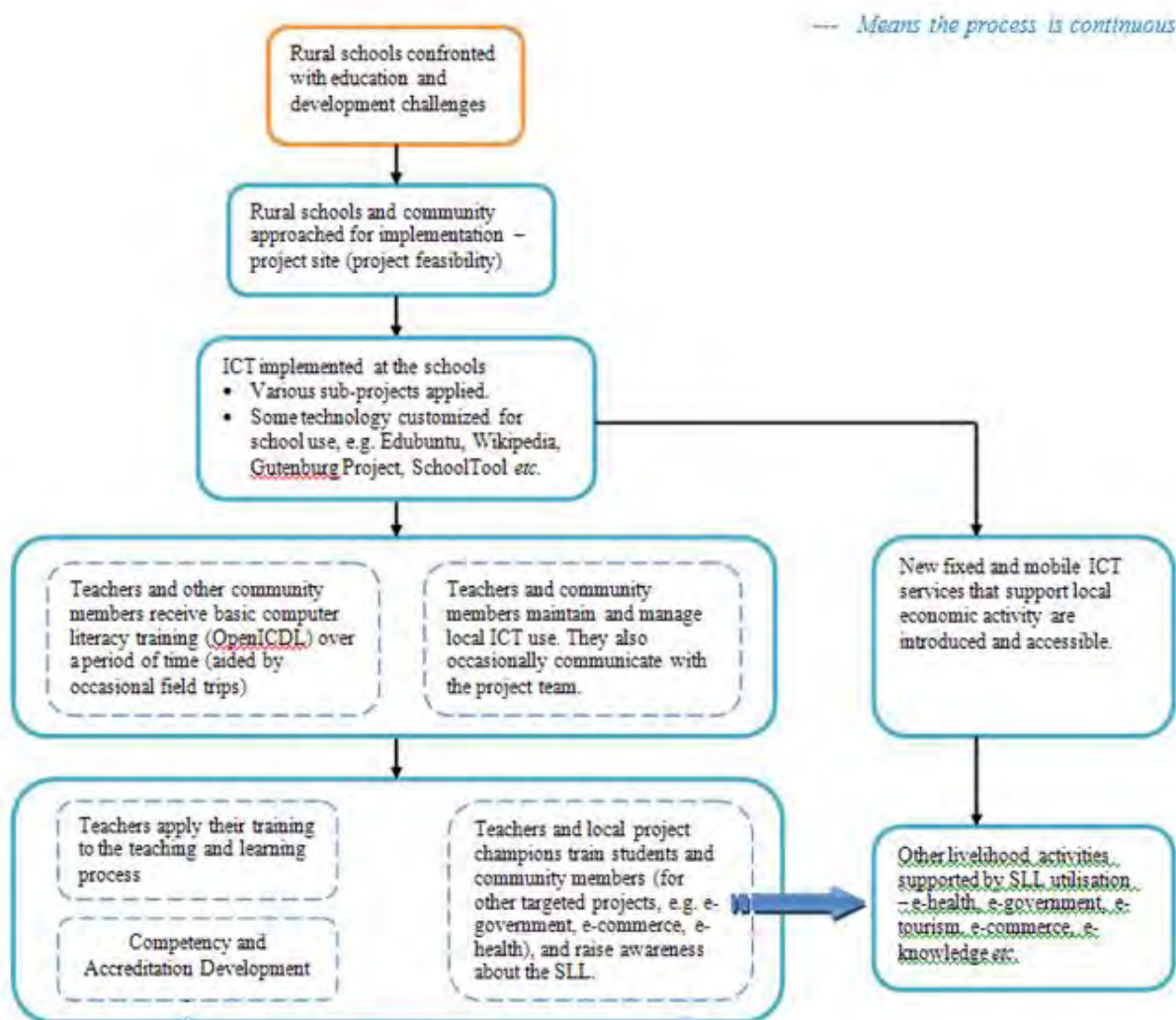


Figure 7.3: The SLL service utilization plan leading up to access of ICT services (Pade-Khene and Sewry, 2011: 236)

Below are the process steps depicted in Figure 7.3 as identified by (Pade-Khene and Sewry, 2011: 235):

1. Local schools in Dwesa are selected as points of presence for the SLL, based on the fact that; a) they represent centralized access points for communities in Dwesa, b)



they provide the best teaching structures in marginalized communities and c) in such areas, they are usually the first to be connected to the national electricity grid.

2. Following the identification of potential schools, these schools are approached by the project, where the idea of the project is proposed to them. Discussions and negotiation terms take the form of community meetings between the project staff and potential project champions (for instance, teacher, school head or a community member who is enthusiastic about the project).
3. Once agreements are finalized between both parties, the necessary ICT infrastructure is gradually implemented at selected schools. Computers at the school are supported by the Edubuntu Open Source operating system, which is specifically designed for school environments (however not limited to school use). Basic applications which the platform supports include; open office (writer and calc), Internet browsers and educational games. The TeleWeaver platform is also deployed. Furthermore, these computers are connected to the Internet.
4. Computer literacy training is administered to enthusiastic teachers and community members on part of open ICDL (International Computer Driving Licence). Provided training is designed to enable prospective beneficiaries to gain confidence in using computers.
5. Due to limited staff capacity, the service utilization plan proposes a train to train approach, where initially trained community members and project champions are tasked with training other community members after they have been trained.
6. After training, teachers and community members start routinely using ICT services provided at the points of presence to support their livelihoods.
7. Gradually, new fixed and mobile ICT services that support local economic activity such as, e-commerce or e-government applications are integrated and made accessible to enable rural dwellers to support their livelihood.

### **7.7 Reflective Report on Applying the RICTP-PAF in the SLL**

This section describes how the RICTP-PAF is implemented in the SLL with a focus on the service utilization theme. The reflective report consists of a description of how and why the RICTP-PAF is applied the way it is, and lessons learned that are associated with the suitability and shortcomings of applying the RICTP-PAF in a real-life setting. Appendix H

provides a copy of the process assessment report. The RICTP-PAF which is made up of guiding principles, critical themes of rural ICT process assessment and methods and procedures for assessing critical themes was applied in the following way:

### **7.7.1 Application of guiding principles to the assessment process**

#### **Principle 1: Collaborative relationship between the evaluator and all stakeholder Groups**

In contrast to suggestions from Linnan and Stekler (2002) and Bliss and Emshoff (2002) on the need for process assessment exercises to be collaborative endeavours between project stakeholders and the evaluator, the evaluator in this case was primarily responsible for planning and conducting the process assessment exercise in the SLL. However, this was only done after seeking the opinions of several stakeholders (both internal and external). The evaluator's decision to solely plan and conduct the assessment was due to a number of reasons. Firstly, it was due to the constant challenge the evaluator was presented with, whenever he made an attempt to meet with members of the project team. Planning the assessment with the project team would have necessitated regular meetings between the evaluator and members of the project team (Bliss and Emshoff, 2002: 3). However, this was not possible due to the busy schedule of most of the project team members, who in addition to their project obligations are also tasked with academic obligations. A second reason which influenced the researcher's decision to solely plan and conduct the assessment process was his internalized assumption that stakeholders, more especially internal stakeholders (project champions and other community members) may not have had any knowledge on the topic. As such, while the researcher did seek their opinion on what aspects of implementation they felt were essential to assess, prior to their answers, he was already influenced by his internalized assumption. This internalized assumption influenced the decision not to probe further when he felt at the slightest that internal stakeholders did not know what aspects needed to be assessed or how such an assessment should be conducted. Another reason for solely planning and conducting the assessment process is that the SLL is seen as a research project where researchers of sub-projects are tasked with the responsibility of planning and conducting their research solely (Pade-Khene and Sewry, 2011: 244). Finally, it was perceived that external stakeholders may not have bought into the idea of jointly collaborating with internal stakeholders to conduct the evaluation.

### **Principle 2: Programme Theory Specification**

This assessment adhered to the principle which emphasizes the need to specify the programme theory (project plan) of a project, prior to conducting a process assessment. The aspect of the SLL programme theory which was required for this assessment effort was the service utilization plan. The service utilization plan is specified in section 7.6.1. The plan was particularly helpful in outlining what the SLL's strategy was for providing services and getting target beneficiaries to use provided services. The availability of a service utilization plan was of great convenience, as the evaluator did not have to bother stakeholders in efforts to identify what services are supposed to be provided and how they should be provided. The service utilization plan of the SLL, however, did not specify what acceptable levels were for coverage, or goals for achieving levels of service use after stipulated time periods. As such, coverage results obtained could not be objectively judged as acceptable or not.

### **Principle 3: Validate Evaluation Questions**

To ensure validity of the questions asked, several project stakeholders (internal and external) were approached to obtain their opinions on the aspects of implementation they felt required assessment. This was conducted to ensure that the questions being assessed were relevant or important to stakeholders within the project. External project stakeholders indicated that it was more essential to assess the extent to which varying stakeholder groups involved in the project were performing their tasks. Internal stakeholders interviewed (project champions) on the other hand felt it was essential to assess reasons for community members not using ICTs. This revealed that sets of questions which may be valid to one group of stakeholders may be less important to other groups of stakeholders of the same ICT4D project. Furthermore, this confirmed suggestions by Rossi *et al.*, (2004) that stakeholders in a project may have different objectives. For instance, in this case, academia's main objective in partnering in this project is to ensure the cultivation of researchers. Reed house systems on the other hand, has the objective of creating and deploying applications to rural marginalized areas thus further seeking to cultivate a market niche. Rural beneficiaries as stakeholders seek to benefit from ICTs, which they feel will support development in their community. As such, it is expected that there will be varying opinions on performance interest areas amongst these stakeholders. The evaluator in this case may be obligated to listen to the demands of the evaluation sponsor (Rossi *et al.*, 2004). However, in cases where the evaluation sponsor is independent of the project, like in this case, the evaluator in addition to seeking the opinions of varying

stakeholder groups may need to further investigate or use his or her discretion in determining which aspects or questions are most important to assess.

### **Principle 4: Quality Control**

Measures were taken to ensure that the quality level of data collected was acceptable. Firstly, with regards to the coverage survey questionnaire, it was decided that it was best to conduct community wide surveys as opposed to the use of samples from the population. While this helped to increase quality aspects such as increasing the level of precision, the confidence level, and the representation of different groups within the community, it also increased the required resources needed to conduct the evaluation (Watson, 2001). For instance, much more paper than earlier anticipated was needed to print out questionnaires for all households present in two communities. Furthermore, this decision resulted in the need to hire more interpreters than earlier anticipated to distribute and collect data. In addition to these increased costs, it was excessively burdensome and time consuming for the researcher, who was solely responsible for entering data elicited from respondents into a computer, and analysing the data. This experience suggests that there will be trade-offs between increased cost and the need to obtain more accurate (quality) results in any evaluation exercise. Furthermore, it suggests that a capable team may be needed to conduct such an assessment.

Another step taken to ensure quality of data collected was satisfactory was the implementation of a mixed method approach, where both quantitative and qualitative instruments were employed to assess certain aspects. For instance, with respect to the user perception survey, while quantitative methods were useful in revealing from amongst different constructs the most important construct in predicting user intention to use ICTs, this method was not capable of revealing reasons which may have been responsible for these results. As such, qualitative instruments aided in revealing reasons which may have been responsible for results which quantitative analysis revealed. As Yin (2003: 40) suggests, improving on quality of data collection may require the use of multiple sources of evidence.

Quality was also ensured by outlining and evaluating the whole process of data collection. This measure was taken to ensure the availability of a blueprint in case the assessment was to be carried out again by another evaluator to verify results obtained. Furthermore, this reflective report is an effort to improve the quality of such assessments, as it seeks to identify lessons learned (through highlighting the suitability and shortcomings of conducting such an



assessment) thus prompting future assessments of this nature to take lessons learned into consideration.

