Rhodes University Education Department – Environmental Education Unit

Half-thesis

in part fulfilment of the requirements for

the degree

Masters in Education (Environmental Education)

Candidate: Alice Rosemary Hogan

Student Number: G06H4047

Field of Research: Environmental Education

Education in the wetlands and wetlands in the education-a case of contextualizing primary/basic education in Tanzania.

Supervisor: Professor Heila B. Lotz-Sisitka

Date: October 2007

Acknowledgements

Thanks to Professor Heila Lotz-Sisitka who convinced me I could afford to do this study and whose support has been invaluable throughout. Also to all the members of the Environmental Education Unit team at Rhodes who provided everything from thumbtacks to theoretical concepts.

My thanks also go to:

In Rufiji

- The students, the community and the school teachers at Nyamakurukuru, Siasa, Rufiji, my co-researchers.
- Mrs. Kambi, Mr. Mchana, Mr. Savannah, Mr. Mlay and the supporting staff at the District Education Department.

In Dar es Salaam

- Brooks for constant support, proof-reading and editing and Peter for half:half.
- Brown, John and Christina who kept home together.
- Freya for quiet, nicotine-free and cat-free space.
- Isabell and Catherine for allowing me to bandy big words.

In Ireland

- My mother, Evelyn Hogan who at 87 years of age teaches and learns every day.
- My siblings and their families who don’t ask difficult questions.

Abstract

This dissertation describes an action research case study carried out at a sub-village school at Nyamakurukuru, Utete, Rufiji District, Tanzania. The study was a fully independent research activity funded and led by a female Irish environmental and community specialist who has fifteen years experience of working in rural Tanzania, five of which were in Rufiji District. The aim of the action research was to engage a community of villagers, teachers, students and district officers in a participatory process to adapt a module of a school curriculum to the local context, and teach it in order to describe one way in which contextualization, using local and indigenous knowledge and active discovery teaching-learning processes, can be done.
The major research question, which I wished to answer for one specific case, was:
Does integrating local environmental cultural knowledge into formal schooling contribute to curriculum relevance? If so, in what way?

This document describes the background and context of the research, the motivation and the theoretical basis for the work, the methodology and methods, and the action research process itself. The results are interpreted and discussed in the light of current theoretical perspectives on education and environmental education. The main findings within the case are that:

Contextualization improved relevance of education and thus its quality by:

- breaking through traditional frames/barriers between teachers and students, students and elders and community and teachers,
- allowing formal education to take place outside of the school,
- necessitating a change in pedagogy[1] to more learner-centered, discovery methods,
- allowing indigenous knowledge to come into the classroom,
- stimulating creativity and increased confidence, and
- bringing local socio-political environmental issues into the classroom.

[1] Pedagogy is the educational term for 'teaching – learning orientation' or the science of teaching and learning.

This study provides a case example of how education processes, when engaging local cultural knowledge, can improve the relevance, and thus an aspect of the quality of teaching and learning in school-community contexts, while providing a conduit for integrating environmental education into the formal school curriculum. It provides insights into the key issue of relevance which currently faces educators of children in wetlands in Tanzania.

Recommendations were made for the case studied and may be useful beyond the boundaries of the case:

- Give more explicit government policy and strategic support for community involvement in educational content–epistemologies and pedagogies.
- Weaken framing (hierarchical power positions) to encourage greater partnership between school, home and community to improve relevance.
- Investigate the provision of education beyond schools.
- Provide practical teacher and community training on use of learner-centered, discovery and active pedagogies.
- Provide teacher and community education on biodiversity and the environment.
- Provide relevant reference texts and research data on the ecology, biodiversity, vegetation, hydrology, agriculture, sociology, history and other relevant subjects.
- Officially nurture a culture that learning should be enjoyable.
- Allow the curriculum freedom, in these times of increasing risk for rural tropical wetland communities, to make the curriculum fit the local issues rather than vice versa.
- Nurture critical analysis of the curriculum in local pedagogic discourse i.e., at the local contextualization level of the home, community and school.

Table of Contents

Tables

Figures

Photographs

1 Chapter 1. Introduction to the research

1.1 Introduction

This chapter provides a brief description of the setting for the research. The challenges and the opportunities which motivated the research and particularly the wetland[2] context of the research are described. A brief profile of the study site is provided. This is followed by a brief discussion of the challenge which environmental educators face in engaging effectively with the formal education curriculum. Next, follows a section on the relationship between school-based education and the consequences of its separation from home and community education. The Continuing Basic Education in Tanzania Programme (COBET/MEMKWA[3]) is introduced as an opportunity for developing learner-centred approaches which foster the "inquiring mind" and the "action competence" encouraged by prominent educational authors. The seventh section of this chapter presents the research question. The final section of the chapter provides an overview of the study.

1.2 The challenges and opportunities for providing quality education in wetlands

Children in the Rufiji wetland of Tanzania, even when they manage to get formal schooling, have difficulty passing the final (Standard 7) exams (Hogan, 2006). There are many reasons for this, which persist nationally and affect the quality of the education in primary schools, including scarcity of qualified teachers, teaching-learning processes, scarce materials and equipment, low access to wider reading resources, low support capacity in the home including parent illiteracy, nutritional deficits and resource limitations. These problems are exacerbated in Rufiji because of the dynamic physical environment of its wetland, which constrains land travel and communications and discourages government personnel from persevering there.

National and district education departments are trying to redress the situation but within a standardised formal curriculum and pedagogy not applied to the extremes of the environment and the natural-resource dependent lifestyle of wetland children. As with educational systems throughout Africa, indigenous knowledge is suppressed and

[2] "Areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static, flowing, fresh, brackish or salt, including areas of marine water, the depth of which at low tide does not exceed six metres". Ramsar Convention,1971.

[3] MEMKWA is the Swahili acronym for COBET.

not respected as much as 'introduced science'. However, the aims of the present educational system in Tanzania provide for a re-appropriation of indigenous knowledge and ways of knowing by including "the promotion and acquisition of culture, good customs and traditions of peoples of Tanzania" (URT., MoEC., 1996: iii). One example of a secondary level curriculum and school specially designed to "foster positive attitudes to cultural diversity; and promote the preservation of species, habitats and indigenous knowledge" exists in a northern Tanzanian pastoralist setting (Aang Serian, 2004:1) but no example of contextualizing the primary school curriculum for wetland children has been found nationally.

The Nyamakurukuru case study is intended to contribute to the understanding of contextualisation in practice. Education in the wetlands context and wetlands in the formal school curriculum: contextually relevant education for a sustainable future? This is the United Nations Decade for Education for Sustainable Development (UNDESD) (UNESCO, 2006a). What might this mean to communities and educators in a remote wetland where humans have managed flooding and drought risk for at least one millennium? What kind of education might prepare Rufiji's children to continue to handle increasing environmental and socio-economic risk while gaining a better quality of life for themselves and future generations of humans and other species? What educational means can be used to engage local and indigenous knowledge and` ways of knowing, with the formal education system and to contribute creatively and more directly and immediately to community management of risks in the local and global contexts within a neo-liberal globalised world economy? What kind of education in this locality can children use to prepare themselves for environmental citizenship in the place where they are born, rather than viewing education as a conduit to escape from rural living?

1.3 The study site – a brief profile and map

Mrutu, Ponera and Nkumbi (2005:57) found school goers of the zone in which Rufiji lies (Eastern Zone) to be the most disadvantaged nationally with regard to the availability of reading materials at home. The region to which Rufiji District (see Figure 1) belongs also has a relatively low percentage (60%) of pupils who get three meals per day. Both factors influence the effectiveness of schooling.

The Nyamakurukuru school was chosen because it is a truly wetland school: in the Rufiji wetland, set between a major river, the Rufiji, a minor tributary, the Lug'onya and a lake, L. Lugongwe (see Figure 2.). The community lives a wetland lifestyle with the main production site being the floodplain of the Rufiji River. Children live in the floodplain and thus there are challenges to reaching them for schooling. There are low levels of literacy, among the adult population. This is a typical wetland characteristic in Rufiji District.

The current school which was established in 2003 was, until recently, treated as an outreach branch of another school dubbed a "satellite" school. It is due to be registered as a formal school recognised by the Ministry of Education and Culture (MoEC).

