DELIVERABLE 3: FIELDWORK REPORT

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WRC project K5/2074/1

Change Orientated Learning And Water Management Practices

CONTENTS

ABBREVIATIONS

ADM	Amatole District Municipality
BRC	Border Rural Committee
CBNRM	Community based natural resource management
CBO	Community based organisation
CF	Catchment Forum
CHAT	Cultural Historical Activity Theory
COP	Community of Practice
CPA	Communal Property Association
DWA	Department of Water Affairs
ELRC	Environmental Learning and Research Centre
IK	Indigenous Knowledge
IWRM	Integrated Water Resource Management
NGO	Non-Governmental Organisation
PhD	Doctor of Philosophy
PRA	Participatory Rural Appraisal
RSA	Republic of South Africa
SLIM	Social Learning for Integrated Management
U.S.	United States
WfF	Working for Food
WFW	Working for Water
WM	Water Management
WRC	Water Research Commission
WRM	Water Resource Management
WUA	Water User Association
ZCBNRMF	Zambia Community based natural resource management forum

GLOSSARY OF TERMS

Action Research: An approach to problem solving in which individuals work together in learning sets, supporting one another to frame and make sense of difficult situations, to work out potential optoins for managing these situations and to evaluate their progress as they try out these options in practice (Colvin, J et al. 2010, 89).

Activity System: Is the minimal meaningful context for understanding individual action.

Community of Practice: A community of practice is a group of people who are are collectively engaging in a similar activity. Through sharing experiences and knowledge members of the group learn from each other.

Cultural Historical activity theory: This is a framework and methodology for exploring phenomena. The interest is in the change that happens within our minds which leads to a modification in the way in which we interpret and act on our world. It rests on two premises. One, the context that we find ourselves in is central to how we develop and, two, the way we learn is a social process which internalises rules. Values, norms and beliefs of the culture we find ourselves in (Stetsenko and Arievitch 2010, 237)

Focus Group: A focus group is a research technique that collects data around a particular topic through group interaction, with questions being determined by the researcher and then presented to the group for discussion (Litsosseliti, 2003)

Knowledge flow: How knowledge moves from one group to another and influences practice.

Mediator(s): the means by which an individual acts upon or is acted upon by social, cultural and historical factors in human activity (Engelstrom in Daniels, 2008, 40).

Participatory Rural Appraisal: This describes “a growing family of approaches and methods to enable local people to share, enhance and analyse their knowledge of life and conditions to plan, and to act.” (Chambers in Van Vlaenderen, 1995, 1)

Praxis: Describes the relationship between theory and practice, where theories or ideas are enacted, exercised and applied.

Social Learning: Social learning has not developed as a consistent discourse (Ison et al, 2007). However most definitions refer to an understanding that learning occurs when people engage with one another and share diverse perspectives in a trusted environment usually around a collective action.

Triangulation: The use of multiple data-collecting techniques to increase the validity of research findings.

LIST OF DELIVERABLES

Deliverable	Description
1. Review Document	Literature review and aligning of fieldwork planning and resource design with review.
2. Start up Document	Project design and identification of site for research.
3. Fieldwork report	Report on fieldwork and development of the resource
4. Development of question driven resource publications based on case activity systems	Question-driven resource publication and report on its development
5. Design of community directed catalogue	Document setting out an approach to designing a community directed resource and a WRC catalogue for mediating processes and expanding learning in WRM practice contexts.
6. Curriculum framework for mediator training programme	Mediator training programme.
7. Report on mediator training and activity systems	Report on mediator training programme, which will include the piloting of the question-driven resource.
8. Final report & masters studies	Final report and Masters studies.

OBJECTIVES OF PROJECT

1. Identify and support the skills that are needed to mediate learning about water management practices in an Eastern Cape community. For this project, the practice of rainwater harvesting will be used as an example.

2. Research the development of a knowledge resource that could be used to develop the capacity of community-based mediators of water knowledge. The resource will be developed in response to and in support of an existing community-based water management practice in the Eastern Cape: for this project, the practice of rainwater harvesting in the Cata area near Keiskammashoek.

How this deliverable addresses these aims

This deliverable is a summary of the thesis by Charles Phiri. Its relevance to the overall project is that it shows how the use of any resource has to provide spaces of reflection both for the communities engaged in a WRM process and for practitioners assisting communities.

INTRODUCTION

The aim of the first phase of the project has been to investigate the sociology of community-based water management practices – how communities learn by being involved in these practices (Burt et al. 2012) and how to understand the role of social learning in water resource management.

This research took the form of a Masters study, an analysis of three water management practices at a community level by Charles Phiri. His study explored how people learn these practices, the challenges and tensions of the learning process, and the learning that has taken place.

Phiri's main findings are:

- Participation in communities of practice creates a platform for learning for community members
- Participatory structures for local communities have developed around a WRM practice
- A range of contextual factors and structural mechanisms influence participation and learning in communities of practice
- Most learning has been achieved through social interactions amongst communities of practice rather than through outside influences.

Phiri's research also shows that most learning happens through sharing, simple conversations, and storytelling, rather than through generic resource material. He concludes that if resource material is to contribute to this shared space of learning, it would have to be woven into the story or stories already being told around this practice, to ensure that it becomes part of the ongoing conversation of learning.

In this deliverable we describe how Phiri carried out his research, his findings relevant to this research project, and how this will influence the design of the resource. We also mention briefly the steps to be taken to develop the question-driven resource.

CONTEXT OF RESEARCH

Charles Phiri's background is in rural development. He works as a national coordinator for the Zambia community-based natural resource management forum (ZCBNRMF), where he develops and builds the capacity of community-based organisations (CBOs) in natural resource monitoring and management. His work in Zambia led him to want to know how communities learn through participation in community-based natural resource management (CBNRM) and specifically, integrated water resource management (IWRM), which is one aspect of CBNRM.

CBNRM is an approach to conservation and development that promotes the rights of local people to benefit from the management and use of natural resources. After almost three decades of its practice, it has become clear that learning and capacity building are key requirements of its success. However, community learning remains poorly understood, which affects the way in which training and capacity building programmes are designed and supported, and ultimately affects programme implementation.

Phiri's study builds on WRC consultancy K8/813 which explored knowledge flow and learning in communities, from the perspective of experienced water communicators. One of the findings of this research was that learning is more likely to occur when people are engaged in expanding or changing practices that they are already involved in (Burt and Berold, 2011). Another finding was that learning is context specific. Those who develop resources have to consider both the way people learn and their current practice.

Phiri takes this research further by directly investigating how people in a specific rural community [the Eastern Cape village of Cata have learnt about three IWRM practices. The findings of his research both support and expand the findings of the consultancy investigation.

RESEARCH QUESTION AND GOALS OF PHIRI STUDY

The aim of the research was to investigate how social learning takes place as communities of participate in selected IWRM practices.

The research question was : How do communities learn through participating in IWRM practices?

The goals of the study were:

- To understand and describe how learning takes place when communities participate in selected IWRM practices.
- To understand community questions and to find out what knowledge resources are available to mediate these questions;
- To understand how water management structures and other underlying mechanisms influence learning processes and opportunities with specific reference to IWRM practices.

RESEARCH DESIGN

A case study was used to gain a deeper understanding of how communities learn as they participate in IWRM. A critical realist ontological analysis was used.

Case Study Method

Critical realism employs in-depth probing of generative causal mechanisms influencing empirical and actual experiences. Bhaskar (2008) argues that the world is inherently transformative, with generative mechanisms having causal powers initiating actual events (and non-events) and leaving empirical traces. Such causal powers can include poverty, power relations, policies, language, inadequate education, and tensions and contradictions. All these influence how participation and learning take place (Wenger, 2007; Pesanyi, 2008). Therefore, if we wish to understand the various mechanisms and events that influence participation and learning opportunities in community-based IWRM practices, this requires what Sayer (2000) refers to as 'intrinsic' or in-depth research. Such research is best served by a case study research design (Yin, 2003).

Data collection techniques

Multiple data collection techniques were used for this research study. Lupele (2004) notes that each data collection technique has strengths and weaknesses, and using them in combination can allow the strengths of one to compensate the weakness of others.

Document Analysis

Documents are analysed to contextualise the study. According to Patton (1990) documents serve two purposes: they are a basic source of information about the programme decisions, project background and activities; and they can give the researcher ideas about what questions to pursue through more direct observations and interviewing.

Documents in this case study came from primary and secondary sources. Primary documents were those with a direct relationship to the study, such as previous contextual profile study reports on Cata, Working for Water project documents, training materials, minutes of meetings, reports and documents related to the focus of this research. Secondary documents do not have a direct relationship with the study such as research reports that have relevance to the research (Cohen, et al, 2000).

The table below lists the documents that were reviewed and analysed (Cohen et al, 2000).