### **Principle 5: Ethical Considerations**

To ensure that ethical considerations were adhered to, firstly, all participants of the research were informed of the nature of the research. This was conducted both verbally and in writing. For community wide survey questionnaires distributed, informed consent was sought verbally, through data collectors debriefing respondents on what the research was about and seeking their permission to participate. Once potential community survey respondents had been debriefed, they were required to sign on the questionnaire forms to indicate their voluntary involvement. Interview participants were given informed consent forms, which briefly summarised the intention of the interviews and the research. Though it was originally anticipated that informed consent forms were to be distributed to all participating respondents' resource constraints did not permit this.

Participants were also assured that the information they had provided would be confidential and that they would remain anonymous. This assurance is essential to participants of studies of this nature, as sometimes they tend to be nervous when their opinions are sought for research purposes. Furthermore, results from research findings were fed back to research participants. While this sounds trivial, it is an essential part of a process assessment, or any other research involving elicitation of information from human subjects. The essentiality of feedback was first noticed by the evaluator through a reluctance of potential internal stakeholder respondents to participate in interviews. After inquiry on their reasons for such reluctance, it was revealed by them that researchers constantly interview them without any future feedback. Therefore, they felt there was no use for such interviews and that they were a waste of time, since there is usually no result or feedback. The researcher found it imperative to ensure that results obtained were fed back to internal and external stakeholders of the project. During feedback sessions to internal and external stakeholders, the evaluator ensured that he was respectful to them. Furthermore, it was ensured that their opinions were heard. Such measures enhance stakeholder responsiveness to evaluation feedback. For instance, during the feedback session to internal stakeholders, efforts made to seek stakeholder opinions on recommended suggestions increased their responsiveness and interest level. Furthermore, feedback elicited was useful in inducing modification to recommendations, which the evaluator anticipated would be reflected in the process assessment report that

project champions would have been unhappy with. Research in rural communities can effect change (Mthoko and Pade-Khene, 2012: 10). Changes derived could affect stakeholders; therefore, a researcher must consider the consequences of their research to determine how consequences will be addressed (Mthoko and Pade-Khene, 2012: 10). In this case, if the evaluator had not sought the opinions of internal stakeholders (project champions and teachers), on a proposed recommendation that a permanent staff be employed to ensure that computer labs are accessible to other community members, it would not have been discovered that these stakeholders did not support such an idea during school hours.

### **7.7.1b Lessons Learned from Applying Guidelines**

- ***Programme theory specification prior to conducting a process assessment is essential to the assessment exercise***

As indicated in Principle 2, a detailed plan serves as a blueprint which enlightens the evaluator on what has been indicated a project should be doing and how it plans to accomplish what it should be doing. The specified programme theory was especially useful considering the fact that stakeholders were not always accessible to the evaluator.

- ***The service utilization plan of a rural ICT project's programme theory should specify what acceptable levels of coverage are at any point in time***

As highlighted in Principle 2, the evaluator was unable to judge whether coverage results obtained were acceptable or not. This was due to the fact that the outlined service utilization plan does not specify what acceptable levels of coverage (usage) should be for services provided. Where expected levels are specified in the programme theory, it is a clear sign that what is specified is agreed on by most stakeholders. Whereas, seeking this information from one stakeholder may simply be his or her opinion on what coverage levels should be. Pade-Khene and Sewry (2011: 174) suggest that a programme theory of a rural ICT project provides benchmarks on which stakeholders and the evaluator can compare actual ICT project performance and impacts. As such, it is important that there are outlined benchmarks for service utilization, if an evaluative judgment is to be made.

- ***Attempts to validate questions through stakeholder consultation may reveal variations in opinion amongst stakeholder groups***

Also indicated in Principle 3, were attempts to validate assessment questions through gaining stakeholder insight into aspects of the implementation process which they deemed as

essential to assess. However, it is not clear whether the variations in insight were due to the fact that internal and external stakeholder opinions were sought separately. As indicated by Mtoko and Pade-Khene (2012), in rural ICT4D projects, communication between stakeholders should be promoted to ensure that different views are taken into account. Therefore, it may have been a good idea for future research of this nature to conduct such elicitation exercises through joint meetings between internal and external stakeholders. Separate meetings intended to gain insight into stakeholder preferences of essential critical aspects revealed that stakeholder groups vary on aspects which they deem essential to assess. This may leave the evaluator in a dilemma of trying to figure out whose evaluation needs to satisfy. Where the evaluator is employed or funded by the project team, he may have to satisfy the interests of that group of stakeholders. However, where the evaluator is independent, like in this case, he or she may be inclined to use his or her discretion while attempting to make a decision on what questions are most important to answer for the success or sustainable development of the project.

- ***The quality of data collected will face tradeoffs with cost of the process assessment***

In Principle 4, it is revealed that it was decided that a community wide survey would be conducted as opposed to the use of selected samples. This decision was a good way of increasing study quality with regards to precision levels, and confidence levels. However, this increased validity measure, as indicated, also results in increased cost to the assessment process. Furthermore, the decision to make use of multiple methods to ensure reliability of results may also result in increased cost for the assessment exercise. Therefore, it should be noted that while it is encouraged that a rural ICT4D project should be assessed using a variety of methods to increase the reliability of results (Grunsfeld, 2007: 14; Yin, 2009), such a decision will result in increased cost which needs to be accounted for.

- ***Feedback to respondents is an essential part of a rural ICT4D process assessment***

Principle 5 reveals the initial attitudes of most internal stakeholder (community members) respondents when first approached by the evaluator whilst seeking their consent to participate in the research. As outlined in Principle 5, the initial attitude was reluctance and scepticism. Their indicated reasons suggest that due to no feedback from previous research endeavours, which have sought their opinions through interviews, they did not feel the need to participate as no results were fed back to them. This suggests a habit of ‘use and dump’, where researchers use community respondents for their research endeavours and forget about them

once their research endeavours are completed. Feedback is such an essential component that it should be regarded as one of the guiding principles for conducting process assessments of rural ICT4D projects.

- ***Ethical considerations also require that an evaluator thoroughly considers consequences of research results and recommendations***

Prior to feedback sessions with internal stakeholders (project champions and teachers), based on coverage findings, the evaluator had anticipated making a recommendation of employing permanent staff which he felt would improve access to the labs for community members. However, during the feedback session to a group of teachers in one of the schools hosting a point of presence, it was revealed that these stakeholders did not agree with implementing such an idea during school hours and only felt it could work after school hours. They indicated that during school hours they would need the lab to teach students, and may be disrupted if community members were making use of them during these hours. This example points out an important ethical consideration, which evaluators need to adhere to. It indicates the need to ensure that evaluators take into consideration possible consequences which may arise as a result of their recommendations. Furthermore, evaluators must anticipate how such consequences that arise from their research must be dealt with (Mthoko and Pade-Khene, 2012: 10). Seeking feedback from internal stakeholders on the recommendation highlighted above was a useful way of considering how the proposed recommendation would have affected them.

### ***Challenges***

#### ***The challenge of planning the process assessment with input from all stake holder groups (Internal and External)***

As suggested in findings from attempting to apply Principle 1, the researcher found it challenging to plan the process assessment with both internal and external stakeholders, though for different reasons. The challenge experienced from attempting to conduct the assessment with external stakeholders was largely due to difficulty of accessibility, mainly as a result of their busy schedules

The challenge experienced with attempting to plan the assessment with internal stakeholders was largely due to the evaluators internalized pre-conception about internal stakeholder's knowledge on the evaluation topic. The internalized preconception spoken about here is one

of doubt or lack of faith in internal stakeholder's ability to contribute to the topic. An evaluator therefore, must not allow such pre-conceptions to hinder him or her from seeking useful contributions from internal stakeholders.

Finally, the perceived lack of buy in from external stakeholders to plan the evaluation in collaboration with internal stakeholders was viewed as a challenge. As Hollow (2007) and Butt (2008: 40) imply, it is commonly assumed by external stakeholders in ICT4D projects that an external evaluation expert is the most suitable option for conducting an effective evaluation in a community. A common consequence which is derived from such an evaluation outlook is that, the community in question is only exposed to interpretations made by external actors, with little or no contribution made by the community (Pade-Khene and Sewry, 2011: 33). As such, solutions proposed from such exercises may not end up meeting the needs and priorities of communities. Therefore, rural ICT4D process assessments should be planned and conducted as collaborative endeavours between the evaluator, internal stakeholders and external stakeholders.

### **7.7.2 Reflection on Assessing Service Utilization in the SLL**

The process assessment exercise of the SLL was conducted between the months of August and October 2012. While the SLL consists of sixteen points of presence, the process assessment exercise was limited to two communities which are host to two of the SLL's points of presence. The two communities selected were Ngwane and Nqabara. The underlying rationale for the selection of these communities as observation revealed was that they seemed to represent two of the most active sites where points of presence are currently hosted for the SLL project. Furthermore, they are the two sites selected by the project team, to host the revamped computer literacy training being conducted by the project team and other involved research candidates. The process involved the assessment of four sub themes of *service utilization*. Themes assessed included coverage and bias, user perception of ICT service characteristics and the influence of such perceptions on the adoption and use of ICTs, an assessment to determine the presence of factors which indicate that there will be sustainable use of ICT services in the long run, and levels of training units received.

#### **7.7.2.1 Assessing Coverage and Bias**

The coverage assessment exercise attempted to elicit data on the extent to which the intended beneficiary populations participate in the use of ICT services provided to them (Linnan and Stekler, 2002: 12; Pade-Khene and Sewry, 2011: 174; Rossi *et al.*, 2004: 183). Assessment of

coverage would also aid in revealing bias levels amongst intended beneficiaries. Attempts to determine bias levels sought to disclose the extent to which some target beneficiary groups participate in the use of ICT services provided by the SLL more than other groups. To assess coverage and bias, the following processes were applied:

### ***Community household surveys (questionnaires) were designed***

Survey questions were quantitative in nature and required controlled answers through providing multiple choice options. Questions included attempts to find out community members who had been trained to use ICTs by the SLL, users of ICT services provided by the SLL and how frequently they used services, and demographic information about respondents and other household members who they reside with. A copy of the designed community survey questionnaire is provided in Appendix C1.

The decision to employ community surveys to assess coverage was due to a lack of programme attendance records at the two points of presence to keep track of user details. As literature suggests, when programme attendance records are present, they are an effective methodology for assessing the coverage levels of a project (Rossi *et al.*, 2004). However, community surveys do provide information which programme records are incapable of providing. For instance, while programme records reveal who users are, they are incapable of providing information on eligible community members who have never used ICT services.

### ***Distribution of community surveys to respondents***

While community survey questionnaires attempting to assess coverage levels was designed by the evaluator, distribution of these surveys was carried out by trained locals from the community. The decision to employ local community members was largely attributed to the fact that community members are in a more suitable position to determine the best way to collect data from their communities (Pade-Khene and Sewry, 2011: 250). For instance, on concluding training sessions with hired data collectors, the evaluator was asked a question by one of the data collectors.

*“Where are the uniforms we will use to collect data?”*

While this seemed a random question which confused the evaluator, there was relevance to it. Seeing the confused state of the evaluator after the question, the second data collector interjected and said;

*“The reason he is asking is because, when we do things like this. Like going from house to house to collect data from people, they always want to know the organization we are representing before they even talk to us.”*

This revealed important information, one which the evaluator was not previously aware of. It revealed the need to ensure that the people representing an evaluator (data collectors) are given some form of identity, associating them to the evaluator, thus eliminating doubts about the credibility of their claims when they approach potential respondents. Data collectors in this case however, indicated that it will be sufficient this time if they were given some sort of SLL flyer or hand out, but emphasised that next time such an exercise is taking place it would be favourable to have some form of identity. Thus in this instance, they made do with a SLL hand out provided by the evaluator.