There are currently 139 students enrolled and three active teachers of different levels of education and experience. A fuller description of the school's history and present status is given in Chapter 2, section 2.6.

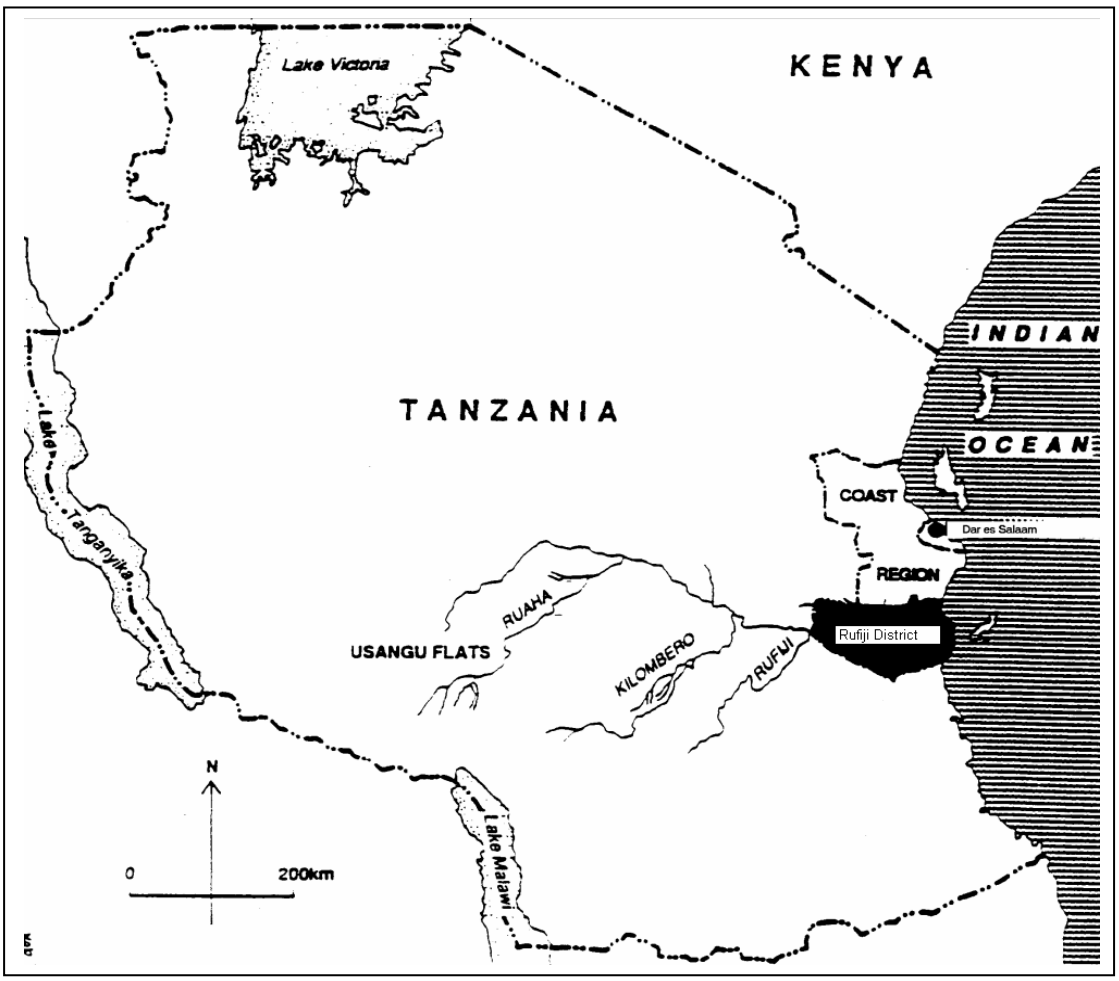


Figure 1. Rufiji's district's location in Tanzania

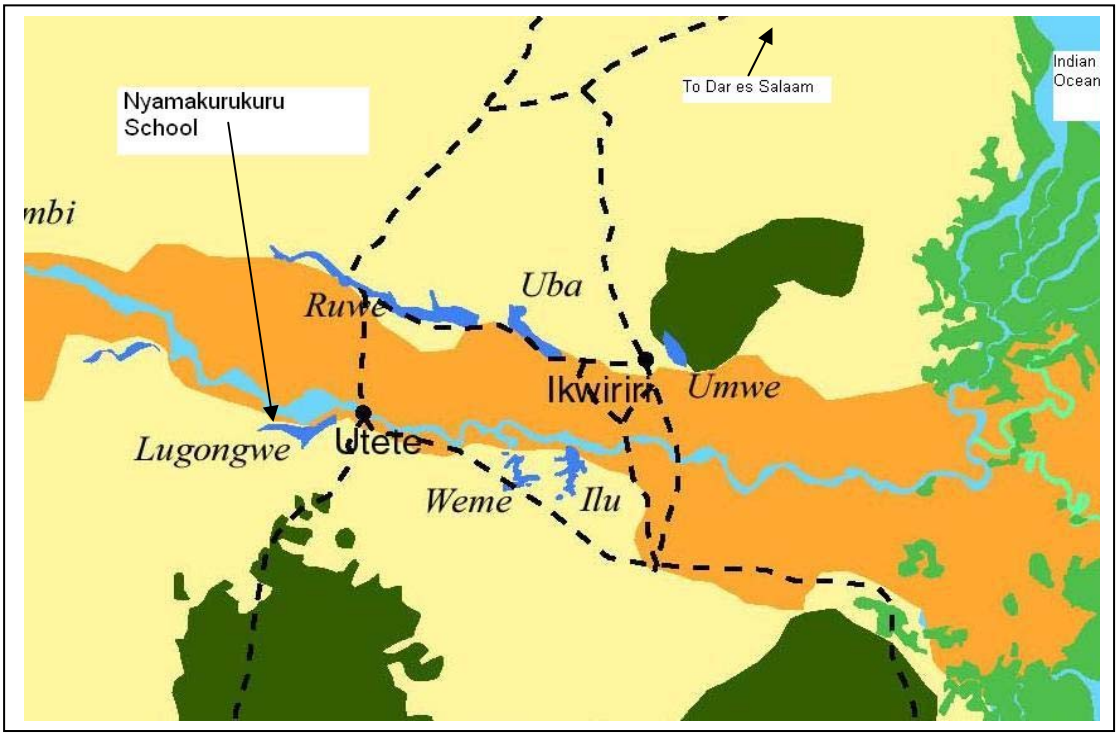


Figure 2. Nyamakurukuru's location in Rufiji District
[original map by S.Duvail, 2005]

1.4 Environmental education and the mainstream curriculum in Tanzania

Having worked for fifteen years in Tanzania as an environmental educator, I am concerned that unless environmental education is integrated in formal education most school leavers will leave education more detached from their environments than when they entered. As O'Donoghue suggests, we environmental educators have for too long been trying from the outside to attach environmental education activities to the mainstream curriculum. Therefore it is necessary to make stronger efforts to work from within the curriculum outwards to become more successful in integrating environmental education into national curricula (O'Donoghue, personal communication, September 7, 2006). Carlsson and Bruun-Jensen (2006) refer to external stakeholders needing to "develop a sense of membership in relation to the school project and its principles in collaboration with the teachers and students involved" (ibid.:259). They also suggest that the external stakeholders/outside actors are somewhat neglected by the insiders (educational researchers) and "deserve much more attention in order to strengthen the development of materials and programs" (ibid.:259). A supportive atmosphere exists nationally for such efforts.

The Government is involved in integrating environmental education into the national curriculum: MoEC has set up a special unit on Environmental Education which has produced Guidelines for Environmental Education in Primary Schools (URT., MoEC, 2005b). The conservation of the environment, albeit from an anthropocentric focus, is given attention in some subject syllabi. In the primary education sector the Social Studies curriculum (Maarifa ya Jamii) that combines[4] civics, science, and geography arguably gives the most attention to environmental issues. The Environmental Management Act (EMA) gives the Director for the Environment (DoE), the authority, in consultation with sector ministries, to "take appropriate measures for the integration of environmental matters in schools, colleges and institutions of higher learning" (URT., 2004a:97). Communications, education, and public awareness strategies have become necessary components of all sectoral and even sub-sectoral programmes.