Table 1: List of documents analysed

Name of Document	Index Code
The Cata Story	D1
South African National Water Policy	D2
Cata – A former homeland affected by Betterment, Eastern Cape, South Africa	D3
Contextual Profile on Cata	D4
South African National Water Act of 1998	D5
Situated Learning: Legitimate Peripheral Participation	D6
Communities of practice: Learning, meaning and identity	D7
A Critical Review of Participatory Practice in Integrated Water Resource Management	D8
Learning about participation in integrated water resources management: A South African review	D9
Learning in a Changing World and Changing in a Learning World: Reflexively fumbling towards sustainability	D10
Within and Beyond Communities of Practice: Making Sense of Learning through participation, identity and Practice	D11
Situated and Social Learning Process: A Brief Introduction	D12
Critical realism - Essential readings	D13
A case of exploring learning interactions in rural farming communities of practice in Manicaland, Zimbabwe	D14
Understanding Social Learning Processes in a Citrus Farming Community of Practice	D15

Key informant interviews and semi-structured interviews

Phiri conducted key informant interviews with five people from the Department of Water Affairs (DWA), Amatole District Municipality (ADM), Cata Communal Property Association (CPA), and two elders from the Cata community. These interviews provided information on the Working for Water (WFW) project, structures for community participation at catchment level, operations of the Cata CPA, and on the cultural history of the Cata people. Phiri notes that some key informants were hesitant to share information especially if it related to the history of people at Cata.

Semi structured interviews were conducted with four people involved in the IWRM practices selected. The advantage of gathering responses to the open-ended questions of such interviews, is to enable the researcher to understand and capture people's points of view without predetermining these points of view via questionnaire categories (Patton 2002: 21). Semi structured interviews allow the researcher to probe for more detail and meaning. The duration of the interviews varied between 25 and 43 minutes. All interviews were audio recorded.

Focus Group Discussions

A focus group is a research technique that collects data around a particular topic through group interaction, with questions being determined by the researcher and then presented to the group for discussion (Litsosseliti, 2003). This process has the

potential for eliciting valuable data that reflects the diversity of the group. It also allows participants to question each other and explain themselves to each other (ibid).

Three focus group discussions were conducted with women who are involved in Working for Food (WfF) for homestead gardens, in the Skafu and Nyanga communities of Cata village. Each focus group had a total of five participants per group and the duration of discussions varied between 30-48 minutes. Sessions were recorded and a local interpreter was employed to translate from English to isiXhosa and visa versa. The recorded discussions were transcribed from isiXhosa to English.

Table 2 : Semi-structured interviews and focus group discussions

Interview	Purpose	Date
Semi-structured Interviews (SS)		
S1 (Working for Water contractor)	Gathering data on Working for Water project in Cata	28th June 2011
S2 (Cata Agricultural Project supervisor)	Gathering data on the Cata Irrigation Project	28th June 2011
S3 (Cata Agricultural Project Manager)	Gathering data on the Cata Irrigation Project	29th June 2011
S4 (Water for Food Coordinator)	Validation and member checking of the data generated through focus group discussions	15thSeptember 2011
Focus Group Discussions (FG)		
FG1	Gathering data on Water for Food community of practice in Skafu settlement in Cata Village	5th July 2011
FG2	Gathering data on Water for Food community of practice in Nyanga settlement in Cata Village	8th July 2011
FG3	Gathering additional data on Water for Food community of practice in Nyanga settlement in Cata Village.	12th July 2011

Observations

Observations were used to observe social learning interactions. Four homestead gardens were visited in order to observe how rainwater harvesting equipment was being used, how the water was collected and stored, and what the collected water was used for. Observations were also made on how people were applying the skills and knowledge they had gained through training workshops.

Working for Water sites were visited to observe how people had put into practice what they had learned from training programmes, and how they interacted with each other.

Charles Phiri also made an observation trip to the Cata Agricultural Project.

All observations were written down and photographs were taken for further documentation.

Limitations of the research process

Since the research study site was in an IsiXhosa-speaking area, a local translator was employed to translate the interview questions from English to IsiXhosa. While transcribing the data, it was discovered that in a number of cases the translator did not pose the questions correctly. This affected the outcomes of the discussions. However, the data obtained was validated through by checking with the WfF COP Coordinator and by reference to the available literature.

Data Analysis

Data analysis was done in three phases throughout the project.

Phase 1: Empirical interpretive analysis
Empirical analysis allowed the researcher to review the data carefully and identify patterns which were turned into categories and sub-categories for analysis (See Table below).

Phase 2: Abductive analysis
This was achieved by interpreting and recontextualising phenomena observed through social learning processes so as to understand meaning as interpreted within the conceptual framework (Silverman, 2010).

Phase 3: Retroductive analysis
This approach provides knowledge of transfactual conditions, structures and mechanisms that are observed or experienced in the domains of actual and empirical (Danermark et al, 2002). This allowed for a critical realist causal analysis that could differentiate the various mechanisms and events influencing participation and learning opportunities in IWRM practices in the Cata community.

Analytical memos were used to organise the data, based on themes that emerged from the data and informed by the research question and goals.

Table 3: Categories and sub-categories

Categories	Sub-categories
Learning	▪ Learning Ways ▪ Learning Knowledge ▪ Learning Opportunities
Participation	▪ Structures for participation ▪ Reasons for participation ▪ Participation processes
Mechanisms & Influences	▪ Inadequate Quality Education ▪ Language ▪ Power Relations ▪ Poverty ▪ Policy & Legislation ▪ Employment ▪ Tensions & Contradictions

Community Questions	▪ Need for prior knowledge on initiated projects ▪ Involvement in decision-making processes ▪ Training not specific to community needs ▪ Use of English during facilitated trainings ▪ Resource materials not locally contextualised ▪ Valuing of local community knowledge ▪ Low education levels affecting performance ▪ Inadequate water for homestead gardens

Validity and trustworthiness

To ensure the credibility and trustworthiness of the research, data was triangulated (Patton, 2002) using multiple data-collecting techniques – document analysis, interviews, focus group discussions, and observations.

In order to represent the data accurately, the data was presented as direct quotations from respondents. Data generation and analysis processes were guided by the research purpose, research questions, and content. This is supported by Maxwell (1992) who notes that validity is not just about what methods one uses, but whether the data, accounts, and conclusions from those methods adhere to the purpose and context of the study.

Face validity, as described by Lather (1986), was an important validity criterion, and was done through member checking. Two feedback sessions were conducted to verify data analysis. The researcher's colleagues were also asked to critique data analysis at various stages (research proposal, research methodology, methods and preliminary data).

Ethical considerations

Permission was sought to record the interviews and the reason for recording was properly explained to the participants (Jackson, 2009). Prior consent was also sought before taking any photographs of the participants.

Another key ethical consideration was language. Since the respondents spoke isiXhosa, permission to conduct interviews in English was negotiated with them and a local translator was employed to allow for their full participation. All three focus group discussions were conducted in IsiXhosa. Informants have been kept anonymous.

THE THREE WATER MANAGEMENT PRACTICES SELECTED FOR RESEARCH

The three practices were selected more to investigate the way in which people learn than to gather knowledge about the practices themselves. This was in line with the aims of this stage of the research project.

Out of the three WRM practices identified, two will be used as examples of how to develop a question driven resource that responds to the way people learn and to the questions that emerge out of practice.

Water for Food Community of Practice (COP)

WfF is a network of interested people who wish to capitalise experience, share and create new knowledge and innovations on the sustainable use of water resources for food production within IWRM. Border Rural Committee (BRC) had introduced WfF home-gardening approaches such as trench gardening and run-off rainwater harvesting in Cata in 2004. Currently 21 Cata families are farming 'WfF gardens'. These gardens focus on nutrition and home food production through rainwater harvesting (Umhlaba, 2008).

Cata Agricultural Project COP

The Cata Irrigation Scheme is a smallholder irrigation scheme in which land-rights holders have grouped their plots together with full-time, commercial farming in mind. It functions through a strong informal partnership between a support NGO, Border Rural Committee (BRC), and a local cooperative.

The irrigation farming is carried out through a collaborative structure called the 'company committee'. It is structured in a typical NGO/community partnership manner, not defined by a written contract but rather by relationships. Consultation and joint decision-making takes place on a reasonably extensive scale, so that there is a perceived mutual ownership.

The irrigation scheme covers 22.75 hectares, made up of 20 individual plots whose owners are members. Its management committee includes the project members, BRC, and the Cata Community Property Association (CPA), with the intention of improving local participation in decision making and management processes (Umhlaba, 2008).

Working for Water COP

WFW aims at improving and securing water supplies through engaging local communities in clearing of alien invasive vegetation which reduce the flow of water in streams and rivers. Although this is its main goal, WFW has other objectives such as conserving of biological diversity, and empowering local communities through job creation.