Considering that the main language spoken in both communities surveyed is *isiXhosa*, a language the evaluator is not familiar with, it was essential to hire data collectors who were capable of interpreting questions to potential respondents. For this reason, it was imperative to employ the skills of community members who had basic knowledge of English, and were also fluent in the native *isiXhosa*.

To carry out the distribution exercise, four local residents were trained. Training involved a review of all questions on the survey questionnaire and how codes, which represented multiple choice options for answers were expected to be used. The use of locals for data collection was an exhibition of collaboration between local stakeholders and the evaluator, as is frequently suggested for such studies. For instance the evaluator provided expertise and research knowledge in the subject, while the local stakeholders understood the structural pattern of the village and how best to go about collecting data.

While there was some unit non response, due to several houses being empty, though being listed as part of the households in the community, the response rates from both villages (Nqabara, 67% and Ngwane, 55%) were acceptable enough to generalize the findings to all households in both villages. Furthermore, while community survey questionnaires distributed were designed to be answered by one member of each household, they were also designed in such a way that some second hand data could be elicited about other members of households currently residing in the same house as the survey respondent. For instance, the community survey questionnaires included questions seeking to determine some demographic



characteristics of other household members, as well as, whether or not these residing household members have been trained to use ICTs and in fact do use ICT services provided by the SLL. In retrospect of the above point, the results from the community surveys distributed, in some aspects were generalized to the survey respondents. However a few aspects were generalized to the entire population of both villages. For instance, results on the number of users are generalized to the entire population, while aspects such as reasons responsible for a person not using ICT services is limited to questionnaire respondents.

### ***Data collection feedback***

Following collection of completed questionnaires from trained data collectors, the researcher sought some feedback from these data collectors. This process was intended to enable the researcher to have some form of knowledge on how the data collection experience was for them, and any challenges they may have encountered. The generally shared view amongst these individuals was that it was a cumbersome task attempting to ensure they visited each house to distribute and interpret questions on the questionnaire. However, one of the trained locals hired specifically highlighted the fact that certain heads of the community were not impressed about not being informed about the community survey data elicitation prior to its commencement. Though it is further indicated that these heads consent after some persuasion, it is also advised that for future references, it would be appropriate to meet with such ceremonial heads in lieu of the evaluation before it is initiated. The decision not to meet with the village heads was not one intended by the evaluator, as it was originally anticipated that the local heads would be met with and debriefed. However, members of the SLL project team felt this was not necessary. Their suggested reason was that the local heads were aware of the projects presence, and as such, would not have any issues with the evaluation exercise.

### ***Data analysis and Interpretation***

Once data had completely been captured in an excel spread sheet, the researcher performed descriptive statistical analysis, to find out frequencies and percentages. Results of the questionnaire were analysed in terms of questions provided in section 1.4 (i) of Appendix H.

This method of assessing coverage and bias proved valuable in providing high level, information regarding users, non-users, reasons for non-use indicated by respondents who have not used services, and demographic characteristics associated with users and non-users from the two communities surveyed. Furthermore, community surveys used to assess



coverage provided information which could help programme implementers undertake comparative analysis between the two sites. For instance, providing information on the extent to which services are used at one site more than the other. More in-depth descriptions were, however, necessary to explain certain revelations from survey results.

### **7.7.2.1. b Lessons learned from assessing coverage and bias**

#### ***Community wide survey results more appropriate than programme records when attempting to elicit coverage data about programme recipients and eligible non participants***

Community surveys may need to be employed to assess coverage, regardless of whether or not properly managed programme records are available. Though Rossi *et al.*, (2004) suggests that where programme attendance records are properly managed, they are an adequate method to assess coverage, there are certain aspects of coverage data programme attendance records are incapable of capturing. For instance, while programme records are capable of revealing data on project recipients, they are incapable of producing data on eligible community members who have never participated in the project, regardless of how well managed these records are. Considering rural ICT projects seek to reach and empower the most marginalized groups, it may thus be necessary from time to time to conduct community wide surveys, to enable the identification of community members who are eligible, but for some reason do not partake in the project.

#### ***It is good practice to employ the expertise of community locals for data collection process:***

The community is aware of the most suitable approaches for effectively collecting data (Pade-Khene and Sewry, 2011: 250). As such, it is fundamental that their knowledge and services are employed, to ensure that the data collection process is conducted appropriately. This was a useful lesson for the evaluator who, prior to conducting data collection felt that the local community expertise was only necessary for interpretation purposes. However, during the on-going interaction with data collectors trained, it became evident that they had a wealth of knowledge not apparent to the evaluator on how best to collect data. For instance, such locals are aware of the structural pattern of the village and placement of houses. Furthermore, locals are aware of how best to approach potential respondents and inciting interest to participate in the study. Lastly as has been indicated, locals were aware of best practice to adhere to while conducting such surveys. This was evident with the example, in which the evaluator was made aware that it is essential to ensure that they are properly

identified as representing the SLL, to avoid suspicion arising or putting their credibility in question.

***A single community survey questionnaire may be used to determine the extent of coverage amongst all the members of one household:*** Community household surveys (questionnaires) were designed to be filled out by one respondent. However, they aided in revealing the use status of all members of a household. For instance, household surveys provided both information on the use status of respondents, and also the use status of other members residing in the house. As such, instead of having each member of a household fill out a separate questionnaire, thus resulting in the exponential increase of required resources, it may be best to use surveys filled out by one household member, however, still capturing the use status of several or all household members. It should be noted that care must be taken when employing such a strategy. Such care needs to be applied when determining what questions a respondent may answer on behalf of other household members and those a respondent cannot answer on their behalf. For instance, while a respondent may accurately be able to determine whether or not each household member uses ICT services, he or she may not be able to speak on behalf of household member as to why they do not use ICT services in cases where they do not or what they specifically use ICTs for.

### ***Collection of feedback from data collectors on the data collection experience***

On completion of data collection by trained locals, it is essential to collect feedback on their experience. This should involve data regarding what their experiences were like on collecting data and challenges they may have faced during the data collection process. Such feedback is invaluable as it could provide useful data, which will consequently contribute to conducting the evaluation better in future. For instance, whilst eliciting feedback from one of the data collectors it was revealed that certain local village heads at Nqabara had reservations about not being informed about the evaluation process prior to its commencement. While they were eventually persuaded, it is advised that it will be wise in future to inform such heads before such an exercise is initiated. This revealed shortcoming provides a useful lesson which aids in potentially improving future evaluations of this nature.

***Community questionnaires provided data on a large number of recipients, however, elicited data was high level***

Administered community household survey questionnaires were appropriate for eliciting the type of data literature suggested they would aid in eliciting. However, this data elicited is at a high level. For instance, community surveys reveal that a substantial number of respondents indicated that they do not use ICT services because they are not aware such services exist. While this presented data, was useful information, there were still some blanks left. For instance, the evaluator was left curious as to why a project which has been operating since 2006 (Nqabara) had such a substantial number of respondents not aware of the project. Curiosity which arose from this prompted the evaluator to probe further to determine possible reasons for the lack of awareness in a community, of a project that had been operating for over five years. Probes through in-depth semi-structured interviews with the project team revealed that no stakeholder group (internal and external) felt they were responsible for initiating awareness campaigns. However, according to the project team, the onus of launching awareness should be the community's (project champion and early users) responsibility. Such essential information could not have been revealed through community survey questionnaires.

***Community questionnaire uses must be combined with other methods to keep continuous track of usage***

While it is essential that community surveys are employed to determine the extent of coverage and whether or not there are biases against certain groups, it may be impractical or even wasteful to employ such a method too frequently. Firstly it may be impractical because it is considerably resource intensive to employ this method and it also requires a substantial amount of planning to conduct. As was revealed, resource intensity in this case was displayed in the form of needed stationary like paper to print out large number of questionnaires to cover all households of both villages, remuneration for services offered by trained locals, time spent on collecting the data and time spent analysing the data. Furthermore, even where the prospect of conducting such an assessment will not be impeded by resource constraints it may be wasteful to conduct such an assessment too frequently. As indicated by a member of the project team, results from community survey exercises conducted a month, two months or even three months apart are very unlikely to vary significantly. As such, it may be ideal to have daily records in notebooks to keep track of usage, while community survey exercises may be conducted twice a year or annually whenever the project feels the need to find out

proportions of users as compared to the entire community or biases against certain social groups.

### **7.7.2.2 Assessing User Perception of ICT Service Characteristics**

This assessment was geared towards users of ICT services provided by the SLL, infrequent users of ICT services, and drop outs who previously used services but do not currently use ICT services. It was attempting to assess user perceptions of ICT service characteristics to determine from among several ICT service characteristics, the characteristic most responsible for influencing use of ICTs provided by the SLL. To assess this sub theme;

#### ***Survey questionnaires and semi structured interview questions were designed***

The design of the user perception questionnaire was particularly influenced by two information systems models which suggest certain predictor variables which may be responsible for influencing use of ICTs. The Delone and Mcleone Information Systems success model and the Technology Acceptance Model (TAM) both commonly used in I.S research, are believed to account for a substantial amount of variance in explaining user adoption of information systems or ICTs. Assessment questions arising from proposed constructs in these models are simplified to ensure they would be understood by trained community members responsible for collecting data. However, while it is essential to simplify questions, caution must be taken to ensure that simplification does not cause questions to lose meanings they are intended to convey. As such, once simplification has taken place, it is essential to validate simplified version of questions. In this case, measures were taken to ensure validity of this survey instrument. Firstly, to ensure face validity, pilot tests were conducted. Secondly, to further ensure that the questions arising from constructs being measured constituted the right content, specialists with experience of such surveys reviewed the instruments. Refer to section S.u 3 of chapter 5 to gain a clearer conception of what these models propose.

The user perception assessment exercise also employed qualitative instruments. Qualitative instruments, which specifically consisted of semi structured interview questions, would provide more descriptive insight into user's perceptual views of ICT service characteristics. Questions proposed here were also adopted from the two I.S models previously highlighted. However, while partly structured (semi-structured interviews) they were designed to allow users to respond to questions in a way not entirely restricting. The choice of semi-structured interviews was based on the fact that it allows for combining freedom of expression of the

respondents and maintaining a certain order of the research (Leclercq, 2007: 39). People interviewed included three teachers at Ngwane S.S.S, two teachers at Nqabara S.S.S, and one community local from Ngwane. Though questions asked for all groups were similar there was some slight variation between ‘teacher’ questions and ‘community member’ questions. For instance, questions designed for teachers sought to elicit information regarding their perceptions on how ICTs support their teaching needs (perceived usefulness), in addition to how they felt about other characteristics of ICT services. Copies of the user perception survey structured questionnaire and semi structured interview questions are provided in Appendices C3 and C4.

### ***Distribution of User perception Survey Questionnaires***

Trained local community members responsible for distributing community wide coverage surveys were also responsible for the distribution of the user perception surveys. Findings from the coverage surveys aided in identifying users of ICT services from both communities. Therefore, identified ICT service users from the coverage surveys represented the targeted group for the user perception survey. Of a combined 64 questionnaires distributed, 30 people were selected who completed user perception surveys. This represented a 47% response rate.