[4] In 2006 the Social Studies subject was discarded in favour of reversion to the three constituent subjects.

1.5 School and community–separate pedagogies, separate knowledge

Traditional African pedagogies and educational philosophies which were communal and strongly embedded in the community are not integrated widely in the formal education system. Some use is made of stories, puzzles, proverbs and word games but these are confined to the teaching of culture. School is separate from home and home education is not valued by the formal government educational system. Although communities are involved in school management in Tanzania they are usually excluded from decisions regarding teaching and learning. Community involvement in children's education is seen by educationalists as a valuable contribution to the relevance of education to the lives of its learners. Moll and Greenberg (1990:345-6), amongst others, urged that meaningful connections be created between academic and social life through the concrete learning activities of the students.

1.6 The Continuing Basic Education in Tanzania (COBET) – an opportunity for learner-centred pedagogy

The COBET (MEMKWA is the Swahili acronym for this programme) system of schooling demonstrates a shift by the Ministry of Education and Culture (MoEC) towards a more active learner-centred and learned-led education methodology by calling the MEMKWA teachers "facilitators". It is designed, in accordance with the national aims for primary education to develop and promote an "inquiring mind" and therefore lends itself to facilitation of learners to actively research their own locality and community for knowledge heretofore undervalued in the curriculum and textbooks. Many recent educational authors support Vygotsky's theories that all learning is culturally and socially influenced (Schunk, 1996). Ivic worried that students are overburdened with "isolated and meaningless facts" and that "All too often schools do not provide a setting for social interactions conducive to knowledge construction" (1989:434). There is need to identify more opportunities in the curriculum and the textbooks for situating learning in local cultures and for providing opportunities for knowledge building through social interaction. The action competence theories of Bruun-Jensen (2002) suggest that empowerment/increased confidence can arise from appropriate teaching-learning techniques that make the curriculum relevant to the child's environment. This can be done by providing active learning opportunities to engage the learners in researching indigenous knowledge

from resources in their locality.

.

1.7 The research question

The major research question, which I wished to answer for one specific case, was:

- Does integrating local environmental cultural knowledge into formal schooling contribute to curriculum relevance? If so, in what way?

Further questions are:

- What opportunities exist for contextualizing environmental learning in the current curriculum and materials available to this school?
- What is necessary to make localization of a curriculum possible in terms of the curriculum adaptation processes, stakeholder capacity-raising and materials and in terms of other issues which the study might uncover?

This study conducted and narrated a participatory process of making the curriculum more context-specific. It facilitated the teachers and the village community of one school to integrate local environmental cultural knowledge about the wetland into a curriculum module. It was an experiment in facilitating teachers to be recontextualizers (Wilmot, 2005) which will inform planning to meet teacher training needs in the context of learner-centred, participatory and active curricula such as the MEMKWA curriculum which was chosen.

1.8 Overview of the study

Chapter Two sets the study in context by providing a history of education in Tanzania followed by a description of the present status of education and environmental education nationally and in the geographical location of the study. The school and the community with which the research was done are profiled. Chapter Two concludes by locating the study in the context of the current theories and experience of the main issues which apply to the study.

Chapter Three describes the orientation of the research, the methodology chosen for the research and the reasons why such approaches were chosen. It describes the

methods used to generate data: how, with whom, and at what stage of the fieldwork those methods were applied. Data analysis methods are explained, as are the criteria for selection of the particular school and community.

Chapter Four describes the action research process in which data generation planning, action and reflection descriptions are integrated with the findings. My reflections on my own vantage point and role in the process conclude the chapter.

Chapter Five discusses the findings in relation to current relevant theories which were introduced in Chapter 2. It concludes with some recommendations for the case under study.

1.9 Concluding Summary

In this chapter a brief description of the setting for the research was given. I have described the reasons for feeling motivated to carry out such research, particularly in a wetland context. The study site is briefly profiled as an introduction to a much more detailed description of the context of the study provided in Chapters 2 and 3. The challenge which environmental educators face in engaging effectively with the formal education curriculum was discussed. There followed an analysis of the relationship between school-based education and home and community education. An introduction to The Continuing Basic Education in Tanzania Programme (COBET/MEMKWA[5]) was given. The research question was presented in the seventh section of the chapter. The chapter concluded with an overview of the study.

[5] MEMKWA is the Swahili acronym for COBET.

2 Chapter 2. Locating the study in history, context, current theory and experience

2.1 Introduction

This chapter sets the study in context by providing a history of education in Tanzania followed by a description of the present status of education and environmental education nationally and in the geographical location of the study. The school and the community with which the research was done are profiled. The final sections of this chapter explore the theoretical concepts relevant to this research by reviewing current literature on those concepts.

2.2 History of education and knowledges in Tanzania

Visual Stone Age records of environmental education and communication methods sit as paintings on the walls of caves scattered throughout Tanzania, the best examples being those of the Sandawe and Hadza tribes at Kondoa and other parts of central Tanzania (Kimambo and Temu, 1969). Historical records from later periods suggest that education was almost totally focussed on the environment and how to interact with fellow beings and non-living things. The African husbandman had vast ecological knowledge (Trapnell, 1937 quoted in Kjekshus, 1977:27), which was the basis for the agriculture and animal husbandry practised in a rich variety of systems. Formal education in the form of initiation schools was known to have existed in the 16th century amongst the chiefdoms (ibid.), but most education was inseparable "from life itself" (Moumouni, 1968:15, cited in Reagan, 2000:29). African education had four unique characteristics: it was considered very important, it was communal and intimately linked materially and spiritually to social life, its aims and methods were multivalent, i.e., diverse in value, and it had an incremental approach which matched the stages of the child's physical, emotional and mental development.

Learning was by imitating adults during play and by taking part in work. Traditional African tribal education and knowledge systems were predominantly oral, although the Swahili tradition had a literary culture (Mazrui and Wagaw, 1985:40). Therefore,

oral pedagogies were highly developed for stimulating mental skills. For example, proverbs were-and still are-used for development of selection, analytical reasoning skills, and for expressing deep concepts needed for conflict resolution. Proverbs compact knowledge and help the retention of information (Reagan, 2000:33). Other language development methods of African educational systems include riddles, word games, puzzles and tongue-twisters. Reagan calls these "critical thinking activities" and many were used for environmental education particularly about non-human species (ibid.:34). Children learned about their tribe's history, beliefs, moral values and codes through stories in the forms of fables, myths and legends (ibid.:36). The overriding aim of traditional African basic education was to produce a *good* person, which is one of good manners, honesty, integrity, courage, honour, community spirit, resilience and conviviality. Further education for crafts, trades and professions was through apprenticeship systems (ibid.:42).

Islamic influences on Tanzania's coast began with Arab traders between the tenth and the twelfth century A.D. (Alpers, 1969:36). Muslims believe that education should be grounded in the Qur'an, which should influence the content of the curriculum. The Qur'an is an oral text preserved in writing but it challenges Moslems to be literate, that is to be able to read it, and to have well-developed retention skills, that is to be able to memorise and recite it (Reagan, 2000:190). Islam sees education as a social phenomenon influenced by "the nature of the material, intellectual and spiritual forces of the civilisation in which he lives" (Tibawi, 1972:39). Abdullah (1982) summarises features of Islamic educational philosophy as; interested in developing a person's unique personality to attune them to their particular Moslem society; simultaneously realistic and idealistic in relation to a person's physical needs and moral duties; timeless and unchanging; concerned with readiness for this and the next life and with aims and objectives measurable in "observable behaviour" (ibid.:25). These educational aims and objectives are of three kinds physical, spiritual and mental (ibid.:119).

A "Tanzanisation" (making more African with drumming in the mosque, and more female participation) of Islam is reported to have occurred in the early 1900's (Ranger, 1969:183-4) but it is likely that a "Swahilification" (integration into the local

culture and spiritual life) was already taking place since its introduction along the whole East African coast in the tenth century. In Rufiji, amongst the resident Wandengereko ethnic group, many Islamic spiritual beliefs and rituals are integrated with tribal animistic spiritual beliefs and rituals. To this day, parents in Rufiji district prioritise religious (Qur'anic) education over "government schooling" with a much higher percentage of children attending Qur'an school than formal government school.