In Cata, the programme has been labour-intensive, with community members being hired by contractors. The contractors, themselves drawn from local communities, direct the clearing process with the collaboration and support of the Cata CPA, a community-owned association which holds, manages, develops and administers land within Cata on behalf of the community (Phiri, 2011a).

The WFW programme has achieved good results, evidenced in the increased water flow in the Cata River, which had nearly dried up as a result of black wattle infestation.

THE STUDY SITE

This research focuses on community learning in the rural Eastern Cape community of Cata. It is a village of on 3three settlements (– Skafu, Ndela and Nyanga) – in the Cata area. It was and was arrived at chosen as a study site due to thebecause a number of existing IWRM practices that are already in place in which community members are participating.being implemented in the area Cata is also located in the upper catchment of the Cata River. In this upper catchment area issues of water management are different from those of the middle and lower catchment areas (Phiri, 2011a).

Biophysical characteristics

The Eastern Cape is one of the poorest provinces in South Africa with up to 68.4% living in poverty in 2002, an increase of 14% since 1996 (BRC, 2008), and Cata, formerly within the Ciskei bantustan, falls under the Amathlathi Municipality, part of the Amatole District Municipality. It is located approximately 58km north of King Williams Town (see Figure 1). The village nestles against the slopes of the Amatole Mountains, which form an important catchment for the whole area. Cata is located in the upper catchment of the Cata River, which has different water management issues from the middle and lower catchment areas (Phiri, 2011a). The river is the main source of water for both people and livestock, running through the middle of the settlements to the Cata Dam in the south (BRC, 2007). The people of this village were resettled here under the Betterment Planning scheme of the apartheid government (Phiri, 2011a).

Land use activities in the upper catchment include commercial agriculture production, community-based or small-scale agriculture through garden plots (up to 500m² in size), livestock rearing, and commercial forestry. Other land use activities include trout fishing tourism in the Cata River.

The grazing vegetation in the area is a mixture of highland sourveld and dome sourveld. The highland sourveld is situated on the mountain areas, while the dome sourveld is located in the lower lying areas (Anderson & Axelsson, 2005).

Mean annual precipitation at Cata is 632 mm with 431.6 mm (68.2%) falling during the standard crop production period (October–March). Rainfall can vary widely, between 153 mm and 710 mm during the crop production period. Such erratic rainfall can be a limitation on crop production (Anderson & Axelsson, 2005).

Socio-economic characteristics

The village surveys conducted in 2001 found that there were 422 households in Cata, each with an average 6.7 people, making up a population of about 2 800 (BRC, 2008). From 1996 to 2001 the percentage of households with no income rose from 16% to 43% (BRC, 2007) due to, amongst other reasons, a decline in economic activity in the village. One of the prerequisites for local economic development is adequate available local skills, and although there had been modest improvements

in overall levels of education in Cata since democracy, only 100 people had a matriculation certificate in 2001 (BRC, 2008).

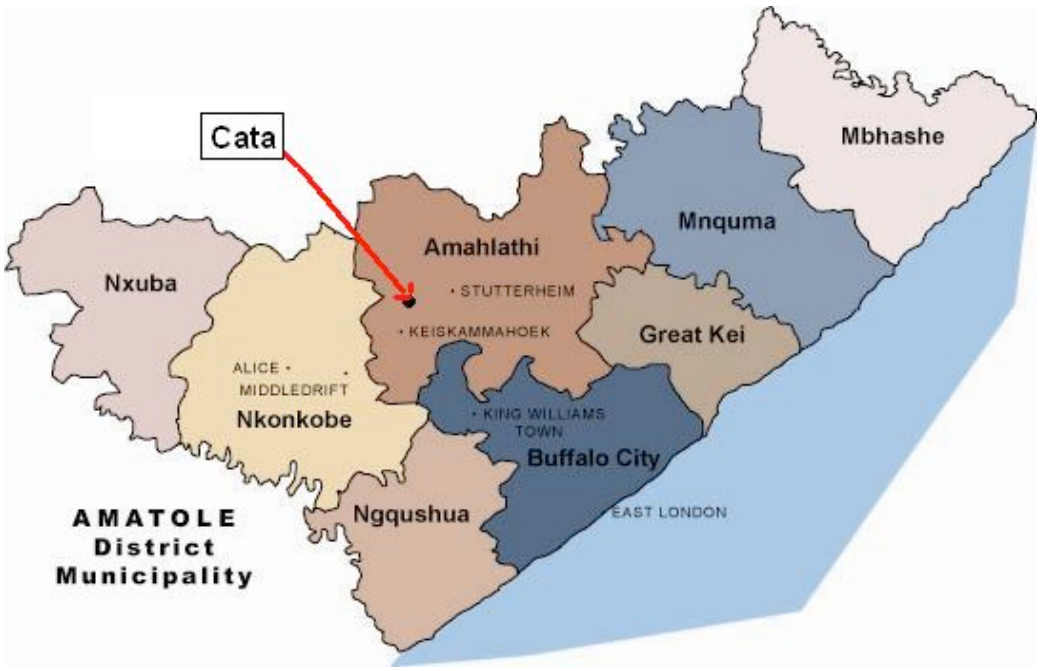

Figure 1: Location of Cata (BRC, 2007)

Historical background

Betterment Planning started in South Africa in the 1930s, aiming to restructure the scattered black settlements of the black rural areas and bring them together into larger blocks for more efficient agriculture. Under the scheme, land was divided into residential, arable and grazing land, and people were relocated from scattered homesteads to more concentrated 'betterment villages'. The number of livestock that could be owned by families was reduced, and residential and grazing areas fenced off in order to introduce rotational grazing. From 1948 to 1950, the government carried out a research project in Ciskei, to test whether Betterment Planning would have an impact (Anderson & Axelsson, 2005). This project was carried out in six villages in Ciskei, Cata village being one of them.

However It was not until the 1960s that the apartheid regime introduced Betterment as a widespread policy. Its official justification was that people would be better off if they moved together into a village – closer to schools, medical services and roads. In practice, however, the effect was an increase in poverty and unemployment (BRC, 2007). The small plots of arable land were located far away from people's homes and were too small to sustain subsistence farming (Hoffman & Ashwell, 2001). This forced people into becoming migrant labourers working in South African industries, mines and agriculture (Anderson & Axelsson, 2005). Families were broken up and support networks destroyed.

One old man in Cata village said that a family was permitted to have about 300 sheep and 100 cattle before the reform, but when their land was reduced it was hard

to feed that many animals. He said that after three years they could only feed 20 sheep and 10 cattle – the rest were sold, stolen, slaughtered, or died (Anderson & Axelsson, 2005).

SUMMARY OF RESEARCH FINDINGS

Structures for community participation and learning

Apart from the Cata Water User Association launched in 2010, no other WM structure exists for the participation of the community in water resource management at a community level. There are, however, a number of water management practices in the area that have been identified above. Participation and learning in IWRM takes place through membership of these communities of practice. Through participating in them, community members learn to engage with tools and develop practices.

Burt et al (2006) contend that although South Africa has embarked on a formal model for participatory water resource management practice, the evidence shows that many aspects of natural resource management, including water allocation and usage, are regulated by traditional institutions and structures which have not been formally considered in the newly-proposed structures. Brown (2011) supports this conclusion, and argues further that instead of participating in structures that seem to be ineffective in addressing community needs, it would be more valuable for rural communities to engage in participatory projects like Water for Food. This certainly seems to be borne out in Cata. By participating in the Water for Food project, community members have developed skills in rainwater harvesting, nutrition and food production, water treatment and recycling of household water, soil conservation and marketing and business management through various learning and social interactions.

These findings support WRC consultancy K8/813 on knowledge flow, when water communication practitioners commented that they found learning and learning resources to be more effective when they engaged learners with water issues that they experience in their local context. Resources were also seen to be more effective when part of a larger social process or social practice (Burt and Berold, 2011).

Two recent Dutch studies observed that knowledge creation should emerge out of the practices of stakeholders situated in their specific contexts (Jiggins et al, 2007). The researchers observed that 'deliberately organised shared reflection' among stakeholders at different levels leads to them to more explicit awareness.