### ***Qualitative semi structured Interviews conducted to complement quantitative methods***

Qualitative semi structured interviews were also employed while assessing user perceptions. Such a method was valuable, as it aided the evaluator in gaining insight into answers provided by internal stakeholders on their perceptions of ICT services. In order to conduct semi structured interviews related to the assessment of user perception of ICT service characteristics, potential respondents were approached, the interview objectives explained and their consent sought to participate in the interviews. Initially, the plan was to have a collection of selected candidate’s representative of the various identified user groups of information needs highlighted in the Baseline Study. However, based on lack of availability of some groups (for instance health practitioners and entrepreneurs), it was decided that it was best to use a convenience strategy (Johnston and Sabin, 2010: 38), thus conducting interviews with whoever was available. Once consent was sought from respondents, dates and time schedules were set for interviews. However, a related challenge was that set interview dates got postponed several times by most respondents. As such, interviews were conducted at randomly selected times once the evaluator felt there was an opportunity. Postponement of interview times in part, was due to reluctance on the part of potential

interviewees to participate in the interviews, even after they had consented to it. A major reason for this reluctance as suggested earlier was due to them being constantly approached to participate in interviews, considering the SLL is a project also intent on cultivating research skills. There was thus a feeling of fatigue from too many interviews, more so sometimes due to not receiving any feedback from interviewers. Interviews lasted for 20 minutes on average, and were recorded after seeking consent from respondents. To begin interviews, a general question was posed to respondents, seeking their most valuable use of ICT services. Subsequently, specific questions were asked based on the constructs present in the I.S models highlighted earlier on. For instance, questions sought descriptive opinions from respondents on the extent to which varying ICT service characteristics (perceived usefulness, information quality, systems quality and service quality) influenced their adoption and use of ICTs. Furthermore, it was required of them to identify from amongst constructs specified what was most responsible for influencing their use of ICTs and why they felt the selected construct was most responsible for influencing their use of ICTs.

### ***Data analysis and Interpretation***

Quantitative and Qualitative data were analysed independently. Quantitative analysis sought to test the strength of association between hypothesised constructs derived from I.S constructs mentioned above and the use of ICTs. Refer to box 1.1 of section 1.3.2 of Appendix H to view hypothesised constructs. Prior to conducting analysis to test hypotheses, data is tested for normality using the statistical R software. The decision to test for normality was attributed to the fact that the initial intent of the researcher was to conduct a Pearson's correlation analysis, to test for correlation between predictor and dependent variables hypothesized in box 1.1 of section 1.3.2 of Appendix H. Analysis revealed that the data elicited was not normally distributed. Due to non-normality discovered, the hypotheses of interest could not be tested for correlation using Pearson's correlation analysis, due to Pearson's correlations requirement of normal data distribution as a condition for conducting hypothesis testing (Blackwell Science, 1999: 763). Furthermore, Pearson's correlation analysis could not be conducted due to its expectation that data captured are either based on interval or ratio scales (Blackwell Science, 1999: 763). This survey did not meet this expectation, considering data collected were based on nominal scales. Therefore, in place of conducting Pearson's correlation analysis, which sought to test the strength of association between dependent and independent variables explained in the user perception section of chapter 5, a non-parametric analysis method was employed. The non-parametric method

employed was the Spearman's rank correlation analysis. Spearman's rank correlation analysis (the Shapiro Wilks test) revealed that there was no correlation between predictor variables and independent variables as hypothesised in the study. Based on these results, it was decided after consultation with a statistical expert that a multivariate regression tree may be used to determine the predictive relationship between the predictor variables (Perceived Usefulness, Information Quality, System Quality and Service Quality) and the dependent variable (use of ICT services). Predictive accuracy is also routinely used as a method of statistical model selection and can replace the widely used practice of repeated hypothesis tests (De'ath, 2002: 1105). The regression tree provides a suitable way of representing data graphically, thus making results easier to interpret than it would be if data was displayed as strict numerical results (Lewis, 2000). This may be an added advantage for conducting quantitative user perception studies in rural areas where the future aim is to advance to a point where rural beneficiaries conduct such studies by themselves.

It was essential though, before plotting a multivariate regression tree to conduct a Principal component Analysis (PCA). PCA is an analytical data reduction tool that is commonly used to reduce complex data sets to a lower dimension to reveal the sometimes hidden simplified dynamics that underlie a data set (Shlens, 2003: 1). PCA therefore assisted in differentiating predictor variables most important in the data set from redundant ones (Shlens, 2003: 1). Furthermore, while the initial intention was to conduct a T-TEST to compare the mean of results obtained between the two sites (Ngwane and Nqabara) the identified number of user respondents from Nqabara (six respondents) was not sufficient enough to allow such an analysis.

Analysis of the qualitative data to explain user perceptions of ICT service characteristics involved, categorizing data into themes. Questions related to each predictor variable each represented a theme. Once categorising was completed, an inductive approach was employed, where the evaluator attempted to discover recurrent themes from interviews and identify their importance (Leclercq, 2007: 41). In addition to the identification of frequency of themes from interviews, frequencies are compared to evidence which may have called into question the regularity of recurrent themes (Leclercq, 2007: 41). Appendix D provides a copy of the transcribed and categorized interview proceedings.

While the employment of qualitative methods for the assessment of user perceptions provided useful insight to the evaluator, such a research methodology is not without flaws. Insofar as



this assessment is confined to a single case (the SLL) the question of knowing whether findings derived from such qualitative methods can be representative of a wider universe can be posed (Leclercq, 2007: 49). Hence, without support from the previously highlighted quantitative analysis, the validity of this assessment would have been limited, due to its reliance on findings from a single study site. Furthermore, the results derived from this interpretative analysis are drawn from the perceptions of local community actors in a specific context and the subjective interpretation of the evaluator, thus compromising the objectivity of the findings. It is therefore good practice to triangulate such analysis with quantitative positivist analysis, as has been done in this case. Such a practice could aid in explaining quantitative findings through qualitative methods. However, as has been indicated, achieving such a comprehensive analysis will be dependent on resources available for the evaluation exercise.

### **7.7.2.2 b Lessons learned from conducting User perception assessment**

*Essential to simplify questions derived from I.S constructs, while still attempting to retain the meaning that the question intends to convey*

In the design phase of the user perception survey instruments (structured questionnaires and semi structured questionnaires), the evaluator initially adopted indicators as they were proposed for each construct. However, after a review of the first questionnaire draft by a specialist, who has extensive knowledge on evaluation in rural communities, it was determined that the indicators derived from proposed constructs to be measured needed to be simplified. The need for simplification was to ensure that rural respondents who may have a challenge with English or information systems terminology understood questions. For instance, from the DeLone and McIrene model it is suggested that an indicator of information quality is the 'accuracy of information received'. The evaluator changed this for the questionnaire purpose to read 'do you feel you receive correct information'. The substitution of the word 'accuracy' with 'correct' as with other words made a difference. An evaluator after such substitution may feel sceptical about the validity of the instrument due to the simplification process. It may therefore be useful in this case to validate the simplified version of the instrument. This could be achieved through soliciting expertise from experts in the field. In the case of this study, the evaluator called on the expertise of two information systems specialists to review the simplified version of the user perception instrument designed. After their reviews, both specialists after their reviews felt the instrument was valid.



***A mixed method approach contributes to the credibility of results***

As is evident from the description of the user perception assessment, both quantitative and qualitative methods were employed. Quantitative analysis in this assessment was useful in providing results on the ICT service characteristic most capable of predicting use. While such quantitative methodology was subject to general rules, thus increasing the validity of its produced findings, it did no justice in describing how and why results obtained were regarded as the most important predictor of use. Qualitative instruments were therefore relevant to aid in explaining the deeper meanings which may have been responsible for results obtained from quantitative analysis. However, it should be noted that if used alone, results obtained from qualitative descriptions may have lacked credibility for generalization. More so, considering the fact that the analysis was confined to a single case study. Therefore, it is evident that both quantitative and qualitative methods employed played complimentary roles, each contributing an aspect the other was lacking.

***Multivariate regression trees may be used as a statistical substitute for analysing repeated hypothesis testing between predictor and dependent variables***

Predictive accuracy is also routinely used as a method of statistical model selection and can replace the widely used practice of repeated hypothesis tests (De'ath, 2002: 1105). Regression trees make it easy to predict a set of response variables based on different independent variables. The procedure is conducted through recursive binary partitioning of data into discrete subgroups that are successively homogenous in the values of the response values (Kadye and Booth, 2012:4). Results obtained from quantitative analysis where regression trees are employed are easy to interpret, especially for non-statisticians. Therefore, such quantitative analysis may be appropriately suited to rural contexts, where the underlying future aim is to equip local community members (internal stakeholders) to learn to conduct such evaluations by themselves.

***Challenge***

***Hypothesis testing did not show correlation between dependent and independent variable as popularly suggested by adopted I.S models***

Pilot studies conducted prior to the actual process assessment did reveal that questions were properly understood by trained data collectors. However, results revealed that hypothesised assumptions made by the adopted I.S constructs did not correspond when applied in the SLL. For instance, assumptions made in the I.S construct that there will be a positive correlation

between perceived usefulness and use of information systems. The evaluator on receiving these results from the conducted spearman's rank correlation analysis of the quantitative data, could not but wonder if a limited understanding of the questions by the respondents was a contributing factor to the lack of correlation results revealed.

### **7.7.2.3 Assessing for the presence of sustainable use factors**

This assessment aspect attempted to assess the extent to which practices which indicate that there will be sustainable use of ICT services in the long run are present in the SLL. To assess this sub theme;

#### ***A checklist is designed using critical success factors***

A checklist is designed using Critical Success Factors (CSF) believed to promote sustainable use, against which it is intended that each critical success factor's presence was rated as either ('strong', 'slight', 'weak', or 'non-existent'). The scoring method is adopted from Pade *et al.*, (2009a). Refer to S.u4 of section 5.2.1.1 in chapter 5 to view identified critical success factors proposed to promote sustainable use.

#### ***The participant observation method is employed to identify the extent to which CSFs are present***

The evaluator, who also participated in training activities in the SLL as a facilitator, was able to observe the practices, routines, functions and operations of the SLL. This opportunity to participate provided an appropriate platform for the evaluator to adequately observe the extent to which critical success factors promoting sustainable use of ICTs were present. Observation took place in phases over trips which the evaluator made to the SLL project site to facilitate training sessions. Trips embarked on were taken between 2011 and 2012. These included a trip in April of 2011 and several other trips between August 2012 and November 2012. Observation aspects guided by the critical success factors included observing who the users of the SLL labs were, observing the project team's attitude towards beneficiaries, and observing the technological implementation and how appropriate it was for the SLL context. Field notes were also taken by the evaluator.

#### ***Unstructured interviews also applied***

Unstructured interview method, mostly in the form of conversations with project team members, project champions, community members and other researchers was also employed to determine the extent to which practices which promote sustainable use of ICT services

were present in the SLL's functioning. The value of unstructured interviews (conversations) must not be overlooked, as they could also be instrumental in providing useful data. For instance, it was through informal conversations with project team members that it was revealed that formal training had only recently begun, as prior computer literacy training was carried out sporadically. Further probing through subsequent conversations then aided in confirming the validity of data obtained through previous conversations. It should be noted though that the employment of informal interviews was a substitute plan, as the initial plan was to conduct semi-structured interviews along with participant observation to assess this sub-theme. However, due to constant postponement of interview schedules, the evaluator felt it would be best to spontaneously elicit the needed information through unstructured interviews in the form of conversations. Ethical considerations in seeking respondents consent though adhered to were established through verbal agreement. The evaluator after elicitation of data through conversations had reflective sections where he attempted to recall and take notes daily, of answers provided by respondents. Employing the conversation approach requires that the evaluator spend a considerable amount of time with the people whom he converses with. Spending time with potential interviewees is essential, because it provides a platform in which you could build a relationship with them, thus gaining their trust to an extent where they can freely discuss with you. A limitation of this approach to assessing this sub theme was that the data collected may have been subjected to the evaluator's bias, as there were no rules guiding the selection of interviewees or the questions asked.

### ***Data analysis and Interpretation***

Data analysis for this sub theme was entirely qualitative. The approach employed was content analysis, where through application of systematic observation the evaluator attempted to examine the data collected for key themes (Welman and Kruger, 2002: 195). To begin analysis, firstly categories are formed. Each critical success factor whose presence is being assessed for represented a category. Subsequently, data collected was reviewed, thus enabling the extraction of key themes associated with categories formulated. Furthermore, based on the conclusion of evidence collected, critical success factors being assessed for are awarded a status of (strong, slight, weak, or none) in relation to the evidence of their presence in the SLL. It should be noted though, that there is no criteria indicating what qualifies a critical success factor's presence to be awarded a particular status. As such, status awarded is purely

subjective and based on the evaluator's observation and interpretation through evidence gathered.