2.2.1 Christian Missionary-run Education

Mission education, began in the mid-nineteenth century with the aim to civilise and Christianise the so-called 'heathen' population. This attitude was a local manifestation of the overall view by Christians, as explained by Ittleson, Proshansky, Rivlin and Winkel (1974) that man had God-given superiority over the natural world. One of the differences between Christianity and animism was that "it provided a religious sanction for these practices which altered man's respect for the forces of nature- a nature which had hitherto been seen as relatively benign and sacrosanct" (ibid.:24). In general, Christian missionaries and colonials brought to Tanganyika a world view which was linear (development will go in straight line towards ultimate success). Empirical science, in which it is assumed we can only know by measuring quantitatively, was born out of Christianity (Ibid.:20-32). Academic scientists and teachers who have been inculcated with reductionist philosophies are today still challenged to make meaning from complex ecological and social situations, while animist theories and practices are suppressed, often hidden, and their philosophies (Reagan, 2000:12-13) left out of formal education. I witnessed this phenomenon in rural Tanzania between 1983 and 2007, one incident being the rejection of a proposal to include an animist worship leader in the ceremony to open District celebrations of World Environment Day in 2001 (REMP, 2001:3).

Some traditional educational systems, although weakened by missionary efforts, continued to function openly until banned in 1916. Education policies formulated by the British colonial office carried such aims as; "render the individual more efficient in his or her condition of life", "promote the advancement of the community as a

whole through the improvement of agriculture, the development of native industries, improvement of health, training of people in the management of their own affairs and the inculcation of true ideals of citizenship and service" (Buchert, 1994:17). Policies varied and some did show respect for indigenous knowledge and culture. For example, the British inter-war strategy was "adaptation", which emphasised a blending of local and Western patterns, values and institutions. The aim was to maintain the 'sound and healthy elements' and to slow down Westernisation. Tribal history was taught as a subject. Tanzanians saw this policy as the colonials' way to keep them on the land and exclude them from paid employment. Therefore, they sidestepped "adapted" education in favour of more academic schooling (Morrison cited in Sinclair and Lillis, 1980:60). Later, secular aims were added within academic curriculum and vocational activities. Colonial mass education considered land management and agriculture but these were directed mainly towards increased productivity with some attention to environmental protection and soil conservation.

From the mid-1930's the colonial government was questioning policy. A speeding up of westernization ensued. According to Buchert's research, "The African theory of traditionalism and the European theory of progress" (1994:19) were interacting but the African culture and civilization was not given equal respect. There was recognition that school needed to be related as closely as possible to the institutions and traditions of the society of which it was part and at the same time "fostering an intelligent interest in the environment which will heighten for individual and community the enjoyment of life " (ibid.:19). However, from 1918 to 1939, missionaries delivered most of the education provided for Africans. Missionaries were outraged at the attempts of Mumford[6] to pilot truly "adapted" education that would "build upon tribal traditions" (Lewis, 1954 cited in Sinclair and Lillis, 1980:34). There was racial segregation in the educational system and in the period between the wars, the peasants' taxes were funding the education of the elite.

[6] Mumford, a colonial teacher, set up a school at Malangali in Tanganyika territory (now mainland Tanzania) in the 1920s to teach 'adapted' education. The school was frowned upon by missionaries and had a brief existence.

2.2.2 Current setting

Present day education in Tanzania is "predominantly academic" (Tanzania Online 13.02.07). It has a 2-7-4-2+3 structure with two years of pre-primary, seven years of primary, four years of ordinary level secondary, two years of advanced level secondary and a minimum of three years for a third level degree course. The only compulsory education is primary education and, as of 2002, there is no fee charged for primary schooling in government-run schools.

Government funding of primary education is low compared to many sub-Saharan countries (Mbelle and Katabaro, 2003). Rajani, Bangser, Lund-Sorensen and Leach (2001) found the quality of schooling was "poor" and the number of children completing primary education low. The waiving of primary education fees resulted in an increase of 1.6 million children enrolling in schools thus putting increased stress on the system and making it difficult to maintain even the poor quality (Buston, 2003).

In 2002, more than 3 million school-age children remained out of school (Mushi, Malekela and Bhalalusesa, 2002). About 28.6 percent of Tanzanians cannot read and write in any language. There is more illiteracy among women (36 percent) than men (20.4 percent). There are gender disparities in performance in formal education (Mbelle and Katabaro, 2003), girls outperforming boys in the early years and the reverse in later years. Girls' lower performance has been attributed to many factors including cultural attitudes towards the education of girls, girls greater domestic work load, early marriage and pregnancy, less ambitious expectations by parents, and the pedagogy being unfriendly to girls. Daniels (2001:153) surmises, from his studies of other educational systems, that collaborative pedagogy as opposed to competitive pedagogy favours equal performance of both sexes.

Mbelle and Katabaro (2003) summarised the factors contributing to the "poor" state of the government educational system as being much the same throughout the eighties and nineties as those at the turn of the century:

- low basic education enrolment,

- high drop out rates,
- poor learning achievement,
- low pass rate (e.g., in primary VII,19.4 per cent passed in 1999 and 22 per cent in 2000),
- inefficient use of resources,
- insufficient financial resources to meet education system needs, and
- few girls in secondary schools, etc…

The teacher pupil ratio is 1:41 (URT., 2002 in Mbelle and Katabaro, 2003:4). Mbelle and Katabaro (2003) in their study regarding education and poverty relationships in Tanzania found that performance is highly influenced by teacher's skill and school characteristics rather than individual student characteristics. In rural areas it is a greater challenge than in urban areas to ensure that good quality teachers are available. In 2005, Mulkeen found that in rural areas there are fewer teachers, more unfilled posts, more unqualified teachers, larger class sizes at early grades, and multigrade teaching. Higher absenteeism and shorter working hours are a likely result and the quality assurance mechanisms such as inspection and support services are often weaker in rural areas (Mulkeen, 2005). He concludes that the "weakest teachers receive the least support" (ibid.:25). Nearly two thirds (71.3%) of Standard 6 students are taught reading by teachers who did not fulfil the minimum requirements for admission to teacher training college. That is, they had no senior secondary education (Mrutu et al., 2005:114). The majority of teachers find in-service training ineffective, partly because of irrelevance (ibid.:120). Half of Tanzanian schoolchildren have no help at home for their studies (ibid.:86) and the majority has no access to reading materials (ibid.:57). This deprives them of opportunities for making their own investigations and makes them highly dependent on teachers as their source of knowledge. Statistics on primary education are readily available from Ministry, Tanzania Education, Information Services and district education offices.

2.3 Rufiji District's Educational System and Status

Under the National Strategy for Growth and Reduction of Poverty (NSGRP) the district council, especially the District Education Department, is expected to make

interventions which lead to achievement of the second of the three overall goals: "Improved quality of life and social well-being, with particular focus on the poorest and most vulnerable groups and reduced inequalities (e.g., education, survival, health) across geographic, income, age, gender and other groups" (URT., Vice President's Office (VPO), 2005:22*).* The programme is huge and includes the expected targets of improving primary and secondary education but with provision for improving early childhood health, nutrition and parenting. It is aimed to expand the primary education system to develop quality pre-primary programmes that link with existing early childhood provision – health, nutrition, parenting education, etc. Some of the proposals that relate to the needs of the Case Study area are:

- Enhance literacy education, skills, entrepreneurship training and vocational guidance to rural population particularly women and youths.
- Promote development dialogue at all levels based on cultural and traditional opportunities for development.
- Develop guidelines and appropriate strategies for inclusive education that welcomes and accommodates all children (including the vulnerable) in the neighbourhood of each primary and secondary education programme.
- Promote critical, creative and skill based learning, incorporating gender, HIV / AIDS, disability and environmental issues.
- Expand active, life-skills based and gender sensitive teacher training for primary and secondary schools to cope with increases in enrolment.
- Incorporate HIV and AIDS and appropriate life skills programmes in primary and secondary schools curriculum.
- Ensure primary, secondary, tertiary and out of schools youths are provided with effective HIV / AIDS life-skills education. Ensure cost-effective and sustainable adult education.
- Ensure provision of special alternative educational facilities that are cost-effective and focused to cater for youth, children and adults (e.g., COBET).
- Institutionalise open and distance learning for youths not enrolled in formal secondary and vocational education.
- Expand skills training and basic literacy for older women and men to enable them to take new options as they age.