Community learning in water resource management

Learning interactions in Cata have taken place through both informal and formal processes, including:

- Facilitated training workshops
- Exchange visits with other groups to share ideas
- Meetings, social interactions and village conversations
- Inter-generational knowledge transfer
- Learning through observations
- Learning from others
- Learning through printed text and literature

- Extension workers facilitating learning

Phiri lists what community members have learnt through these various activities:

Water for Food community of practice:

- Rainwater harvesting, including installation of water harvesting tanks and/or pits, water collection, conveyance and storage methods
- Methods of water treatment
- Garden development and management such as weeding, pest identification and control and use of trench beds water conservation methods
- Soil conservation practices such as erosion control and soil fertility improvement through use of organic manure
- Recycling of household water for use in gardening
- Fruit and vegetable growing

Working for Water community of practice:

- First aid
- Safety and health education including HIV/AIDS
- Values and ethics
- Herbicide application
- Chainsaw management
- Management and supervision
- Occupational skills
- Environmental management
- Forestry and plantation management
- Identification and control of invasive alien species
- Life skills to equip workers to look for more permanent employment

Cata Agricultural Project

- Rain water harvesting
- Flood and sprinkler irrigation
- Soil conservation practices such as erosion control
- Improving soil fertility
- Weed control
- Farm management
- Herbicide application
- Riverbank management
- Business management
- Food and hygiene
- Health education and occupational skills

This list of topics demonstrate how many different skills can be developed by channelling learning around an existing WM practice rather than developing generic training programmes that are not linked to practice. This guides us in developing a resource. It tells us that if the knowledge generated by research in a community is

mediated through an existing practice, it will be more likely to be used by people (Burt and Berold, 2011)

The above list also shows that learning occurs through formal and informal interactions. People learn through observation, and they will observe the work of those who have been to a training course on home food gardening and copy these practices in their own gardens.

When working for the WFW project, novice and slow learners are often paired with older more experienced learners. Lotz-Sisitka (2011) explains this as a process of 'legitimate peripheral participation'. When we start learning something new, we are on the outside looking in, but as we learn, we gain more experience, develop our identities and gain membership into different kinds of knowledge communities. Thus through social interaction with a supportive adult or peers, learners are able to move beyond their current range of ability and function at a higher level. However, as Phiri's research revealed, this is not without problems as elders or more experienced practitioners do not always want to share their knowledge.

Mechanisms influencing participation and learning

Six contextual factors were identified by Phiri's research as influencing learning interactions and participation in the identified WRM practices.

1. Language as a mediator: Danermark et al. (2002) argue that human language is a distinct feature of human societies, and it has a very important role in conveying and exchanging meaning in the social world. Phiri found that use of English as a mode of facilitation hampers participation and learning. Although facilitators often use translators, all learning materials are in English.

2. Power relations: In the Working for Water project, novice learners get discouraged while others withdraw from certain activities because those who have been trained become too harsh on them each time they ask for help. Those with more training are often hesitant to show new workers all that that they need to know in order to do the work. This is probably because they fear that if the novices become more knowledgeable their jobs could be threatened.

Service providers often provide training that does not address the specific needs of the community members. A manager of the WFW programme commented; "As a manager I pass on my needs and that of the workers to the Working for Water project Managers who then inform the Service Providers. Despite that they come up with their own training specifications." It is apparent that the beneficiaries of training programmes do not have the power to influence the kind of training they receive or to insist that they are consulted on what their specific needs are.

Lotz-Sisitka and Burt (2006) comment that while participatory practice is often established with a view to reducing power imbalances and enabling more equitable forms of natural resource management, participation does not automatically lead to a balance in power. In some cases participation has been found to entrench existing power relationships because of the lack of clarity about its meaning and application.

Likewise significant issues of power and conflict can arise in the process of becoming a full member of a community of practice. This is apparent in the tensions that arise between newcomers and more experienced participants.

It is therefore vital to consider the relations of power and control embedded in the production of cultural or mediation tools, and their use in learning processes. The forces that go into their production often play a major role in determining how they will be used (Daniels, 2008).

3. Low education levels: Phiri's research indicates that low education levels have a negative effect on participation, performance and output. Because their writing and reading skills are poor, their training has to rely heavily on their ability to learn through listening. As one respondent commented: " Because people can't read or write, it is very difficult to even implement a management plan. They cannot even measure their targets to see if they have achieved them."

Clapper (1996) who writes about citizen participation in local government says that people who have higher levels of education are more likely to participate because they have more political information, and consider themselves capable of influencing government activities. This makes them to be more likely to be active members of a community.

This brings us to the relationship between participatory WM practices and capacity development (Haddad et al, 2007). Here we should look first at mobilising community capacity in practices that are already engaged in WRM practices, for example home food gardens and rainwater harvesting.

4. Resource materials are not locally contextualised: For practical tasks, manuals need to be written in the most common language of the community, and include clear photos or illustration to mediate learning.

5. Policy frameworks: Policy frameworks can influence learning and participation in a positive or negative way. An example which encourages learning and participation is the national policy framework for public participation which those interviewed felt promoted public participation in water resource management in their area.

An example of a policy which negatively effected learning and participation was Betterment Planning. According to respondents this policy had negative social, political and ecological consequences. It influenced for the worse their socio-economic status, quality of life and involvement in communities of practice.

6. Poverty: Phiri's research shows that people join a WM community of practices to address poverty – their own and that of others. Reasons given for participating in the WFW project was to gain some form of income. Participation in farming and home food gardens was also motivated by economic need.

Reasons for community participation in IWRM practices

Phiri's research identified seven reasons why people engage in WRM practices:

- Source of income
- Skills development
- Employment opportunity (not only through the WRM practice itself, but developing the necessary skills to get further, more long-term employment)
- Restoration of the productivity of the land
- Water availability and supply (people have noticed how the flow of the Cata River has improved since Working for Water has been clearing alien invasive plants)
- Socio-ecological issues and risks (The clearing of wattles is not only viewed as an important ecological contribution but also as a way of addressing social problems that have arisen because of thick forestation, such as women and children being raped while collecting firewood)
- Incentives offered by the Cata Agricultural Project (fresh produce at a reasonable price)

Learning through social interaction amongst communities of practice

Learning in IWRM practice in Cata has been shaped by external influences such as training programmes, interactions with experts and extension support services. But it is also happening every day through social interactions with other community members.

Through such relationships the three communities of practice observed in this study have developed into a knowledge community, so that their knowledge of water resource management can be communicated and shared with others. This has implications for the way in which we support learning. We can ask what questions people have, how research knowledge can respond to these questions, and what choices can be articulated for people to deliberate in their everyday interactions with each other.

THE NEXT PHASE OF THE RESEARCH

In developing learning support materials as mediation tools in this project we need to consider the following questions coming out of the Cata research:

- What structures already exist where communities are participating in WRM practices? These structures will more than likely not be the formal WRM institutions such as WUAs or Catchment management committees. How do we create a learning tools that will support existing structures?
- What learning has already taken place and how? How will learning tools enhance and support learning that has already taken place?
- How do we make such tools appropriate to the context? How do we develop learning support materials that take into consideration factors that inhibit learning and participation?
- How do we develop learning support materials that encourage the learning that happens between people as they practise rain water harvesting?
- How do we develop learning support materials that are responsive to the existing practice and support this practice?

The findings of WRC consultancy K8/813 (Burt and Berold, 2011) suggested that learning support materials should be driven by the fact that people seem to learn best in the context of a group that is already doing the things needing to be learned. This kind of learning happens through conversation and demonstration. Charles Phiri's research in Cata supports this approach.

With this in mind, we have decided to document in depth the stories of rainwater harvesting in Cata and build a question driven resource around these narratives. In order to do this and engage with the questions above, we have designed the next stages of the project as follows:

March/April 2012	Nina Rivers, a second Masters student, will conduct a series of field trips in Cata to further deepen the evidence that has emerged from Charles Phiri's study. Her focus will be to capture the narratives of people engaged in rainwater harvesting so as to thoroughly understand their skills and knowledge, the choices they have made, and the challenges or tensions they face (See draft proposal in Appendix E).
March	A departmental seminar will be held at the ELRC, Rhodes University, to discuss the findings of Charles Phiri's research and further investigate how this could influence Nina Rivers's study as well as the development of the question driven resource.
March	Gather resources on rain water harvesting for the catalogue.
March	Finalise a second study site in which the resource will be piloted.
March – June	Contract Tim Wigley, an experienced permaculturalist and environmentalist, to assist with the writing of the resource. He has a vast amount of experience with using various rainwater harvesting which will be woven into the resource.

31st March	Run a workshop on finalising the resource design at Rhodes University. This will involve the project team, Tim Wigley, students from the Institute of Water Research and the department of Environmental Science, consultants working with rainwater harvesting in the former Transkei, and a student environmental group involved in rainwater harvesting.
24th -27th April	Run a week-long resource writing workshop. At the end of this week have completed drafts of the resource and catalogue.
May	Finalising and editing the resource and catalogue
June/July	Nina Waters to test the resource in Cata and the second study site.

CONCLUSION

The main finding of this fieldwork report summarising Charles Phiri's research is that learning happens in order to fulfil the actions of everyday life. What this means for implementing IWRM is that learning that needs to be incorporated into and support the practices that communities are already involved in. The existing practice becomes the centre of a wheel around which many different learning opportunities can emerge. The task for the research team is to find a way of mediating research knowledge within this wheel of practice.