### **7.7.2.3 b Lessons learned from assessing for the presence of factors suggesting there will be sustainable use of ICTs in the long run**

#### *Qualitative approach well suited for assessing the extent of practices*

A qualitative approach derives meaning through exploration of a detailed view of a particular case, as variables associated with a project may not be obvious or easily identifiable (Krauss, 2005: 763). Such a method was well suited for assessing this sub-theme, as the aim of the assessment was to investigate the extent to which certain practices that promote sustainable use of ICT services are applied in the SLL. Therefore, this required understanding through descriptive narratives on how and why certain practices related to ICT use are carried out the way they are in the SLL. This enabled the evaluator to compare results gathered through qualitative methods to suggested critical success factors believed to promote sustainability. More so, based on the need to build a knowledge base (through lessons learned) for future research and project initiation purposes, it was essential that such an assessment was descriptive. To illustrate why, it will be essential to provide a practical example, which is as follows: one of the CSF outlined, which promote sustainable use is, gaining knowledge on the extent to which appropriate technology is used at project centres. Using quantitative methods, it may be concluded that technology used is appropriate. However, such a result will not be backed by any logically descriptive reason of why the technology used in such a context was deemed appropriate for that context. Thus leaving no suitable explanation for future project implementers on why a certain technology may be appropriate for their context. It is essential to note though, that the qualitative methods outlined here are suitable where an evaluator has a relationship with interviewees, to a point where they are comfortable discussing issues freely with the evaluator. Furthermore, to use participant observation effectively to determine the extent of a practices presence, it is indispensable that the evaluator spend considerable amount of time at the project site.

*Results from assessment of other service utilization sub-themes contribute to the assessment of identifying sustainable use practices*

One of the critical success factors believed to promote sustainable use of ICT services was the extent to which socially excluded groups participate in the project. Results from the coverage surveys conducted revealed such related information.

*Challenge*

*Ascertainment subject to the evaluator's subjective interpretation*

Ascertainment of what score category a CSF's presence in the SLL falls into was based on the subjective interpretation of the evaluator. Another evaluator conducting such an assessment at a different site may allocate different scores based on his or her judgment. Thus it may become challenging to compare findings across sites.

**7.7.2.4 Assessing Training Units Received By Rural Beneficiaries**

This sub theme intended to assess the extent to which newly recruited community recipients learned from basic computer literacy training or the extent to which they exhibited that they could apply what was taught during training sessions towards supporting their livelihoods. The assessment of this sub theme was not conducted by the evaluator, but was designed and conducted by the SLL management team. The SLL management teams approach to the assessment of this sub-theme was to facilitate practical computer use exercises for training recipients based on what they had learnt during training sessions. The evaluator however intended that in addition to the SLL management team's assessment exercise it would be useful to conduct interviews with recipients, also attempting to elicit the extent to which recipients had learnt from training courses. However, the evaluator did not succeed in conducting these proposed interviews. Reason for failure to conduct the interviews was due to over flooding of bridges in the Mbashe municipality which impeded the evaluator and also training recipients from gaining access to the proposed venues on proposed dates exercises were scheduled to be conducted. Though through interviews with facilitators present at practical exercise dates for a previous set of trainees, the evaluator was able to get an accurate picture of how this sub-theme was assessed. Furthermore, an interview with the SiLLMU project lead responsible for reviewing completed exercises provided more useful insight. To assess this sub theme;

***Training exercises are designed and administered by the SLL management team***

On completion of the training syllabus with a group of trainees, class exercises were administered to the completing training group. It was decided that class exercises would not be administered in an examination format and would also not be graded. Attempts to ascertain whether or not this was a suitable approach to assess gained knowledge by computer literacy trainees suggested that it was. Though, as indicated by several facilitators present at exercise sessions, a significant number of the trainees needed some form of assistance to complete the administered exercise. This raises a question as to whether or not trainees should be assisted when undertaking such an assessment. As some would argue that determining that a person has gained knowledge or become competent at something requires formal examination (Boit, Njoki and Chang'ach, 2012: 180). As it is revealed though, the underlying reason which influenced the decision not to administer examinations is that most of the trainees are new to computers, and as such, require an interactive assessment approach under a not too strict environment. One of the facilitators noted:

*“The method is suitable, because facilitators present are able to gauge a trainee’s level of gained knowledge based on the level of assistance the trainee requires, which is a useful source of feedback as well”.*

It was generally perceived that trainees had gained knowledge even though some trainees needed some assistance in completing exercises. An interviewed facilitator felt the challenge for trainees on this task was not attributed to grasping taught concepts but instead an issue of not understanding exercise questions. It was insinuated that training questions were not understood by trainees due to their limited understanding of English, which exercise questions were administered in. A number of external project stakeholders feel a solution to this challenge may be to have more training lessons and exercises administered in Xhosa. Their suggested reason for this is that teaching a new concept such as computers requires a medium which recipients who are new to the concept are familiar with. Several training facilitators and internal stakeholders interviewed disagreed with the above suggestion. According to these individuals, it is essential that people are trained and assessed in English. It was a generally shared view by these facilitators and internal stakeholders who were interviewed on different occasions that properly employing ICTs requires a fundamental understanding of the English language. An internal stakeholder (project champion) stated;

*“The training exercise must be set in English. They need to learn, especially for those who are teachers who will need to go and teach students how to use computers. “*

An interviewed facilitator thus suggested that it may be better if exercises were performed in Groups. Considering some trainees understood better than others and considering that they all speak a common language (Xhosa), trainees who understood English, and grasped training components better would be in the best position to explain what is required from a question in such a training exercise. It was further revealed that there was a general feeling of frustration amongst trainees who did not complete their exercises. Some trainees resorted to attributing their inability to complete the exercise, to the Internet's speed, and amount of time allotted to the exercises. This feeling of frustration indicates that recipients took exercises seriously, like they would have done in a quiz or exam situation. This suggests the appropriateness of such class exercises for assessing units received and also counters arguments which advocate for graded quizzes or exams as the best method to assess units received by recipients. For instance, this finding disputes findings by Enerson, Plank and Johnson (2007) who suggest that class assessment recipients are more likely to take assessments more seriously where they feel they would be graded.

The evaluator is also reminded that the class exercise assessment approach adopted captures all topics covered in the computer literacy course, and therefore is a comprehensive assessment tool well suited for eliciting information on knowledge gained by trainees.

### ***Evaluation forms distributed to Trainees***

Following the completion of the training exercise, trainees were expected to complete evaluation forms. These forms were designed to elicit feedback about trainee's experiences with the training sessions, thus providing the project team with valuable information to improve on training sessions. Aspects of training the evaluation form covered include: Trainee opinions on timing of training, opinions on the venues used for training, whether or not trainees encountered transportation issues, whether or not facilitators were properly understood, giving trainees an opportunity to highlight possible ways they feel they could apply what they had learnt, their opinions on the proposed graduation date, and the preferred names they expected to appear on training completion certificates they were going to receive. These forms once completed were to be delivered to the SiLLMU via a project team member. Such evaluation forms also serve as feedback, to assess the performance of the projects effort in administering training, an aspect which this research categorizes under the organizational functional theme.



#### **7.7.2.4 b Lessons learned from observed assessment of Units received**

##### ***Gaining knowledge of the right balance or appropriate method to employ for the assessment of units received requires an iterative process***

As can be seen from the above description, there are mixed reactions to the assessment methodology employed to assess units received. These differing suggestions revealed to the evaluator an essential point with regards to training units received. It revealed that gaining knowledge of the right or appropriate method to employ to properly assess units received will require an iterative refinement, where based on feedback received from prior group assessment exercises, refinements can be made to how units received is assessed. For instance, based on observations by trainees present at the conducted exercises, it is suggested that assessing units received may be administered better through group tasks., thus enabling a process whereby trainees who are more competent at speaking English explain to other trainees in their group what is required of them in a question. As suggested by Enerson *et al.*, (2007) when attempting to assess units received, achieving the right balance suited to the needs of your students may require some experimentation.

##### ***The perceived notion that scored assessments are held in higher esteem than class exercises not scored may be false***

Contrary to opinions by Enerson *et al.*, (2007) suggesting that students take assessments more seriously when being scored, it was revealed that there was a general feeling of frustration by trainees who did not complete assessment exercises. Such feelings do not in any way indicate that respondents did not take exercises seriously because they were not going to receive marks. This suggests that such exercises may be suitable for assessing units received. However, as indicated earlier on, it may be more appropriate to administer them as group exercises.

### **7.8 General Lessons Learned from Applying the RICTP-PAF**

In addition to providing sub-theme assessment specific lessons, application of the RICTP-PAF in the SLL also revealed some general lessons. Lessons focused on here attempt to retrospectively reflect on how the RICTP-PAF has addressed or attempted to address identified shortcomings common to current process assessment efforts of rural ICT projects. With regard to challenges highlighted in section 3.8 of chapter 3 it is determined that the application of the RICTP-PAF addressed the following shortcomings:



*Creating standard measurable critical aspects of project implementation to better enable comparing of findings between sites*

A common challenge with rural ICT process assessments is the range of disparate measurement aspects. This challenge impedes attempts to compare findings between sites, as evaluators may end up confused while attempting to decipher what a labelled critical theme in one project's site may be equivalent to in another site or similar project. Reflections reveal that the RICTP-PAF addresses this challenge. The RICTP-PAF consists of critical themes and sub themes that may be common to a variety of rural ICT project types. As such, findings on critical aspects between various sites or projects may be compared. For instance, a health related rural ICT project necessitates assessing the critical themes contained in the RICTP-PAF, so does a rural ICT educational project, as well as an agricultural or an entrepreneurial rural ICT project. All of these projects which may be implemented in various contexts will consist of: marginalized target beneficiaries who must be reached, the use of ICTs thus necessitating an understanding of user perceptual issues to enable improvement of issues relating to use, the need for sustainable use of ICTs in their various projects and attempts to inform or orient new ICT user audience (project staff or rural beneficiary) on how ICTs will be employed.

The case studied also confirms that comparative studies could be conducted of the sub-themes assessed. Findings from assessing the level of coverage was compared between the two communities surveyed. The comparative study, which may have further applied to the user perception assessment was only constrained due to the limited number of users identified in one of the communities. A comparative study in this case was not applicable to sustainable use factors, as project management of the two sites whose practices were being assessed is implemented by a single organization (SLL). However, such a study could have been achievable if the projects being compared were different or the same project in totally geographically dispersed community contexts. Finally, feedback for training units received was combined by the project team for both sites, thus impeding the prospect of a comparative study.

It must be noted that in no way is this lesson implying that the critical themes identified are an exhaustive list of all rural ICT process assessment critical themes. However, it reveals that all the critical themes discussed are common and important to typical rural ICT projects.

***Ensuring that the process assessment exercise took the perspectives of rural beneficiaries into consideration***

Process assessment exercises of rural ICT projects do not place sufficient emphasis on rural beneficiary perspectives. For instance, these assessments place more emphasis on the supply side (infrastructure implementation), rather than the demand side (willingness of beneficiaries to use ICTs, their attitudes and acquired capacity to use ICTs) (Ashraf *et al.*, 2007). Such approaches more likely than not, will result in rural ICT project implementations which do not meet the needs of rural beneficiaries (Pade-Khene and Sewry, 2011: 33). The RICTP-PAF addresses this challenge by ensuring that rural beneficiary perspectives are appropriately considered. As results of the process assessment indicate in Appendix H, the service utilization theme encompasses aspects related to rural beneficiaries, seeking to adequately gain their perspectives on the project. With assessment results gained on such aspects, rural ICT project implementers can tailor projects to fit the rural context they are implemented in, and also design solutions which meet the needs of rural dwellers.