- Expand and improve TUSEME, Children Theatre projects in Secondary and Primary Schools.

Statistics regarding the success rates and the status of the primary education system in Rufiji are given in Tables 1 and 2. Three or more national level programmes, including the Primary Education Development Programme (PEDP) for primary schools and COBET/ MEMKWA (see lengthier description below) for out of school children and adults, operate in Rufiji District. Many new classrooms, teacher houses, and other facilities have been provided since 2002. See Table 3 for Rufiji district's education inventory figures for the year 2006. More teachers have been recruited but are not usually keen to remain long in what is perceived as a 'backward' place and apply for transfers out of the villages or out of the district. In recognition of the difficulty for wetland children to reach schools an outreach programme of 'satellite' schooling is being piloted in one area. The case study school of Nyamakurukuru sub-village was initiated as a satellite school but is now nearing completion of its formal registration process as a government primary school.

Table 1. Success Rates in Primary Schools, Rufiji District

Year	Percentage Success
1998	19
1999	22
2000	21
2001	33
2002	25
2003	36
2004	34
2005	43
(Source: District Planning Office [DPLO], in draft, 2005).	

Table 2. Primary Education: Rufiji's place nationally

Year	Place (nationally) of 118 Districts
1998	108
1999	43
2000	66
2001	40
2002	63
2003	81
2004	106
(Source: District Planning Office [DPLO], in draft, 2005).	

Table 3. Rufiji District Education Inventory, 2006

Item	Needs	Actual	Shortfall	Percent Shortfall (%)
Classrooms	1,071	771	306	-28.5
Teachers Houses	982	592	390	-39.7
Toilets	1,904	648	1,256	-65.9
Desks	21,321	11,538	9,774	-45.8
Teachers of level IIIA	1,065	532	201	-18.8
Teacher's Offices	304	217	87	-28.6
Tables	1,649	728	921	-55.9.6
Chairs	1,817	680	1,137	-62.6
(Source: DPLO, In draft).				

As previously mentioned, Mrutu et al. (2005) found school goers of the zone in which Rufiji lies (Eastern Zone) to be the most disadvantaged nationally with regard to the availability of reading materials at home (ibid.:57). The region to which Rufiji belongs also had a relatively low percentage (60%) of pupils who got three meals per day. Both factors are considered to influence the effectiveness of schooling (ibid.).

2.4 COBET MEMKWA - a crash course system which successfully boomerangs students forward

The MEMKWA (COBET in English) curriculum was prepared to meet the needs of the 1.6 million children and young adults who have missed out on primary education.

COBET was established in order to "provide education opportunities to children who were either too old to enrol in the formal primary school system or had dropped out of school before completing the school cycle" (Tanzania Institute of Education, 2005: vii). Through MEMKWA, the seven-year curriculum of the primary education system can be completed in three to five years (URT. MoEC, 2005a). It is designed in accordance with the national aims for primary education to develop and promote an "inquiring mind" and therefore lends itself to facilitation of learners to actively research their own locality and community for knowledge heretofore undervalued in the curriculum and textbooks. After three years of COBET/MEMKWA education the learners are expected to be able;

> To read and write, use arithmetic in their daily life, look after their health, environment and build good relations among members of the community, and mainstream into formal education, acquire skills that will enable/him/her to become self reliant, acquire important life skills that mould personality and enable one to face different problems and challenges (ibid.:2).

The MEMKWA system of schooling demonstrates a shift by the Ministry of Education towards a more active learner- centred and learned-led education methodology by calling the MEMKWA teachers "facilitators" (ibid.:3) and having as one of its two main functions: "ensuring delivery of a relevant and competence – based course of study through a well-designed curriculum, delivered through interactive child-friendly and participatory approaches" (T.I.E., 2005:viii). The facilitators receive training (albeit for only 12 days) in participatory methods and are encouraged to use demonstration, discussion, role play, songs, study visits, guest speakers and small group activity amongst their teaching methods (URT. MoEC, 2005a:27-37); thus opening opportunities for learners to be discoverers of knowledge through their own research. The COBET/MEMKWA programme addresses the relationship between the school, the parents and the surrounding community dedicating a section to the (URT., MoEC, 2005a:9) subject in the facilitators guide. Facilitators are expected to be "loving and caring" and are advised that caning and corporal punishment ("do not smack them!") are not solutions for misbehaviour as

these may be the reason for dropping out of school in the first place (ibid.:4-5). The roles of the parents and community are to provide facilities e.g., classroom furniture; security of assets; and motivation of students to go to school and to study (ibid.:9). There is no consideration of a parental role or community role in lesson planning or curriculum decisions.

2.5 COBET/MEMKWA outcomes to date

An internal Tanzania Institute of Education (T.I.E.) study shows that COBET was nationally successful in supporting children to succeed academically (80% of the 8-13 age group joined mainstream education after 3 years and 3-6 % of the 14-18 year age group joined secondary education) and also "enabled the children to be inquisitive, to think and reason critically, to participate in community debates and to make decisions on social demands within their own groupings and in community meetings" (T.I.E., 2005:ix).

Mkombozi Centre for Street Children in Dar es Salaam has adapted and applied the MEMKWA curriculum and suggests that the Ministry of Education and Culture (MOEC) should put less emphasis on increasing primary school enrolment through MEMKWA and more emphasis on child-centred and active learning approaches to foster self-reliance in the learners. A good quality relationship between the educator and the child is found to lead to transformation of the child's knowledge, attitude, and behaviour (Mkombozi Centre, 2005).

Rufiji District started its first MEMKWA classes in 2005 with thirty-one sites throughout the floodplain and delta. In 2006, (URT., PMO-RALG / Ministry of Education and Vocational Training (MoEVT), 2006:40-45) there were 45 MEMKWA sites with a total of 414 (123 girls, 291 boys) enrolled and more than 292 (81 girls, 211 boys) attending. Forty-one women and fifty-seven men were trained as facilitators by 2006. Of these, half (forty-nine) were already professional teachers. Out of 136 students registered in 2005 for Std IV exams, 120 (88%) were selected for Std V mainstream education. This is a very high success rate and is attributed in part to facilitator and student commitment. The book to learner ratio (BLR) ranged from 1:20 to 1:32 in Rufiji COBET classes in 2006. This was

considered “alarming” by the ministry officials who carried out the stocktaking evaluation in 2006 (ibid.:28).

2.6 Background data on Nyamakurukuru school

2.6.1 History of schools at Nyamakurukuru

A school was built at Nyamakurukuru after independence in 1969 but, in 1974 when Ujamaa villagisation was enforced, the population was forced to go to live in Utete and the schoolhouse was abandoned. The ruin was left to disintegrate. In the year 2000, during the pre-electoral registration exercise, it was recognised that most (approximately 80%) of the adult population in the sub-village were unable to read or write. This appalled the sub-village chairman and in September 2003 he opened a shack and 120 children began to attend his ramshackle school. Some books were requested and received from the district which also suggested that the MEMKWA curriculum would be suitable. At the end of 2004, the area, known not as Nyamakurukuru but as Siasa, was registered as a sub-village and the teacher became an official sub-village chairman and left his teaching post. The Education Ministry under the MEMKWA scheme trained two voluntary facilitators for twelve days and one professional schoolteacher was appointed school principal.

The population of the sub-village is currently 776 (367 female and 413 male); mainly waNdengereko tribe but also waNgindo, waPogoro, waSukuma and waBarbaig. There are 139 children registered at the school. Those who completed three years of MEMKWA took Standard IV exams and have now been integrated into mainstream primary education in a Standard V class. The classes which currently run are Standard II, Standard V, Standard I and a Cohort I Year 3 MEMKWA class. There are only two classrooms and three active teachers. Children all come to school at the same time in the morning (between) 06.30 –07.30 hrs, leaving two classes to remain outside waiting while the others are taught in the classrooms. Each classroom is equipped with desks and a teacher’s table and chair. This compares well to other schools as approximately 30% of teachers in Tanzania do not have a teacher’s table or chair in the classroom (Mrutu et al., 2005:135).