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APPENDICES

Appendix A: Interview Schedule for semi-structured interviews

1. What is your role in this project that you are involved in?
2. What activities do communities/people participate in?
3. Why are people participating in the project?
4. Why did the project start in Cata community?
5. How are people engaged to participate in the project?
6. How do they learn to do project activities?
7. What do people learn?
8. What influences learning amongst the people?
9. How do communities share knowledge/information amongst themselves and with others in the villages?
10. What problems do workers experience when participating in the project?
11. How are these highlighted problems addressed?
12. What incentives/benefits are in place to foster community participation in WFW activities?
13. What social factors/interactions are sustaining these WRM activities?

Appendix B: Interview questions for focus group discussions

Q1. What activities of Water Resource Management (WRM) do you participate in as Water for Food group?

Q2. How do you participate in these activities?

Q3. Why are you participating in these WRM activities?

Q4. When did you start to participate in these activities?

Q5. How many people are involved in the Water for Food group?

Q6. How do you learn to do these WRM activities?

Q7. What problems do you encounter in doing these WRM activities?

Q8. How do you address these problems?

Q9. What support/benefit do you get from other members of the group?

Q10. How do you share information with other group members?

Q11. What external support do you get as Water for Food group?

Q12. What social interactions are sustaining the group and its activities?

Appendix C: Letter for seeking authority

_____

_____

Dear Sir/Madam,

Reference: Permission to conduct an interview for academic purposes

I am male student pursuing a Masters degree of Education (Environmental Education) at Rhodes University in Grahamstown. As part of the programme, I am preparing a half thesis on "*how communities learn through participating in Integrated Water Resource Management (IWRM) practices*" in Cata village in the Amathlathi municipality of the Keiskammahoek Magisterial District.

I am therefore, seeking your permission for an interview with an officer from your organisation for the stated purpose.

I am enclosing for your information a copy of my letter of introduction from the university. I undertake to use the information I will collect for the purpose stated in this letter. Ethical issues such as confidentiality, right to privacy, and honesty will be maintained. If the institution is willing to participate in the interview please sign the letter in the space provided below.

Signature: _____ Date: _____

Thanking you in anticipation of your favourable response.

Yours sincerely,

Charles M. Phiri
Masters Student
Environmental Learning Research Centre
Rhodes University, Grahamstown

Appendix D - Letter of introduction

17 June 2011

To whom it may concern,

This letter serves as confirmation that Mr. Charles Phiri (student number 611P6214) is a full-time student within the M ED Environmental Education programme at the Environmental Learning Research Centre, Rhodes University, Grahamstown. This is a two year course running from 2011 – 2012.

Mr Phiri's study is 'An investigation of how communities learn through participating in Integrated Water Resource Management practices'. The research is a case study on communities in Cata village in the Amathlathi municipality of the Keiskammahoek Magisterial District in Eastern Cape, South Africa.

The study is in partial fulfilment of a half thesis in a Masters Degree Programme at Rhodes University, Environmental Education.

Should you require any further information, please don't hesitate to contact me.

Yours sincerely,

Sashay Armstrong
Research Programme Administrator
Environmental Learning Research Centre
Education Department
Rhodes University
Grahamstown
Sashay.armstrong@ru.ac.za
046 603 8390

Appendix E : Nina Rivers' Draft Masters Proposal

Rhodes University

Education Department

Research Proposal

Provisional title: The Mediating Processes within Social Learning: Women's Food and Water Security Practices in the Rural Eastern Cape.

Candidate: Nina Rivers

Student no: G06R4063

Degree: Master of Education (Environmental Education)

Thesis type: Full thesis

Supervisors: Professor Heila Lotz-Sisitka

Professor Rob O'Donoghue

Estimated date of submission: 15 December 2012

Field of research: Environmental Education

Interest Area: Mediation and Women Empowerment

Focus: Social learning

1.0 Context

1.1 Water scarcity and security in South Africa

*"Water is always a metaphor of social, economic and political relationships-a barometer of the extent to which identity, power and resources are shared" (*Strang *2004: 21).*

Growing water scarcity threatens global food and environmental security and it is predicted that by 2025 2.7 billion people may face water shortages (Ison, Roling, and Watson 2007). South Africa is a water scarce country with a history of inequalities in land and water distribution (Kahinda *et al.* 2008: i). A large portion of the population are poor or vulnerable to poverty and the historical affects of apartheid are still marked in terms of access to resources such as safe water (Kahinda *et al*. 2008: 1; Cleaver 2011). After apartheid the government focused its energies and financial capital on urban development. Rural populations are therefore poorer and more vulnerable due to inadequate infrastructure (Kahinda *et al*. 2008: 1).

Water is a key resource for agriculture and food security. In 1996 South Africa passed the National Water Act which proclaimed water as a public good (Burt et al. 2011: 13). At the same time integrated water resource management (IWRM) and community based natural resource management (CBNRM) practices were being implemented internationally which encouraged participation and equity by multiple stakeholders (Lotz-Sisitka and Burt 2006: 9). Institutional reform has proved to be inadequate to achieve the goals of IWRM or CBNRM and focusing instead on how people learn seems to be a move toward solving water resource challenges (Burt and Berold 2011; Steyaert, 2007).

In order to understand not only the nature of environmental challenges but what drives human behaviour, environmental education (EE) explores how humans learn and what informs the way they affect and are affected by the world around them. One of the primary aims of EE is to open up a space for sustainable solutions to our environmental problems. It is the aim of this project then to explore the intersection between human behaviour, human understanding and the socio-cultural factors surrounding water resource management. This study also aligns with the UN Decade

of Education for Sustainable Development and the Millennium Goals of integrating values, activities and principles linked to sustainable development into all forms of education and learning to help change attitudes and behaviour to ensure a more sustainable future (Lotz-Sistika and Lupele, 2012: 5).

1.2 Research and knowledge flows

In response to serious water shortages and the 1971 Water Research Act, the Water Research Commission (WRC) was established with a mandate to generate new knowledge of water and to promote purposeful research concerning South Africa's water resources (**www.wrc.org.za/2011**). The WRC divides its areas of research into five Key Strategic Areas (KSA) which include Water Resource Management, Water-linked Ecosystems, Water Use and Waste Management, Water Utilisation in Agriculture and Water-centred Knowledge. This study is situated within the fifth KSA under Water-centred Knowledge and is the second phase of a larger project following on from a previous masters student.

In their 2011 WRC consultancy Burt and Berold (2011:10) found that water research is not reaching the relevant groups, specifically those who use water, bringing into question the relevance and accessibility of water research. Reasons for this include that resources are not disseminated properly, are "inappropriately technicist" and potential readers are hampered by low educational levels (Burt and Berold 2011: 1). Many resources are available but little is known about which work best and why (Burt and Berold 2011: 1). In their 2006 critical review of participation in IWRM, Lotz-Sisitka and Burt (2006: 5) argue that in order for best practice to emerge in IWRM, contextual factors and social processes need to be carefully accounted for. Factors such as history, resources, knowledge, empowerment, experience, political enfranchisement, language, attitudes, individual agency and educational experience play out differently in different contexts and act as mediators of both learning and participation (Lotz-Sisitka and Burt 2006: 6). In other words, activities around water take place within a specific cultural landscape marked by its own social, economic, knowledge and material culture (Strang 2004: 5). One of the aims of this study then is to better understand the processes that mediate learning within a specific context, namely that of rural women's food and water security practices in the Eastern Cape.

1.3 Mediation

A recent review conducted by Burt and Berold (2011:17) focused on knowledge flows to rural communities within the water sector and highlighted the importance for learning to be mediated. They found that a learning resource, good or bad was not useful unless mediated by a local organisation or person sensitive to and having a good understanding of local practices and context (Burt and Berold 2011: 4). A mediator in this case is understood as a person who "re-interpret[s] knowledge in a way that is relevant to a particular water practice and to those involved" (Burt and Berold 2011: 4). A mediator of knowledge, however, can be something other than an individual and can be defined as the means "by which the individual acts upon and is acted upon by social, cultural and historical factors" in human activity (Engeström in Daniels 2008: 4).

Knowledge and learning are culturally shaped and mediated (Daniels 2008: 57; Smagorinsky 1995; Jiggins *et al.* 2007). The same applies to the learning and thinking of water knowledge and practices. Knowledge is mediated in implicit (invisible) and explicit (visible/clearly defined) ways. Examples of explicit mediation in water knowledge are the use of reports, learning resources, multimedia booklets and media advertisements and individuals who re-interpret knowledge in a specific way and aim to teach or inform through various forms of reasoning. Implicit mediation, on the other hand, is embedded in the discourses of every day life (Daniels 2008: 6). Examples include our beliefs, traditions, norms, values, and socio-economic, political and religious institutions, the way risk is socially constructed, the way environmental regulations are implemented, and the multiple voices and interests involved in water management, all implicitly mediate how people learn about and manage water (Ison *et al.* 2007: 508).