While addressing the above challenges common to rural ICT process assessments the RICTP-PAF did not have a solution for every process assessment challenge identified. For instance, gaining knowledge on the most appropriate methods to employ in order to get stakeholder groups to jointly plan the evaluation and also jointly set criteria for acceptable performance is still lacking. Therefore, this could be viewed as a valuable proposition for enhancing the applied critical theme (*service utilization*) of the RICTP-PAF.

## **7.9 Reflection on Feedback**

Feedback of the assessment results were administered to internal and external stakeholders separately. Feedback sessions to both groups took the form of workshops, where the evaluator presented the process assessment results through Power Point. Furthermore, discussions were incorporated into feedback sessions.

Internal stakeholders, who assessment results were disseminated to, provided their opinions on the evaluator's recommendations. Though not totally disregarding the recommendations, they made suggestions which provided insight for the evaluator to make adjustments to earlier anticipated recommendations. Furthermore, reflections on the feedback process reveal that stakeholders may not always agree with recommendations made by the evaluator. For instance, as it is indicated in the process assessment report, the external stakeholder project

lead had differing opinions on a recommendation to incorporate occupational specific projects to enhance the extent to which the projects training offering to rural beneficiaries is consistent with job market needs. However, this was not entirely negative, as other stakeholders present with differing views also voiced their opinions. This indicated to the evaluator that such feedback workshops serve as powerful forum to discuss proposed changes to implementation of a project. As such, future implementations of the RICTP-PAF when attempting to conduct result dissemination exercises may find it useful to carry it out jointly, with contributions from both internal and external stakeholders. This way, varying stakeholder groups could view the projects implementation from other stakeholder's vantage points.

### **7.10 Conclusion**

The description of a process assessment in the SLL represents the application of a developed process assessment framework in a real-life rural ICT project environment (RICTP-PAF). Through its collaborative approach to development the SLL characterizes one of several projects which have adopted the living lab concept. Collaboration here is exhibited through partnerships between academia, industry, government and rural communities to bring about development for marginalised rural communities. Considering the project has been operating for some time, it was relevant that a process assessment was undertaken to reveal whether or not the implementation process is going on as planned. The RICTP-PAF provides a suitable tool to conduct such an assessment. The application of the RICTP-PAF to assess a critical theme of the SLL operation processes provides useful results along with essential lessons for enhancing the framework. Lessons learned through the assessment of four sub-themes of service utilization (coverage and bias, user perception of ICT service characteristics, the extent of the application of sustainable use practices, and units received from training) reveal the suitability and shortcomings of applying the RICTP-PAF in a real life rural ICT environment. Lessons learned contribute to an enhanced version of the RICTP-PAF.

## **Chapter 8**

### **Revised RICTP-PAF**

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*This chapter revises the RICTP-PAF in retrospect of lessons learned from the application of the framework in the real life project environment.*

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## **8.1 Introduction**

The applicability of the RICTP-PAF is explored through a case study depicting its application in a real life rural ICT project environment. Furthermore, the case study reveals the suitability and shortcomings of the RICTP-PAF when employed pragmatically to assess critical themes of process assessment. Identified aspects of the frameworks suitability and shortcomings as applied, enable reflections, which consequently result in suggested revisions to the framework. This chapter aims to incorporate suggested revisions to the RICTP-PAF.

Suggested aspects contributing to the revision of the framework are summarised. This begins with revisions to the guiding principles applied to the assessment process. This will be followed by revisions to reflect suggested ways of suitably applying various methodologies employed to assess each sub-theme of service utilization, that is, coverage and bias, user perception of ICT service characteristics, the presence of sustainable use practices, and units received. A brief overview of the application of the RICTP-PAF is then described. Subsequently, the findings are summarised, and it is concluded that wide spread application of the RICTP-PAF by varying rural ICT projects contributes to the incremental and iterative improvement of the framework, through lessons learned. Furthermore, it is believed that the application of the framework to different projects potentially provides a platform for comparing results obtained from different project process assessments.

## **8.2 Revisions to the RICTP-PAF**

The RICTP-PAF is composed of critical themes of process assessment in rural ICT projects, methods and procedures for assessing critical themes, and guiding principles to apply when conducting a process assessment of rural ICT projects. A case study exploration of the applicability of the RICTP-PAF in the SLL, through an assessment of sub themes of service utilization (coverage and bias, user perception of ICT service characteristics, the presence of sustainable use practices and units received) suggest useful revisions to aspects of the RICTP-PAF applied.

### **8.2.1 Application of Guiding Principles**

The application of *guiding principles* to the process assessment exercise was successful. However, difficulty was experienced when attempting to plan the process assessment with stakeholders, an aspect related to ‘collaborative evaluator/stakeholder relationship’. While this challenge did not necessitate change to this guiding principle, it did aid in raising awareness on issues which may impede potential planning of a process assessment with stakeholders. Furthermore, the application of the framework aided in highlighting an

additional guiding principle (ensuring there is feedback from evaluation results to internal and external stakeholders), one not previously stated prior to the assessment conducted in the SLL. Lastly, other suggested lessons and the way in which their incorporation enhances the framework are highlighted. A summary of an enhancement to guiding principles is depicted in Table 8.1.

*Table 8.1: Enhancements to guiding principles for conducting a process assessment*

Guiding Principle	Lessons Learned	Suggestion for incorporating lesson learned for framework enhancement
<p><b>1. Collaborative evaluation relationship between evaluator and Stakeholders</b></p>	<ul style="list-style-type: none"> <li>Planning evaluation with internal and external stakeholders was challenging.</li> </ul>	<p>Evaluator must ensure he/she is not influenced by their internal perceptions about stakeholder's knowledge on evaluation topic, while anticipating planning the evaluation with stakeholders. Furthermore, the evaluator should ensure that the overall planning is conducted with input from all stakeholder groups. Stakeholders are more likely to be receptive and willing to collaborate if overall planning of evaluation is conducted with their input (Pade-Khene and Sewry, 2011: 286).</p>
<p><b>2. Programme theory specification</b></p>	<ul style="list-style-type: none"> <li>Programme theory specification was essential to the process assessment exercise.</li> <li>Programme theory did not specify what acceptable levels of coverage should be.</li> </ul>	<p>Estimations of acceptable coverage levels should be included in programme theory.</p>
<p><b>3. Validate evaluation questions</b></p>	<ul style="list-style-type: none"> <li>Attempts to validate questions through stakeholder opinions revealed variations in opinion amongst stakeholder groups.</li> </ul>	<p>The evaluator should attempt to plan the evaluation through joint meetings where both internal stakeholders are present. This should be done in order to get joint consensus from both stakeholder groups, while also creating a platform for differences to be dialogued on.</p>
<p><b>4. Quality control.</b></p>	<ul style="list-style-type: none"> <li>The need for more accurate results faced a trade off with evaluation cost.</li> </ul>	<p>Adequate balance should be achieved, with the need for accurate results and the availability of resources.</p>
<p><b>5. Ethical considerations</b></p>	<ul style="list-style-type: none"> <li>Ethics also entails that an evaluator considers consequences which may arise as a result of the evaluation and its propositions or recommendations.</li> </ul>	<p>Evaluators must thoroughly consider how their results may affect rural beneficiaries and other stakeholders, and must determine ways to deal with consequences which may be derived as a result of their research.</p>
<p><b>6. Feedback (Additional)</b></p>	<ul style="list-style-type: none"> <li>Due to a lack of feedback, community respondents</li> </ul>	<p>Results from a process assessment must be fed back to both internal and external stakeholders.</p>

guiding principle)	were reluctant to participate in interviews.	This should also be regarded as a guiding principle.
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### 8.2.2 Assessing Service Utilization sub themes

A table format is employed to explain enhancements to the RICTP-PAF. The table consists of six columns:

- The first column outlines the method type.
- The second column indicates whether the method is originally proposed in the RICTP-PAF.
- The third column outlines propositions stated by the RICTP-PAF if originally outlined prior to application in the SLL prior to its application.
- The fourth column indicates whether a method is applied in the SLL.
- The fifth column reveals the type of result obtained if a method is applied in the SLL
- The sixth column suggests through lessons learned how methods which were applied may be appropriately applied.

#### 8.2.2.1 Coverage and Bias

While the theoretical framework presented in Chapter 5 indicates suitable methods for assessing *coverage and bias*, it does not outline how such methods may be appropriately applied. The application of the in the SLL reveal useful lessons which suggest how methods outlined by the RICTP-PAF for assessing *coverage and bias* may be suitably applied. Depicted in Table 8.2 are lessons learned from assessing coverage, which aid in contributing to enhancements of the framework.

Table 8.2: An enhancement of the RICTP-PAF's proposed methods for assessing coverage and bias

Method type	Method originally proposed in RICTP-PAF	RICTP-PAF proposition on method if originally proposed	Method applied in the SLL assessment.	Type of result obtained from application of method if applied	Enhancement to the RICTP-PAF. (Suitability/Appropriateness) outlining how method should be applied appropriately as revealed through lessons learned
Community household survey questionnaires	Yes	More suitable than programme records when attempting to find out estimates of eligible non participants present in a community. Furthermore, suitable when there are no properly managed programme records.	Yes	<ul style="list-style-type: none"> <li>• Determining extent of service use by the entire community.</li> <li>• Biases against user groups with regard to service use.</li> </ul>	<ul style="list-style-type: none"> <li>• A single household questionnaire can be employed to determine the extent of coverage of in an entire household.</li> <li>• It is essential to employ the expertise of local community members for distribution of community household questionnaires.</li> <li>• Collection of feedback from data collectors on data collection experience is essential.</li> <li>• More in-depth investigations may be needed to make sense of answers provided by respondents of community survey questionnaires.</li> <li>• Community household survey questionnaires should not be applied too frequently, as this will constitute wastage of resources. Therefore, it is still essential to keep programme records to keep track of regular usage, while community surveys may be administered once or twice a year to determine</li> </ul>



## Chapter 8: A Revised RICTP-PAF

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					whether or not service use is equitable.
Programme attendance records	Yes	When programme records are available and properly managed they are the most suitable method for determining coverage. However, they cannot be used all the time as they cannot reveal data on eligible community members who have never participated in project.	No	None	None

### **8.2.2.2 User perception of ICT service characteristics**

This proved to be a relevant sub-theme of service utilization to assess. Furthermore, its exploration in the SLL concurs with the RICTP-PAF's suggestions on potential ways to assess this sub theme. Referring to methods and procedures of (*Service Utilization 3*) S.U 3 in section 5.4.1 of chapter 5, it is suggested that both quantitative and qualitative methods may be applied to assess user perceptual aspects of rural ICT project services. However, it is not revealed how such methods may be employed appropriately. Table 8.3 highlights useful lessons and how these lessons may be used to enhance suggested methods for assessing user perceptions of ICT service characteristics.

### **8.2.2.3 Identifying the Presence of factors suggesting there will be sustainable use of ICTs in the long run**

Assessing for the presence of practices which suggest that there will be sustainable use of ICTs in the long run, was also shown to be relevant to the SLL context. The assessment of this sub-theme in the SLL suggested some useful lessons which could be taken into account where evaluators intend conducting such an assessment. Table 8.4 depicts enhancements to propositions made in the RICTP-PAF on suggested ways to assess for the presence of sustainable use factors, and useful lessons to consider when attempting such an assessment.

### **8.2.2.4 Units Received from Training**

Referring to methods and procedures of S.U 2 in section 5.4.1 of chapter 5, it is indicated that observation of participants and interviews with them are appropriate assessment tools for units received by project recipients undertaking computer literacy training. However, the suggested method for assessing units received was different than instruments suggested in the framework. Furthermore, the case study observation of how this sub theme was assessed provided useful lessons. Table 8.5 depicts the appropriateness of methods employed by the project team to assess units received in the SLL.

Table 8.3: An enhancement of the RICTP-PAF's proposed methods for assessing user perception of ICT service characteristics.