One teachers' house has been built and this is shared between two teachers (one of whom is accompanied by his family). The dearth of teacher's housing is one reason for teachers not wanting to stay in rural areas. It seems that urban teachers' housing has been provided more readily by the ministry's primary education support project. This is the case in Rufiji district. Lack of housing is also one of the reasons given by the female teacher for her prolonged absences from Nyamakurukuru. Eight pit latrines have been built for students and two for teachers.

2.6.2 Physical access to the school

The school is accessible by two routes from Utete but neither is reliable in the wet season. The most direct route from Utete (11km.) has become impassable by car because a logging truck damaged the bridge across the channel between Lake Lugongwe and the Rufiji River at Utete. Also other hardwood bridges on the route have been left incomplete by the construction company contracted to build them under the Village Travel and Transport Project and so they are unusable and rotting away (Photograph 1). The direct route can only be used on foot, bicycle or motorbike, using a canoe in the wet season to cross the Lugongwe channel (Photograph 2). The other route that travels the length of Lake Lugongwe and turns back west towards Utete is 16.7 kms. This route becomes impassable during the wet season when logging trucks get stuck in patches of black cotton soil, leaving deep ruts.

Photograph 1. Bridge left incomplete and rotting

Photograph 2. The road to Nyamakurukuru

2.6.3 Ecology [7].

The school, situated in woodland of mixed Miombo and Lowland Coastal forest vegetation,(Photographs 3 and 4) is about one hundred metres from the wetland between Lake Lugongwe and the Lug'onya and Rufiji rivers (see Figure 2, Chapter 1, section 1.3). A well has been dug, in the wetland near Lug'onya River, for domestic water supply. Bushbabies, bats, owls, jackals, hyenas and elephants can be heard here at night. There are crocodiles and hippopotamus in the rivers. Small antelope (dikdik carcass seen), and probably other species, are hunted for meat. Low mesh sizes are used for fishing very small fish.

Photograph 3. An African Blackwood Tree (*Dalbergia melanoxylon*)- Endangered species

[7] For more detailed information on the environmental history and status of Rufiji District please refer to Hogan, 2006 available from the author.

Photograph 4. A spiritual worship site beside a baobab tree (*Andansonia digitata***)**

2.7 Educational theories and experiences which help to understand the case study situation and the research question on contextualisation

2.7.1 Introduction

Having described the setting in which the case study took place I will in the remaining sections of this chapter use educational theory to gain deeper insights into the pedagogical and epistemological aspects of the Nyamakurukuru situation. I will also use the theories and experiences of others to develop a broader, as well as deeper, understanding of contextualisation as a means of making education more relevant and thus of better quality for wetland people.

2.7.2 Forms of knowledge, diverse definitions and dialectics.

Scholars have provided explanations for the way knowledge has evolved and can be categorised. Durkheim defined two different worlds according to how meaning is made within them. One is the ‘profane world’ where meaning is made by individuals in direct involvement with other people and with reality and is articulated through

adages, caution, local experience, and general common sense (Muller, 2001:132). Durkheim's other, non-profane world is the "sacred" world where things are put in order, or classified, by powers from outside the things themselves. In this 'idealisation' of objects into fixed classifications it is possible to connect things with each other while at the same time forecasting a future of greater order and quality than the present (ibid.:132-133); a more ideal world based on an infinity of possibilities. Durkheim placed both science and religion in the "sacred" world though he considered science as "a more perfect form of religious thought" (ibid.:133). Although science has traditionally suggested that individual scientists are responsible for production of knowledge, Durkheim believed that truth is produced in social communities (ibid.:133). Durkheim described the specialisation of disciplines and thought that it cultivates social interdependence which is a mark of civility. Muller (2001) argues however that no-one lives only in the 'sacred' or the 'profane' worlds and only some types of scientific practice are 'sacred'. Bernstein (1990) has shown that the difference between the sacred and the profane is not the same as the differences between the written and oral and the formal and practical (ibid.:140). In explaining educational knowledge, he categorizes forms of knowledge as *horizontal discourse* and *vertical discourse*. The former is "local, segmental, context-dependent, tacit and multilayered" (ibid.:139) while the latter is a coherent systematically principled structure, that is either hierarchically organised or takes the form of a series of specialised languages" (ibid.:139).Vertical discourse is organised such that it is transferable from its context but only through a specific structure of symbols underpinned by "*principles of recontextualisation"* (ibid.:139, italics original). Recontextualisation principles refer to the ability to trace in detail how the original knowledge was given symbolic meaning (through codes) as it was removed from its context. References (symbolic codes) are a "way of keeping something *constant* through a series of transformations" (Latour, 1999:58).

Within the vertical discourse categorization, Bernstein defines 'hierarchical' and 'horizontal' knowledge where he considers that hierarchical knowledge is integrated into existing propositions in a more complex hierarchy while horizontal knowledge is added on as further specialised languages (Moore and Maton, 2001:158). Horizontal knowledge structures insulate different kinds of knowledge from each other such that

they are ‘non-translatable and non-comparable’ (ibid.:140). Bernstein (1990) characterises formal education systems as having primarily a horizontal knowledge structure (ibid.:161). The horizontal knowledge structure of a state education system can be exemplified by its set of subjects with their specialised languages such as mathematics, science, Swahili, business studies all of which have separate ‘languages’ which are not seen as translatable or transferable.

Moore and Maton (2001) in writing about the legitimation of knowledge, distinguish between the arbitrary and non-arbitrariness of knowledge ; “arbitrary” being “ the way in which knowledge may be shown to be related to historically situated social relations of power” and “non-arbitrary” being “that dimension of knowledge which is irreducible to such social relations of power” (ibid.:160). They argue that the “epistemic device” which is both the regulative means by which knowledge claims are assessed and by which “knowledge structures and grammars of intellectual fields are maintained, reproduced, transformed and changed” is a “*precondition”* of knowledge production. Knowledge claims are made about something and by somebody and the languages of legitimation are “conceptualised in terms of the strength of the boundaries around (classification) and control over (framing) *what* knowledge may be claimed and how (epistemic relation) and *who* may claim knowledge (social relation)” (ibid.:161)

However, these theories do not adequately explain how an aspect of our lived world becomes recognised as scientific knowledge, and thus as legitimate within the horizontal and vertical discourses commonly found in modern state education systems. Here, the work of Bruno Latour (1999) provides further insight into the sociology of knowledge. He looks into how nature is transformed by scientists through systems of standardisation (ibid.:24-79). One such standardisation system is the Munsell chart which allows standardised colour classification for soils and thus, as Latour puts it, “turns dust into an idea” (ibid.:60). The “truth-value” of the transformation is preserved by recording the means by which the standardisation has been done so that it is retraceable back to the original object (ibid.:69). The power of the classificatory act rests with the classifier, normally a ‘scientist’ who has access to the discourse and tools associated with the ‘standards’ of soil classification. Such

processes of standardisation can afford global understandings of local objects. However, Latour also points out that "in losing the forest, we win knowledge of it" (ibid.:38). That is how he explains the way scientists detach themselves from the whole in order to explain parts of it. He also explains that when scientists are reducing nature, for example a forest and its soils, from its "locality, particularity, materiality, multiplicity and continuity" (ibid.:30) to the pages of a written scientific report (often translated into school science syllabi and textbooks) the scientists are simultaneously involved in a process of '*amplification'* of forest and its soils "to obtain much greater compatibility, standardization, text, calculation, circulation and relative universality". Thus sciences construct representations of the world that "seem always to push it away, but also to bring it closer" (ibid.:30).

Latour, speaking from a science studies perspective in his "circulatory system of scientific facts", provides us with evidence that science is necessarily embedded in society as it needs the instruments, colleagues, allies, public representation and the concepts flowing between them to survive. He believes that "the more connected a science, the more accurate it may become" (ibid.:97) and that the truth of what scientists say "no longer comes from breaking away from society, convention, mediations, connections but from the safety provided by circulating references that cascade through a great number of transformations and translocations". Latour is impatient with dialectical analyses and sees that "the difference between theory and practice is no more a given than the difference between content and context, nature and society. It is a divide that has been *made*." (ibid.:267, italics original). It is a dialectic similar to the sacred versus profane and the vertical versus horizontal divides, all of which have been constructed in the intellectual tradition which characterises modernist forms of logic framed within a broader history of science, and which has permeated modern forms of schooling and the modern knowledge economy that structures schooling.