When seeking to explore the mediating processes surrounding rainwater harvesting practices one needs to consider ***who*** is mediating (NGO workers, extension officers, Water Affairs officials, teachers, ordinary community members, others who may be interpreting and explaining scientific information to communities), ***what*** is mediating i.e. what tools are being used to mediate (knowledge resources, learning materials, schemas, scripts, representations of scientific information, media and media formats,

environmental policies) and ***how*** mediation is taking place (Burt *et al.* 2011: 18). Six conditions that lead to water dilemmas have been identified and can also be seen as factors that mediate learning around water practices (Blackmore 2007, 513). These factors are that: (1) water is a *common pool resource*, (2) there are *multiple stakeholders* making different claims on water resources, (3) there is also *interdependence* among stakeholders which influences how people learn about and use their water resources, (4) interdependence and multiple interests lead to *controversy,* (5) there is always the *complexity* of multiple causality, which means problems cannot easily be resolved, and finally (6) there is the *uncertainty* inherent in complex situations (Blackmore 2007: 513). These are just some of the processes that mediate knowledge and learning in water resource management.

1.4 Community based natural resource management (CBNRM): Rain Water Harvesting (RWH)

The current South African government has the challenge of providing safe water to its citizens but conventional water supply methods seem to be reaching their limits with an ever increasing demand for water (Nare *et al.*2011:1). The participation of community members in managing this scarce resource is essential as they are the primary stakeholders and have developed their own local knowledge and practices for using and managing water (Ong'or in Nare *et al.*2011 :2). Community based natural resource management (CBNRM) is premised on the fact that ordinary men and women manage and use natural resources such as water in ways that enhance their livelihoods through local rules, taboos and belief systems (Fabricius *et al.* 2004; Elmhirst and Resurreccion 2008: 13). CBNRM is thus an educative framework (in the form of courses and the intervention of government departments and NGOs) that mediates particular practices within rural development.

The age old practice of rain water harvesting is proving to be a significant CBNRM method for a large portion of South Africa as it has the potential to contribute to food and water security for the rural poor and specifically women (Kahinda *et al.* 2008: I; Woyessa *et al.* 2006). Rain-water harvesting (RWH) technologies "are a range of techniques used for collecting, storing and conserving rainfall and surface runoff in arid and semi-arid regions (Boers and Ben-Asher in Mutekwa and Kusangaya 2006:

437). Water is collected from roof surfaces of homesteads during the rainy season, stored in above ground or underground tanks and used for domestic and outdoor use. Researchers argue that the potential for increasing the productivity and livelihoods of the rural poor in South Africa relies on RWH technologies in that sustainable and safe water supplies works toward improved sanitation and health conditions for many South Africans (Kahinda *et al*. 2008: ii; Rockström 2003). I will therefore investigate the learning that occurs around RWH practices in rural communities. One of the aims of this project will also be to explore the extent to which RWH practices are sustainable, specifically using rainwater tanks.

1.5 Gender, food and water security

Africa and the rest of the developed nations are facing the world's largest food security challenges (Rockström 2003: 77). The regions of the world with the largest food deficits also have the largest water scarcity problems which is indicative of the link between water and food security (Rockström 2003: 77). Principle three of the 1992 Dublin International Conference on Water and Environment recognises that women play a pivotal role in the provision, management and safe guarding of water (Steele, Jeenes, Jacobs and Dyobiso 2005: 11). This is true in the rural South African context as set out in the 1997 Department of Water Affairs and Forestry (DWAF but currently DWA) Gender Policy (Monyai 2002). The policy calls for visible representation of women in water projects. This study will also be informed by the critiques of gender based development (Elmhirst and Resurreccion 2008).

1.6 Rural communities: Cata and Port St. Johns

In order to explore the mediating processes within community based water research management practices this study will be carried out in two villages, namely Cata and Port St. Johns (PSJ). These sites were chosen as they are rural areas within the Eastern Cape thus the study remains local and research costs are kept relatively low. A relationship is also already established with the Cata community through the work of a previous masters student so for the sake of continuity, it is thought advisable to continue working in this village but with a different focus (Boarder Rural Community 2007). Researchers Burt and Berold (2011) will also develop a question-

driven learning resource from the previous masters student's findings which I will work with in my research in these two cites. PSJ is suitable as a second research site as a number of similar studies are being conducted here and it would be advantageous to work alongside other researchers. I aim to explore the learning around RWH practices in different stages of their establishment in these two areas. Rainwater tanks have been used in Cata for several years so it will be useful to compare a well established practice in a community with one that is not as established such as in PSJ.

2.0 Research aim, question and goals

The aim of this study is to investigate how the learning of rain water harvesting practices is mediated in two contexts of rural development practice.

2.1 Research question:

1. What are the mediating processes evident in and surrounding the learning of RWH in the context of women's water and food security in rural communities?

2. How can a question-driven learning resource be aligned with learning practices in this context?

The goals of this study are:

- To investigate **what** the mediating processes are within rain water harvesting practices and **how** these mediate learning
- To explore **how** a question-driven learning resource mediates learning

The wider question of food and water security for women and the issue of sustainability of RWH practices will be investigated within the contextual investigation of these practices.

2.2 Relevance and purpose of study

This study is relevant for several reasons. The first is that it is vitally important to understand how people learn to use and manage their water resources in the context of South Africa as a water scarce county as well as what the factors are that inhibit

or facilitate this learning. The second is that this study is relevant for research in general as the broader project seeks to grapple with the relevance and accessibility of research in general. Those involved in the consultancy commented "how useful it was to be part of a broader conversation on the accessibility of research knowledge" (Burt and Berold 2011: 2). A third factor that makes this study relevant is that it focuses on food and water security issues. In the face of increasing global food and water security challenges a study that focuses on those most vulnerable, especially those living in arid and semi-arid regions such as the Eastern Cape, is most relevant (Tortajada, Rockström and Figuères 2003: 1). In terms of the study having a gendered focus, this aligns well with not only South African policies concerned with gender mainstreaming but international commitments for integrating gender within the water sector (Steele *et al.* 2005).

3.0 Theoretical Framework

3.1 Research orientation: Critical Realism

I will use a critical realist depth ontology in order to track to what extent female water harvesting practitioners understand their practices. The point of departure in critical realism is that the world is "structured, differentiated, stratified and changing" (Danermark *et al.* 2002: 5). Bhaskar (2008) argues that the world consists of the real (mechanisms), the actual (events) and the empirical (experiences). In the real world there are also generative mechanisms (with casual powers) that instantiate actual events (and non-events) (Danermark *et al.* 2002: 198). When an event takes place there are generative mechanisms causing this event; events do not happen by themselves. In relation to this study these casual factors could be poverty, power relations and historical events that influence the mediation of learning within RWH practices. One can then perform a casual analysis in order to understand the various mechanisms and events that influence the mediation of learning within RWH practices.

3.2 Vygotsky's theory of socially mediated learning

Lev Vygotsky was a Russian psychologist interested in the mediating processes within learning (Daniels 2005). One of the overarching themes in Vygotsky's

theoretical framework is that mental processes such as thinking and acting are mediated by signs and tools (Smagorinsky 1995: 193). These tools are cultural artefacts constructed by humans (artificial) and inscribed with meaning and are thus "used to control behaviour from the outside" (Daniels 2008: 8-9). The socio-cultural context is important in that these tools are being used at a particular time and place (Daniels 2008: 9).

Vygotsky (Daniels 2008: 13) asserts that cultural artefacts are produced by humans and that in order to study how these mediate one must focus on the "mediated processes". Mediated processes are the activities of humans or "the actions or events "that take place in specific socio-cultural settings (Daniels 2008: 53). The aim of this study is to take this theory of mediation into the field and to understand the learning and change processes as they emerge out of the actual context by observing the actions and events (mediated processes) in RWH practices that take place in a specific socio-cultural setting such as Cata and PSJ among women.

3.3 Cultural Historical Activity Theory (CHAT)

Cultural Historical Activity Theory (CHAT) is both a theoretical framework as well as a methodology used to explore social phenomena. CHAT argues that human activity is the foundation of human development (Stetsenko and Arievitch 2010: 237). CHAT evolved out of three generations of research beginning with Vygotsky's theory of mediation in the 1920s and 30s which describes the relation between subject, object and the mediation artefacts or tools (Engeström 2001: 133). Vygotsky bridged the gap between the individual and the social by arguing that cultural tools (explicit and implicit) mediate learning (Stetsenko and Arievitch 2010: 243). In the context of RWH practices the mediation artefacts/tools are the use of rain water tanks to achieve the object of collecting and storing water. Second generation CHAT was developed by Leont'ev in the 1970s where he explicated the difference between individual action and collective activity (Engeström 2001: 133). The elements of second generation CHAT include the subjects (individual rain water harvesters), the community (neighbours, individuals from government organisations etc.), the rules of the community (taboos, cultural rules, legislation etc.), division of labour (how labour is divided between collectivities and individuals), objects (motives for harvesting rain

water) and the outcomes (using water for domestic use or agriculture potentially) (Daniels 2001).