Method type	Method originally proposed in RICTP-PAF	RICTP-PAF proposition on method if originally proposed	Method applied in the SLL assessment.	Type of result obtained from application of method if applied	Enhancement to the RICTP-PAF. (Suitability/Appropriateness) outlining how method should be applied appropriately as revealed through lessons learned
Quantitative Questionnaire	Yes	Assessments where concrete evidence is needed through the application of general rules capable of predicting behaviour.	Yes	Identifying through statistical calculation, the most important predictor variable influencing use of ICTs in the SLL context.	<ul style="list-style-type: none"> <li>• Questions derived from I.S construct indicators should be simplified especially for rural contexts where rural respondents may be illiterate or may not understand English. However, it is essential to note that while simplifying questions the intended meanings questions seek to convey must be retained.</li> <li>• After simplification of survey questionnaires, they must be reviewed by specialists and validated.</li> <li>• Multivariate regression trees may be used as a statistical substitute for analysing repeated hypothesis testing between predictor and dependent variables.</li> <li>• Quantitative results are incapable of explaining the deeper meanings which may be responsible results which questionnaire analysis will produce. Therefore, a mixed method may be necessary where qualitative studies complement quantitative studies.</li> </ul>

Qualitative semi-structured interviews/observation.	Yes	Suitable where deeper meanings are sought to explain a phenomena. For example, semi structured interviews attempted to reveal why information quality was selected as the most important predictor of ICT use.	Yes	Qualitative descriptions confined to the SLL context on possible reasons for explaining results obtained from quantitative study	<ul style="list-style-type: none"> <li>It is essential to complement qualitative methods with quantitative methods to improve the credibility of results they produce.</li> </ul>
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Table 8.4: An enhancement of the RICTP-PAF’s proposed methods for assessing for the presence of factors promoting sustainable use of ICTs

Method type	Method originally proposed in RICTP-PAF	RICTP-PAF proposition on method if originally proposed	Method applied in the SLL assessment	Type of result obtained from application of method if applied	Enhancement to the RICTP-PAF. (Suitability/Appropriateness) outlining how method should be applied appropriately as revealed through lessons learned
Qualitative informal interviews.	Yes	None	Yes	Qualitative descriptions detailing why certain practices may be deemed as strongly, slightly or weakly practiced.	<ul style="list-style-type: none"> <li>Suitable when evaluator has a relationship with potential respondents. This is because to get internal and external stakeholders to a point where they are comfortable discussing with you, you have to spend considerable amount of time with them to gain their trust. Approach is well suited for assessing the extent of sustainable practices presence, based on the fact that it provides a platform to descriptively motivate for reasons why a practice may be deemed to be present and also to determine what extent it is present. By reviewing such qualitative descriptions, other projects do not just</li> </ul>

					see that a practices presence promotes sustainability, but they can also be provided with reasons why such a practice is deemed sustainable.
Participant observation	Yes	Participant observation could be used to complement interviews to confirm, descriptions elicited through interviews.	Yes	Evidence from first hand participant observation suggesting that certain practices are present to a certain extent.	<ul style="list-style-type: none"> <li>• Suitable when evaluator is willing to spend considerable amount of time at the project site.</li> <li>• Ascertainment of the presence of sustainable use practices based on evaluator’s subjective interpretation.</li> <li>• Results from assessing coverage can contribute to evidence of the extent to which socially excluded groups are included in the project.</li> </ul>

Table 8.5: An enhancement of the RICTP-PAF’s proposed methods for assessing units received

Method type	Method originally proposed in RICTP-PAF	RICTP-PAF proposition on method if originally proposed	Method applied in the SLL assessment.	Type of result obtained from application of method if applied	Enhancement to the RICTP-PAF. (Suitability/Appropriateness) outlining how method should be applied appropriately as revealed through lessons learned
Class exercise	No	None	Yes	Completed class exercise by trainees. Thus, indicating whether or not knowledge has been gained from training classes.	<ul style="list-style-type: none"> <li>• Suitable for providing evidence of proficiency gained by trainees, regarding what they have been taught. While such a method may seem suitable, evidence also suggests that fully gaining knowledge of the right balance or the most appropriate method to employ for assessing units received will require an iterative process of constant refinement.</li> </ul>

Feedback evaluation forms	No	None	Yes	Feedback mechanism of trainee's thoughts on training course.	Suitable for eliciting feedback.
Interviews	Yes	Interviews with trainees and facilitators could provide knowledge on the extent to which trainees have learnt what they have been taught during training	No	None	None
Observation	Yes	Observing trainees during training sessions could provide an indication on the extent to which they have learnt what they have been taught	No	None	None

### 8.2.5 The Overall Structure of the Process Assessment Framework

The structure of the process assessment framework did not require any revision. However, its application in the SLL revealed the need for an additional guiding principle to the framework. Referring to Figure 5.1 in chapter 5, it can be observed that there are 5 guiding principles indicated as supporting factors to consider when conducting a process assessment of a rural ICT4D project. The application of the RICTP-PAF revealed that feedback of assessment results to internal and external stakeholders is fundamental to the assessment process. As such, Figure 8.1 below depicts an enhanced version of the RICTP-PAF's diagram. The guiding principle marked in red is the newly integrated principle.

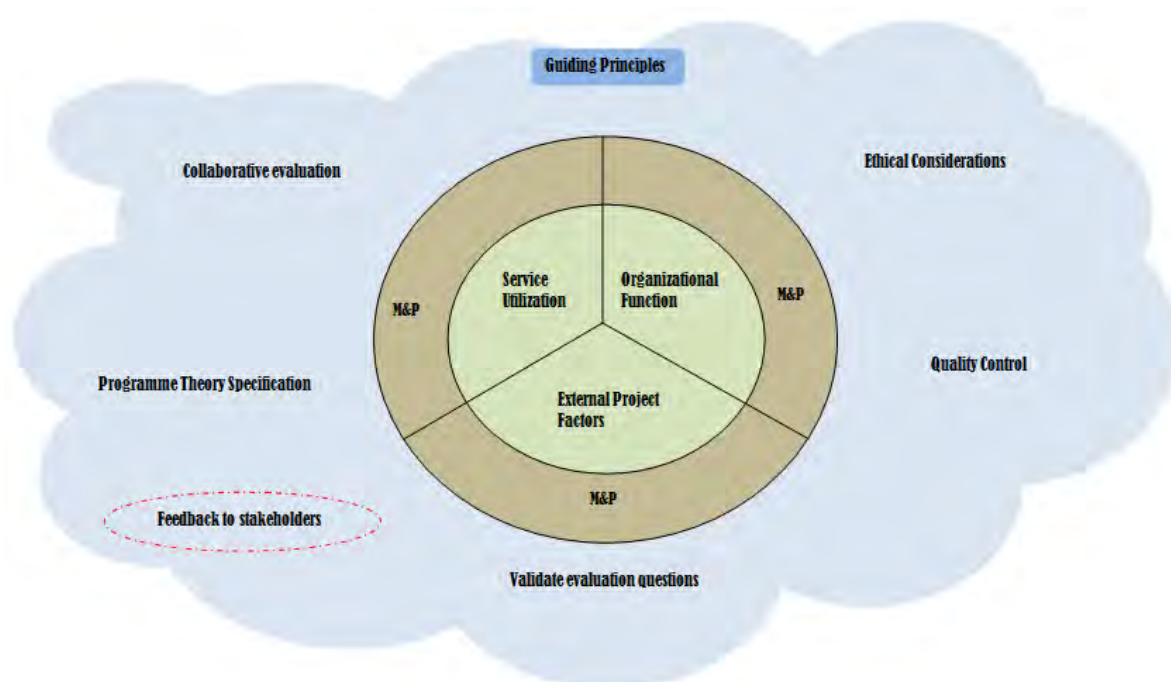


Figure 8.1: The Enhanced Rural ICT Project Process Assessment Framework (RICTP-PAF)

### 8.3 An Overview of the RICTP-PAF Application

The application of the RICTP-PAF to assess the service utilization critical theme revealed the relevance of all sub-themes assessed under service utilization. Furthermore, the application revealed useful lessons for each sub-theme assessed. These lessons contribute to the invariable enhancement of the RICTP-PAF, as while not modifying the structure, they suggest ways of enhancing methods and procedures employed to assess sub-themes. To add on, the conducted assessment suggests that the RICTP-PAF addresses certain challenges relevant to rural ICT4D project process assessments identified in section 3.6.2 of chapter 3. These include, identifying standard measurement themes to better enable comparative studies

between sites or projects, and ensuring that a rural ICT4D projects process assessment takes into consideration the perspectives of rural beneficiaries. Other identified challenges not addressed, such as, gaining knowledge on how best to get all stakeholder groups involved to jointly plan the process assessment and derive consensus on criteria for acceptable performance, reveal the need for further enhancement to the applied portion of the RICTP-PAF. Furthermore, other identified critical themes of the RICTP-PAF not explored in the SLL, such as *organizational function* and *external project factors* need to be explored. Application of the RICTP-PAF in other rural ICT project environments potentially creates a platform for further enhancing the framework, through lessons which could be learned. This process of enhancement requires an iterative approach where application of the RICTP-PAF constantly suggests revisions which will make the framework more effective. Therefore, this allows for an incremental process of improving on rural ICT process assessment exercises.

### **8.4 Conclusion**

Process assessments are invaluable exercises to rural ICT project implementation phases, as they act as performance checks that reveal to project stakeholders when a rural ICT4D project is not operating as expected. Essentially, without such diagnosis, rural ICT projects will remain oblivious of implementation aspects which necessitate correction or direction, consequently risking resultant project failure. Critical themes of process assessment that form the most essential aspects of assessment in the implementation phase of such projects, together with suggested guiding principles, make up a framework for conducting process assessments of rural ICT projects. The RICTP-PAF, when explored in a real life case study of a rural ICT project reveals lessons through its application. Lessons expose the suitability and shortcomings of applying the framework in a real life project environment. Lessons learned suggest ways of appropriately assessing service utilization sub themes: coverage and bias, user perception of ICT service characteristics, sustainable use factors and units received. Furthermore, an additional guiding principle is discovered while applying the framework, thus contributing to the enhancement of the overall framework. Finally, it is revealed that the RICTP-PAF addresses certain challenges common to rural ICT4D project process assessments.

While it is specified that the application of the RICTP-PAF revealed the relevance of the service utilization sub themes assessed, it is also indicated that the framework was not applied in its entirety. Thus, it is suggested that other identified critical themes of process assessment need to be explored in future research. It is also revealed that the application of



the framework in other rural ICT project environments potentially creates a platform for further enhancing the RICTP-PAF, through lessons which will be learned. A process of enhancement as is exhibited in this study necessitates an iterative approach where applications constantly result in a more effective artifact (framework).

## Chapter 9 Conclusion and Future Research

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*This chapter concludes the research. The conclusions of the research are outlined and future research areas are highlighted.*

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### **9.1 Introduction**

Information and Communication Technologies (ICTs) are paramount to rural development projects as they underpin processes of information exchange between rural areas and the rest of the developed world. The deployment and employment of ICTs as strategic support tools for rural development are, however, threatened by barriers that impede their sustainability and undermine their essentiality. Thus, evaluation has become a necessary component for such projects to ensure their initiation, design, and implementations are appropriately conducted. Furthermore, such evaluations provide a suitable platform to account for impacts derived from these projects.