In current discourses about education, research and world development, another divide has been made. Two major kinds of knowledge are set against each other as if they oppose each other and are distinctly different. These two kinds of knowledge are purported to derive from two different cultures or traditions "western" and "non-

western" which are also set against each other in what has been critiqued as a misleading dichotomy (Reagan, 2000:10). For convenience I call the two knowledges "indigenous knowledge" and "western scientific knowledge" though I, like other contemporary scholars such as Shava (2005), believe that neither are purely what these terms suggest and both have been influenced by each other and by a multiplicity of non-western sources of knowledge. Table 4 lists some of the words that are used to distinguish "western scientific" knowledge from "indigenous" knowledge.

Table 4. The western scientific vs. indigenous knowledge dialectic descriptors

Western scientific knowledge	**Indigenous knowledge**
Scientific knowledge	Indigenous knowledge
Western knowledge	Everyday knowledge
Subject matter knowledge	Practical knowledge
Schooled knowledge	Local knowledge
Understood knowledge	Knowledge in people's minds
Empirical knowledge	Active knowledge
Book knowledge	Unorganized knowledge
Technical knowledge	
Rationalist Positivist	
Sacred	Profane

Thus even though some of the definitions of knowledge are paradoxical, for example not all western knowledge is scientific nor vice versa, these definitions dominate the discourse today such that "westernism and science are almost interchangeable in the perception of young Africans" (Mazrui, 1978:312). Scholarship's concentration on the literary tradition has been accused of sidelining non-written knowledge and knowledge systems. Mazrui described this phenomenon as: "Rigid rationalisation" which "had equated historical knowledge with written documentation bearing specific dates" (ibid.:212) Odora-Hoppers (2002:13-14) maintains that the knowledge that could not be measured by scientific methods was "undermined or destroyed".

2.7.3 Knowledge, formal schooling and pedagogic discourse

As discussed above, and in more depth by Basil Bernstein (1990:202), the production

of discourse takes place outside the educational system's own field. Educational systems choose which knowledge to prioritise and then decide how to recontextualize that knowledge within their systems. Bernstein provides a model to assist our understanding of the institutions and processes involved in government-managed pedagogic discourses and practices which adopt the predominantly European approach to constructing a "pedagogic device[8]". I have drawn a simplified version of this model (Figure 3) to illustrate in red where the main recontextualisations of knowledge take place between the state, the school and the actors and institutions in between. That is, the ways in which states and their associated agents employ the "pedagogic device".

[8] This is the 'root' structure for African education systems based on colonial / missionary models which, as mentioned in Chapter One, emerged in the late 19th and early 20th centuries.

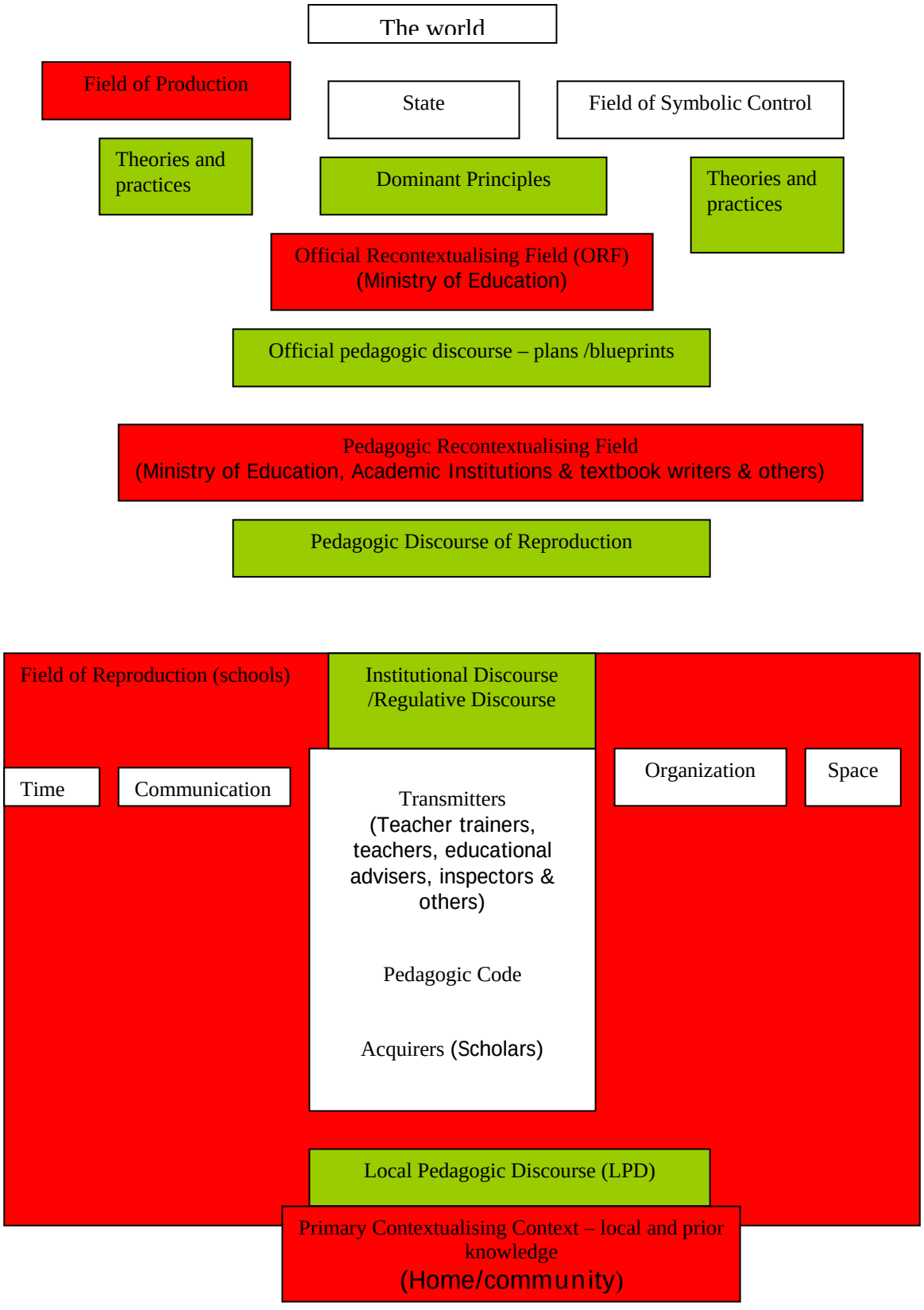


Figure 3. Simplified version of Bernstein's Pedagogic Discourse Model.
[Adapted from Bernstein, 1990:197]

The pedagogic device can be considered as a set of "hierarchical rules, distributive, recontextualising, evaluative which constitute its internal grammar". Bernstein (1990) argues that "…the link between power, knowledge and consciousness is established by the pedagogic device." The pedagogic device provides the "internal grammar of symbolic control…or socialization" which forms the basis of modern education systems (ibid.:205).

Currently the dominant thrust of the educational and knowledge systems in Tanzania follows cultures[9] other than African cultures (Buchert, 1994; Odora-Hoppers, 2002; Hountondji, 1997; Reagan, 2000; Brock-Utne, 2002) and follows a western paradigm which carries with it the values of a linear, neo-liberal, materialistic society that measures success in terms of quantity of material acquisition and level of academic qualification. According to Bernstein (1990:168) "Education is a relay for power relations external to it."; also that pedagogic communication in the school and the home is the relay for class, gender, religious and regional relations. (ibid.:168-169). He asserts that in school "the talk, the values, the rituals and the codes of conduct" (or "the privileging text") are "biased in favour of a dominant group" and the dominated group is "recontextualized as having less value" (ibid.:169). Cornbleth (1990:185) agrees that "Curriculum knowledge is largely mainstream, the knowledge deemed important by dominant groups..." and that minority and marginalised groups must advocate to have their histories, cultures and perspectives included as "legitimate knowledge". Popkewitz, Pereya and Franklin (2001) agree that "knowledge is not, in and of itself a practice but something that is used in social practices to affect some social outcome" (ibid.:12).