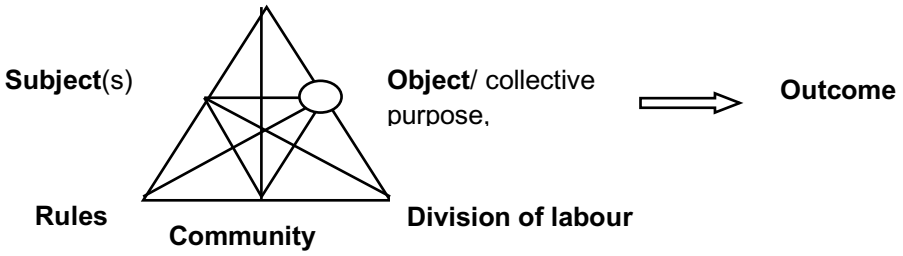

Figure 1. Second generation mediational triangle of a cultural and historically constituted activity system (adapted from Engeström, 2001).

In the 1990s third generation CHAT emerged when Ritva Engeström and others introduced the concept of multiple activity systems interacting with each other (Engeström 2001: 135). This helps to understand the central activity system of RWH practices and the neighbouring activity systems such as government trainers, NGOs and funding agents. Individuals and their environment are thus understood through the activities that they practice. These practices and thus the mind are situated in a specific socio-cultural and historical context which offers agency to the individual (Stetsenko and Arievitch 2010: 237). This theoretical perspective will inform my conceptual, methodological, explanatory and analytical tools in phase 1 and 2 of this research project. People essentially learn through activity so second generation CHAT will help me understand the relationship between the different elements in a central activity system and the mediation that occurs within.

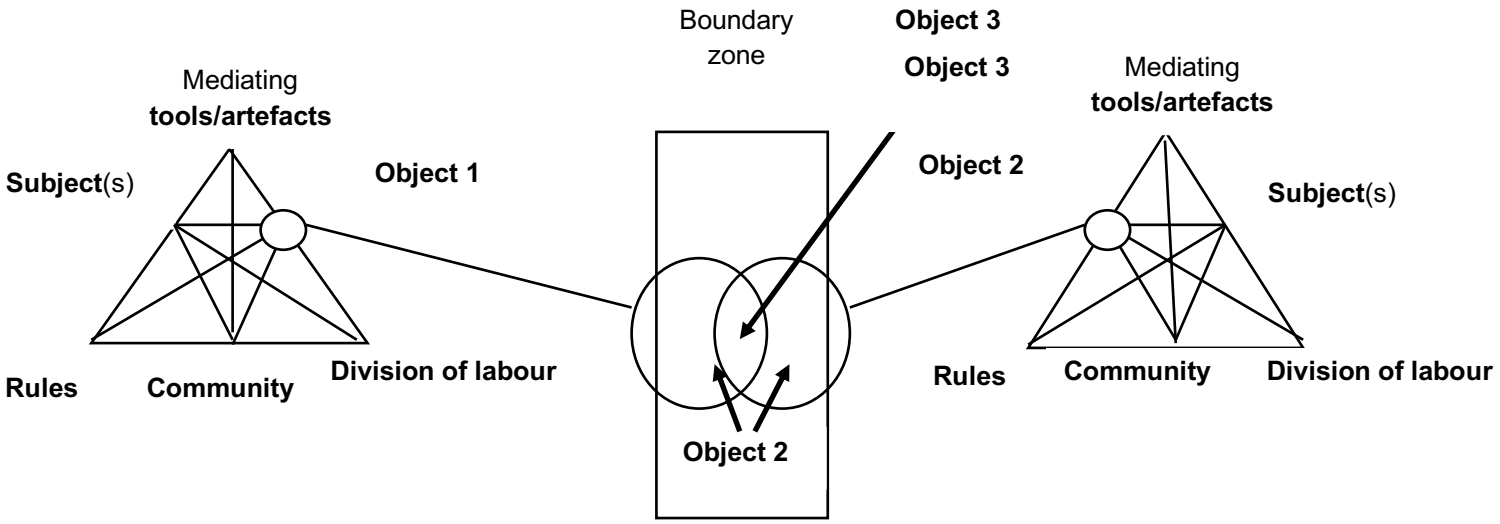

Figure 2. Third generation activity theory (Engeström, 2001: 136).

A major principle in activity theory is the central role contradictions play as a source of change and development within an activity system (Engeström 2001: 137). Contradictions are understood as "historically accumulating structural tensions within and between activity systems" (Engeström 2001: 137). Contradictions produce disturbances which can aggravate subjects enough for them to find innovative attempts for change and the potential for expansive learning to occur (Engeström 2001: 137). Expansive learning involves new knowledge and new practices for an activity. For this study I will use third generation CHAT to merely describe the interconnections between different activity systems and to surface contradictions. I will however not enter into the expansive learning stage by carrying out change laboratory workshops.

4.0 Methodology

A qualitative approach using the methodological tool of Cultural Historical Activity Theory will be employed to investigate the mediating processes at work within the context of social learning in RWH practices.

4.1 Case study and narrative inquiry

For this study I propose to use a case study approach which seeks to engage with the complexity of social and educational activity (Chadderton and Torrance 2011; Yin 2009). A case study investigates contemporary phenomenon in depth and within its real-life context especially when the boundaries between phenomenon and context are not clearly defined (Yin 2009: 18). Case study argues that 'social reality' is created through social interaction situated in particular histories and contexts which is why coupling this approach with CHAT is consistent. I will use a multiple case study approach comparing mediated learning across two case studies (Cata and PSJ) to understand the patterns of mediation at play (Chadderton and Torrance 2011). I also intend to use a **narrative inquiry approach** as part of a creative weaving of methods where respondents' stories are analysed in order to understand certain phenomena (O'Leary 2004: 199; Clandinin and Connelly 1999). Dewey in Craig and Huber (2007: 255) argues that "narrative inquiry is the study of experience, and experience…is a matter of people in relation contextually and temporally". In narrative inquiry the power of the relationship between the

researcher and the researched is recognised as well as the power of words as data to identify the nuances of experience and relationship in a particular context of human experience (Craig and Huber 2007: 9-20). Narrative inquiry focuses on the particular as opposed to the general and argues that there are multiple ways of understanding human experience (Craig and Huber 2007: 9-25). Narrative analysis is relevant for this study in that I aim to identify the mediating processes within my research participants' learning as they emerge out of their own stories of their RWH practices (O'Leary 2004: 199).

4.2 Data collection techniques

Multiple data collection techniques will be used such as document analysis, observation, interviewing and focus group discussions. This multiple approach strengthens a study as well as offers validity to the research because it produces rich data (Maxwell 2008: 244).

4.2.1 Document analysis

Document analysis will constitute **Phase One** of the data collection process in order to carry out a **contextual profile** of each case study. A systematic review of relevant documents is important as a contextual profile will provide historical depth and perspectives of the two cases (Yin 2009: 103). I will analyse training materials, formal study reports, newspaper articles and any policy documents concerned with the learning of RWH practices. These documents have the potential to provide information on how learning around RWH practices has been and is mediated. I will also analyse the thesis of the masters student that my work follows on from so as to use it as a point of departure and to identify the mediatory processes that emerge out of his findings. I will use the CHAT framework to trace the history of RWH in these two cases.

4.2.2 Participant Observation

Participant observation and interviews will constitute **Phase Two** of the data collection process. Participant observation is an appropriate method to use in order to identify how people interact with each other, the division of labour, rules that govern certain communities and the implicit and explicit mediating artefacts and tools

that influence learning within these water practices. One of the main aims of participant observation is to understand and look into the social world from an insider's perspective (Foster 1996: 6). Social situations are also approached with a wide-angle lens where the participant observer takes in a broader spectrum of information and becomes more introspective about what is observed (Spradley 1980: 56).

I aim to spend time with women in Cata and PSJ so as to observe their RWH practices and the learning surrounding these activities. I plan to observe the way learning is mediated explicitly through, for example, learning resources they may use, through the training by NGO workers or government officers or through knowledge that is passed on from generations. Observation gives direct access to social interactions and insight into those events that are so familiar to members of an activity system that they are never commented on, questioned or made explicit (Simpson and Tuson 2003: 16). This is particularly helpful for these case studies as I will need to look for both the explicit and implicit mediating processes influencing learning. I will use a camera to document instances of learning around RWH practices as well as keep a detailed field journal to document my observations.