While it is now commonly accepted that ICT4D projects necessitate evaluation, current approaches are confronted with inadequacies and challenges which influence their effectiveness. A major challenge is the lack of approaches which ensure comprehensive and an all-encompassing analysis of rural ICT4D projects. More concerned with identifying impacts, such evaluation approaches neglect earlier phases of a rural ICTs project life-cycle. As a result, there is no account or track record of processes which may be responsible for impacts derived. The comprehensive evaluation framework on which this research is based on attempts to deal with such shortcomings, by proposing an approach for evaluating rural ICT projects from their inception to post implementation stages. Seeking to further the implementation of this framework in a real life rural ICT project environment, this research explores the process assessment phase of the Rural ICT Comprehensive Evaluation Framework (RICT-CEF). This required that critical themes of process assessment relevant to rural ICT projects be identified. An analysis of the process assessment of social programmes, evaluation of information systems in use, and rural ICT project case studies, aid in identifying critical themes relevant to rural ICT projects. This research further investigated the application of identified critical themes of process assessment in a real life rural ICT project environment. Outlined and described in this chapter is the overall research investigation. The outline specifically focuses on the contributions of the research and proposed areas for future research.

### **9.2 Research Contribution**

Through the research, knowledge is contributed to in the following way;

### **A review of rural development, ICTs and the sustainability of ICT4D projects.**

- Rural development contributes to socio-economic growth in developing countries through a process of expanding human capabilities of rural dwellers who constitute three quarters of the worlds poor.
- Information and knowledge are essential components for the expansion of human capabilities required to bring about rural development. Furthermore, ICTs provide a suitable medium for transmitting information to and from rural areas, based on their abilities to facilitate communication between remotely dispersed individuals or groups.
- ICTs provide information and facilitate communication to enhance the following aspects of livelihood assets/capitals: human capital, natural capital, financial capital, social capital and physical capital. However, the utility ICTs potentially provide for rural development is impeded by challenges which influence the sustainability of ICT implementations for rural development and undermines the importance of such implementations.
- Sustainability of rural ICT4D projects must be given due attention, as it is a critical determining factor of whether or not a rural ICT project is deemed successful in the long run. In retrospect of challenges that threaten the implementation and sustainability of rural ICT projects, it is essential that projects of this nature are evaluated to aid in revealing what works and what does not.

### **Evaluation of rural ICT4D Projects**

- ICT4D project evaluations, amongst other benefits, enable project planning and implementation effectiveness, provide documentation of proof of successful project implementations, and aid in deconstructing assumptions project implementers might hold when executing such projects.
- However, ICT4D evaluation is plagued with challenges which influence the accuracy and relevance of evaluation results. These include limited micro level evaluations that are sensitive to rural contexts, incomprehensive evaluation approaches which do not consider all life cycle stages of a project, a lack of understanding on how to properly account for impacts and inadequate resources to conduct rural ICT project evaluations.
- A comprehensive evaluation approach that is sensitive to the rural context it is applied in, may aid in alleviating many of the challenges currently being faced by ICT4D evaluations. The Rural ICT Comprehensive Evaluation Framework (RICT-CEF), entails the comprehensive application of appropriate domains of evaluation throughout the life of

a rural ICT project to improve and support rural development (Pade-Khene and Sewry, 2011: 142). The RICT-CEF consists of seven domains, each of which is congruent to a life cycle phase of a rural ICT project. Domains in sequential order include: A baseline study, a needs assessment, programme theory assessment, process assessment, impact and outcome assessment, efficiency assessment, and a scalability assessment. The first three domains of the RICT-CEF which constitute the definition stages of the framework have been applied in a real life rural ICT project environment. Chronologically, the next domain necessitating application is the process assessment domain. The process Assessment domain seeks to assess how well a rural ICT project is operating to implement its intended functions in the specified way stipulated in the projects plan.

- A process assessment potentially provides the following advantages for rural ICT projects: replication of successful implementation processes in other project sites, satisfying stakeholder interest, equity of service distribution amongst sub-groups of potential recipients, linking project processes to outputs and outcomes, and understanding the relationship amongst various project components.
- Various challenges may impede the realization of the advantages process assessments potentially contribute to rural ICT project implementations. Such challenges may include: disparate measurement indicators across project sites, resource constraints limiting the amount of potential data which can be collected, few training opportunities to specialize as a process evaluator, limited concentration on rural beneficiary perspectives during such assessments and difficulty of criteria setting for acceptable performance due to varying stakeholder views.
- It is essential that in conducting process assessment exercises the following guiding principles are adhered to: Collaboratively conduct evaluation with internal/external stakeholders, specify programme theory, validation of evaluation questions, quality control throughout data collection and integration of ethical considerations.
- Process assessment questions are centred around critical themes of project performance. Furthermore, critical themes are the most essential aspects of a rural ICT projects implementation phase that necessitate assessment, based on their importance to project

outcomes. Identifying critical themes of process assessment in rural ICT projects, aids in eliminating some of the challenges which may limit the potential advantages project implementations may derive from such assessments. Furthermore, identifying critical themes ensures that aspects being assessed are those which play vital roles in order for projects to realize their objectives.

### **An Extensive Analysis of process assessment of social programmes, Information systems in use, and Rural ICT project Case Studies.**

- A template based on the essentiality of process assessments to rural ICT4D projects, identified shortcomings relevant to process assessments of rural ICT4D projects, and the research questions this study attempts to investigate (the need to identify and explore critical themes) guides a comparative analysis to identify critical themes of process assessment relevant to rural ICT4D projects.
- The template comparatively analyses process assessment approaches with regard to the following aspects: Title of text, organization/ author, purpose of text, critical themes identified, definition of critical themes, identified instruments and methods for assessing critical themes, reason critical theme identified is relevant to rural ICT4D projects, contextual themes identified, lessons learned, limitation of Assessment Approach.
- The extensive analysis consisting of 14 assessment approaches included: 5 assessment approaches from social programme process assessments, 3 assessment approaches from information systems in use and 6 assessment approaches from rural ICT4D evaluation case studies. Each selected Assessment Approach either contributed to, or reaffirmed already identified critical themes and suggested assessment methods identified amongst each other. Rural ICT project process assessments could draw from the experiences of social programme process assessments, considering both types of interventions function to improve socio-economic conditions. In like manner, rural ICT projects are also considered information systems projects which seek to employ ICT services to facilitate and contribute to rural development. Furthermore, the implementation phase of rural ICT projects involves use related aspects of information systems projects, thus revealing the essentiality of integrating information systems models focusing on use. Lastly, rural ICT project evaluation case studies suggest from a pragmatic view aspects which they view as essential to assess in real life rural ICT project scenarios. The key aspects compared

across assessment approaches are the identified critical themes of process assessment, and the suggested instruments and methods for assessing identified themes.

### **The Rural ICT Project Process Assessment Framework (RICTP-PAF)**

The proposed Rural ICT project Process Assessment Framework (RICTP-PAF) suggests that critical themes of process assessment are the most essential aspects in the implementation phase of rural ICT projects which require monitoring, as the performance of these aspects are critical to achieving project objectives. The RICTP-PAF is composed of critical themes of process assessment, methods and procedures for assessing critical themes and guiding principles vital to adhere to when conducting process assessments. Critical themes of process assessment in rural ICT4D projects include: Service Utilization, Organizational Function, and External Project Factors. Each critical theme consists of sub-themes:

- Service utilization (*Coverage and bias, user perception of ICT service characteristics, sustainable use factors, and training units received*)
- Organizational function (*Units delivered, service quality, project support functions, project flexibility and sustainable management practices*)
- External project factors (*Institutional support and contextual factors*).

Methods and procedures selected to assess critical themes are determined by what is being assessed, and resources available. The guiding principles suggest best practices to observe whilst conducting process assessments, to aid in maximizing results obtained.

### **The Application of the RICTP-PAF in the Siyakhula Living Lab**

The application of the RICTP-PAF is limited to assessing *Service Utilization* and its sub-themes. Through this process, useful lessons are learnt from observations of the suitability and shortcomings while applying the RICTP-PAF in a real life rural ICT project (the SLL). Lessons learned through reflections of the application of the RICTP-PAF enable enhancements to the framework. A summary of enhancements made to the RICTP-PAF can generally be described as follows:

- a) Highlighting how instruments used to assess sub themes could be applied appropriately. Furthermore, limitations of methods employed to assess particular sub-themes are discussed.
- b) A guiding principle (feedback to stakeholders) not previously outlined in the framework prior to its application in the SLL is identified and integrated into the framework.

## 9.3 Future Research

### 9.3.1 Enhancing the RICTP-PAF

The scope of the research was limited to assessing the Service Utilization theme. Therefore, future research aims to:

- 1) Explore the application of the other critical themes, which are, *organizational function* and *external project factors*. For instance, as was indicated by external stakeholders interviewed (project team members), there is a need to monitor the extent to which all stakeholders involved in the SLL ensure the performance of their varying objectives which contribute to the project goals.
- 2) Apply the framework in other rural ICT4D project contexts. Lessons learned can contribute to the continuous refinement of the framework.

### 9.3.2 Application of Subsequent Domains of the RICT-CEF

The process assessment domain studied is part of a comprehensive evaluation framework (RICT-CEF), whose subsequent domains still necessitate exploration. Currently, applied domains of the framework include, *the Baseline study*, *the Needs Assessment*, *the Programme theory assessment* and in this research the *Process assessment*. Therefore, future research aims to apply subsequent domains of the RICT-CEF in a real life rural ICT project environment. Domains which necessitate application include, *Outcome* and *Impact Assessment*, *Efficiency Assessment* and a *Scalability Assessment*, and these all depend on the *Process Assessment* domain.

### 9.3.3 Exploring other Process Assessment Approaches to identify more Critical Themes and principles

Identified critical themes of process assessment relevant to rural ICT4D projects were derived through an extensive analysis of 14 assessment approaches. Therefore, by employing the template used and criteria for selection of appropriate assessment approaches, research could be conducted to identify other critical themes which necessitate assessment in the implementation phase of rural ICT4D projects. For instance, analysis could concentrate on sector specific rural ICT4D projects like education, agriculture, health, and social welfare to identify other critical themes relevant to assess in the implementation phase of rural ICT4D projects. Furthermore, the study of related process assessment approaches may reveal other guiding principles essential to consider when conducting a process assessment of rural ICT4D projects.



### **9.3.4 Applying the RICTP-PAF to other ICT4D Project Cases**

Rural ICT4D projects commonly are implemented in varying contexts, and as such, each possess idiosyncrasies not common to each other. Due to this characteristic of peculiarity, future research could focus on application of the RICTP-PAF in other rural ICT4D projects. Thus, lessons which will be derived from reflection of the suitability and shortcomings of applying the RICTP-PAF in other project contexts contribute to future research. With more wide spread application of the RICTP-PAF in varying project environments, process assessment results from these varying applications provide an adequate platform for comparative studies of the effectiveness of rural ICT4D implementations in developing countries.

### **9.4 In Closing**

The employment of ICTs in the development sphere in recent times has conjured mixed reactions in ICT4D literature. While some view ICTs as supportive tools when employed for development, others are not so optimistic about its employment for such purposes. If ICT4D pessimists are to be convinced that ICTs do in fact significantly contribute to development, such projects must be implemented appropriately for desired impacts to be derived. Ensuring the effective employment of ICTs where development is concerned requires appropriate approaches and mechanisms to support its deployment and implementation. Appropriate approaches necessitate evaluation which serves as checks to inform project implementers where corrective measures need to be taken. Key to a rural ICT evaluation is a process assessment, due to the fact that project implementations become concrete through project processes that are put in place. This suggests that the significance of process assessments in rural ICT4D projects cannot be overlooked, as it aids in revealing aspects of implementation which must be improved on or corrected if projects are to derive positive intended or unintended impacts. A process assessment requires that critical themes of process assessment in a rural ICT project are assessed. As contribution to knowledge, the findings in this study suggest that these critical themes, when integrated with certain guiding principles, provide an appropriate framework (the RICTP-PAF) for conducting process assessments of rural ICT projects, with adequate sensitivity to the rural contexts where such assessments are conducted. The application of the RICTP-PAF in varying rural ICT4D project contexts provides a platform for iterative and continual refinement of the framework, while also acting as performance checks for such project implementations in developing countries.

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