4.2.3 Interviews

As part of **Phase Two** I will conduct **semi-structured interviews** with rain water harvesting practitioners so as to gain a better understanding of participants' own understanding of how they learn. Semi-structured interviews are understood as those that contain open and closed questions and if conducted with skill can deliver rich data (Gillham 2000: 65). Interviews will be conducted with female water harvesting practitioners as well as facilitators such as NGO workers and extension officers as they share their knowledge and skills with RWH practitioners. Interviews will compliment the intended narrative inquiry approach.

I plan to interview 8-10 RWH practitioners in each village concerning their water practices and the mediatory processes surrounding these. Depending on who is involved in these practices, I may interview both men and women but will focus on women. I will identify a group of women in Port St Johns to work with. I already have contact with another researcher doing work in a similar field of interest who said she

would introduce me to the communities there. While working in Cata, I am following on from a previous masters student so will link up with the women he worked with if they agree.

A major constraint to this study is that the majority of my research participants will be Xhosa speakers while I only speak English. Not only will this effect rapport with individuals but it will also be challenging for me to identify nuanced elements such as linguistic devices (metaphors and proverbs) that mediate learning. This is why socio-cultural phenomena at the linguistic level will not be my primary focus but will support other data. I will enlist the help of a Xhosa interpreter who has worked with other researchers in the same area of study and therefore will know how and when to probe deeper for answers. I appreciate that interviewing is a delicate process and a researcher must establish credibility and earn the trust of communities first (Gillham 2000: 62). I will make use of a voice recorder during my interviews in order to give my full attention to my respondents as well as being able to transcribe these sessions verbatim.

4.2.4 Focus groups/report back sessions

A focus group discussion in the form of a report back session will be held as the **third phase** of research in each site. The aim of these sessions will be to acquire interaction data from discussions among participants as well as to observe how they use the question-driven learning resource (Lambert and Loiselle 2007). I will analyse the contextual profiles (Phase 1) of the case studies as well as the stories (Phase 2) of RWH practitioners in order to code for the different mediatory processes and then construct an activity system for each case study using the CHAT framework (Engeström 2001). I will also aim to surface any tensions and contradictions in their practices. I will then critically analyse the question-driven learning resource (the language used, the way it is set out and any potential graphics and images which may influence the way people use and learn from the resource) and in a report back session I will mirror back the tensions and contradictions as well as introduce the question-based learning resource to those involved in the study to see how they work with it. I aim to approach NGO or community facilitators to run

these report back sessions in order to be able to observe better how people work with the learning resource and to link my research to some form of local agency concerned with water practices.

5. 0 Data management and analysis

I aim to adopt a reflexive analysis approach where the researcher stays as close to the data as possible, moving between the raw data and research questions and aims (O'Leary 2004:184). In terms of managing my data I aim to *log* and *systematically organize* my data, keeping records of collection dates, data collection procedures, conducting preliminary coding and culling notes for relevance (O'Leary 2004:187). I appreciate that in practice, data management is not always such a tidy process but I will endeavour to be as organised as possible for the sake of the integrity of the research.

My data will be qualitative in the form of people's stories, interviews and my observations regarding how they learn their water practices. My analysis will take on a retroductive or interim analysis approach in that collection of data and analysis will take place simultaneously and calls for different modes of inquiry at different stages in the study (Huberman and Miles 1994: 431). I will perform cumulative data generation through the interplay between contextual profiles, interviews and observation work. I will interview research participants on on-site and then transcribe and analyse each interview straight away, coding for different themes and subthemes and then linking these to theoretical models using the CHAT heuristic (identifying objects of RWH such as healthy drinking water or gardening for example) (Pepper and Wildy 2009: 23). Cumulative analysis of interviews and observations will point to key areas that I need to revisit in order to build on. I will then hopefully be able to gauge when I have enough data to construct an activity system when no new information is being generated.

After analysing the contextual profiles, observations and interviews (phase 1 and 2) by exploring the interconnections between various themes by looking for correlations between concepts, I will construct a picture of each activity system (O'Leary 2004: 197; Engeström 2001). I will then pull out contradictions and tensions (differences in social controls or different tools for example) and then mirror these back in a report

back session in phase three with the help of NGO or development workers. I will not engage in the expansive learning phase of CHAT as the aim of this project is not development based. It is my hope however that in report back sessions I can raise the outcomes of my research with the support of a local agency, thereby adding value to the communities and concluding the research in a responsible manner.

6.0 Data verification and trustworthiness

Validity and trustworthiness is important to the integrity of one's research participants and study. Maxwell (2008: 243) asserts that there are two broad categories of threats to validity; researcher bias and reactivity. Researcher bias refers to the way in which data collection or analysis may be distorted by the researcher's own theory, values or preconceptions (Maxwell 2008: 243). I will endeavour to be self-reflexive about my position as a researcher and keep in mind that the aim in qualitative research is not to eliminate the influence of the researcher but to understand and use it productively (Maxwell 2008: 243).

I will employ several measures to increase the credibility of my research. Generating "rich" data counters the danger of respondents producing data that supports a mistaken conclusion as well as makes it difficult for myself as the researcher to only focus on what supports my prejudices and preconceptions (Maxwell 2008: 244). Member-checking or respondent validation is another validity tool in which I will present transcripts, photos and other data to my research participants in order to solicit their feedback as well as hold discussions in the report back sessions (Maxwell 2008: 244). I will also be using multiple data collection techniques in order to test the integrity of inferences drawn from data against each other (Maxwell 2008: 245). Searching for discrepant evidence and negative cases is also a useful strategy for ensuring validity in research. Due to the fact that this is a multi-cited study my analysis will then be open to comparison which strengthens the validity of findings and conclusions (Maxwell 2008: 245). I will also strive to be open and invite critique from my colleagues and supervisors at the Environmental Learning Research Centre (ELRC) which nurtures an atmosphere of peer support and critical reflection.

7.0 Ethical considerations

Ethical practice will be one of my main concerns throughout this study. Three basic ethical principles have been identified as critical when conducting qualitative research (Sieber 1992). The first is beneficence, respect for others and upholding justice (Sieber 1992: 18). These main ethical principles can also be understood in terms of respect for democracy, truth and for persons (Bassey 1999: 74). Ensuring the relevance of the theory and methods I employ is one way of making sure my research design is valid, reasonable and achievable. I will aim to be transparent and realistic with my participants as to the benefits and risks of a study of this nature. Although the benefits of a study of this nature may be long term I will aim to add as much value to the communities I study in as possible. Voluntary informed consent is another ethical norm to be followed when conducting research (Sieber 1992: 19). I will negotiate access responsibly with written letters if required, clearly communicating in nontechnical jargon the expectations of the research, that it is voluntary and will assure my research participants of their right to withdraw from the study at any point. Another ethical norm is that no harm should be done to a research participant due to a study (Sieber 1992: 19). Harm in this context could mean divulging individuals' identities. As a result I will take the necessary precautions to maintain the anonymity of research participants as well as any organisations and institutions I work with. I will also ask permission to take photographs of research participants and their activities. Another important ethical consideration is the respect for truth (Bassey 1999: 74). I will make sure that I am truthful in my data collection, analysis and reporting of findings and that I do not manipulate any raw data.

Research schedule

Table 1: Proposed time frame of activities

MEd Requirements/activities	**Date**
Submission of proposal	2 February
Work on literature review **Phase 1: Contextual Analysis** Visit research site, introduce study and	February 20-24 February (PSJ)

set up field work including consent, collect contextual data 2 sites (Cata+ Port St Johns)- one week per site	28 February-2 March (Cata)
Analysis of phase 1 data Construct contextual profile **Phase 2: Interviews and Observations** Two sites (Cata+ Port St Johns)- one week per site	3-11 March 12-20 March (PSJ) 22-31 March (Cata)
Submit draft 2 Literature Review Submit draft 1 Methodology Chapter	April 16-20 April
Analysis of phase 2 data Tensions and contradictions Construct activity systems Analyse question-driven learning resource	20 April-5 May
Phase 3: **Report back sessions** Mirror tensions and contradictions Introduce question-driven learning resource	7 May-12 May (PSJ) 16-19 May (Cata)
Analyse phase 3 data Begin to write up Findings Chapter 4 Literature review Chapter 2 completed	June
Submit draft 2 Methodology Chapter Submit Analytical Memos Prepare research poster (EEASA)	July (23-27 July)
Final analysis of data (chapter 4), findings (chapter 5) and recommendations (chapter 6) Submit draft 1 Chapter 1 (context and	September

introduction) EEASA Conference-present research poster Submit completed Chapter 4 Submit draft 1 Chapter 1 Submit draft 1 of full thesis	(10-14 September) (15-19 September) 30 September
Write up conclusion (chapter 6) and abstract	October 1
First draft of thesis submitted	October 15
Submit draft 2 of thesis Open writing workshop to complete write up Submit final thesis to supervisors	1 November 5-18 November 18 November
Submission of thesis for examination	December 15

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