In Africa and elsewhere, indigenous and local knowledge have been de-valued by historical events associated with colonial intrusion, modernisation and more recently neo-liberalism and globalisation. Thus indigenous and local knowledge get little opportunity to be explicated in the formal school setting. Shava and several others in southern Africa found that the formal education system which is detached from indigenous knowledge and everyday experiences of the children is not contextually relevant and does not give the children the skills to live in their environment (Shava,

[9] I use the plural term cultures to avoid the misleading dialectic between western versus non-western cultures.

2005; Masuku van Damme and Neluvhalani, 2004; Mokuku and Mokuku, 2004). It is acknowledged that, as it penetrated the world, the European pedagogic device established a clear boundary between mental and manual practice, that is, displayed a strong horizontal insulation between the teaching of academic subjects and practical skills (Bernstein, 1990:201). Indigenous and local knowledge encompass both mental and manual competencies.

Dr. Julius Nyerere, first an educationalist then Tanzania's first president was deeply concerned that his country should build enough self-confidence to "refuse what we regard as the world's best (whatever that may mean) and to choose instead the most appropriate for our conditions" (Lema, Mbilinyi and Rajani, 2004:130). He advised against "blind imitation" and promoted "relevant initiative" and "national adaptation" (ibid.:130). He worried that Tanzanian's considered that education was not respectable unless it took a form "recognizable by, and acceptable to other countries". He was not talking about going back solely to traditional systems of "learning by living and doing" (ibid.:129) because this would lead to social and technological backwardness. Nyerere believed that a formal education system was needed but that it would be no use if it was not relevant to the society in which its alumnae would live. In 1974 Nyerere said "education cannot be considered apart from society" because "education is unavoidably a part of society" (ibid.:128). He proposed the integration of the formal learning (in schools) with the societal learning to provide education "which is relevant to our conditions and our aspirations" (ibid.:129).

In 1998, appalled at the low quality of education in Tanzania in the 1990s and keenly aware of globalisation, Nyerere still emphasized the need for relevant education "we must educate our young people for the life which they are going to live in Tanzania" (Lema et al., 2004:163) in their "corner of the Global Village" which is "rural Tanzania" or the "informal sector of urban Tanzania". According to UNESCO (2006b:13) "… education based on local culture and contextual needs has been neglected in Africa". Odora-Hoppers (2002:3) believe that most of Africa's peoples have lost the "cultural reference points" which would have sustained their societies and that this has negatively affected human development. She is concerned that the global trend towards individual ownership of knowledge for the benefit of a minority

threatens the collective creation and ownership of indigenous knowledge. Therefore, she and others believe that the re-appropriation of the rich heritage of indigenous knowledge, which has "intrinsic efficiency and efficacy", must complement the use of "the western framework" in tackling the issues of sustainable development and human poverty (ibid.:11). Her views are supported by seventy-six indigenous and academic delegates, in a 2005 conference in Ghana who stated that teaching, learning and research processes at all levels have been skewed towards western models (Millar, Bugu, Kendle, Apusiga and Haverkort, 2006:171). The delegates, including Tanzanian representatives, agreed on the need for a new type of scholarship "that combines indigenous knowledge with external knowledge at a collegial level" (ibid.:168). One of their three chosen themes for action is to reorient ways of research, teaching and learning. Amongst the means they suggest towards achievement of this reorientation are the integration of local experts into formal systems of knowledge and the inclusion of traditional knowledge, ways of knowing and African sciences in primary and secondary school formal curricula and pedagogies. (ibid.:168-169). These views echo the suggestion of Mazrui (1978) that "accelerated indigenization of the content of education may prove indispensable if Africa is to find harmony between values and techniques as she undergoes the agonies of developmental transformation" (ibid.:40).

Tharp and Gallimore (1988) suggest that teachers should weave together every day and 'schooled' understanding. Integration of indigenous knowledge into education and environmental education systems has recently become more prominently recognised as important for sustainable development (Masuku van Damme and Neluvhalani, 2004; Shava, 2005). UNESCO (2006a:1) stated, "Education must strike a balance between exogenous and endogenous knowledge, and new dynamics must be found between teachers, students and community knowledge-holders". Mushi et al. (2002) reflecting on marginalisation in education in Tanzania implied that increased community participation could enhance learning opportunities.

Recently, senior education and environment representatives from ten southern African countries considered that "There is a need to close the gap that exists between family

education (involving values, ethics, morals and taboos) and formal education (involving scientific knowledge and technical skills) through ESD[10] processes and strategies" (UNESCO, 2006b:12-13). Both traditional knowledge and traditional pedagogies should be considered for re-integration into children's education. There are opportunities within the educational system to recontextualize the curriculum, however there are limitations through regulations and institutions which formally or informally restrict the latitude, and the perception of the latitude, to adapt and transform the content and the methodologies of teaching (See next Section). The majority of Tanzanian teachers, perhaps reflecting the whole educational system's culture, are not convinced of an important role for the home community, or what Bernstein refers to as the "primary contextualising field" (see Figure 3), in educating children. Mrutu et al.(2005) report that teachers did not think it important for pupils to have reading materials at home indicating, "teachers regarded the role of the home in promoting reading as very minor or even negligible" (ibid.:124). Because it is internationally recognised that frequent, good communication between teachers and parents can improve reading achievement in children, Mrutu et al. advised the government to train teachers for appreciation and implementation of greater parental participation in their children's education (ibid.:133).

2.7.4 Classification and framing and how they relate to contextualisation

The recontextualisation field (Figure 3) where recontextualisation is shown to occur at all levels above community and below state) is concerned with deciding what will be transmitted down to the transmitters (teachers) and how they should transmit it. 'Classification' during the process of recontextualisation refers to "what" will be transmitted in terms of "categories, contents and relationships" while 'framing' refers to "how" the knowledge will be transmitted. "The stronger the classification between education and production, the more likely that the privileging text will be a realisation of a pedagogic code" (Bernstein, 1990:195). That is, if education is insulated from outside influences, the decisions made about what knowledge to include at the official production level (higher government) will be more likely to be implemented at the

[10] Education for Sustainable Development.

reproduction level (the school). “The text will be both highly abstract and abstracted from relationships other than its own” (ibid.:195). This would suggest that the more classified a pedagogic discourse the less it will be open to adaptation to the context in which it is taught. Recontextualisation principles might influence the content and methodology of schooling depending on the particular situation and on the “extent of external control over official pedagogic discourse” (ibid.:199). This would suggest that in a strongly classified and framed educational system such as that of Tanzania’s formal education system, except for pilot sub-systems such as MEMKWA, there is limited latitude for the “transmitters” particularly the teachers to adapt the curriculum to local contexts. Taylor and Mulhall found that “the rigidity of primary school curricula seemed to discourage teachers from moving beyond the boundaries of the subject area…” (Taylor and Mulhall, 2001:143-144). Thus an over-rigid curriculum is identified as a constraint to contextualisation.

Bernstein (1990) also suggested that power relations at the local pedagogic discourse (LPD) level between the school and the home or the community of the learner may influence the content of the schooling. (ibid.:194,199). This could mean that a local community could influence the curriculum, and make it more contextually relevant, should it engage effectively in local pedagogic discourse.

2.7.5 The influence of classification and framing on classroom practice

The strength or weakness of classification and framing within an educational system also influences pedagogic activities and knowledge content in the classroom. Implicit in the curriculum are sets of values about the educational organisation of the nation and the school and classroom. Eisner[11] calls this the “implicit curriculum” (1985:95) which includes structures such as timetabling and behavioural rules which pervade school systems. Daniels (2001) refers to schooling as an “elaborate form of sociocultural activity” (ibid.:175). The sociocultural values within this sociocultural activity, for example, in the case of Tanzania, of top down control through a strict

[11] Eisner defined three curricula: The *Explici*t –the overt and obvious curriculum - and the *Null* –what is ignored or deliberately left out - are the other two curricula.

pyramidal hierarchy, are part of the culture of the system and influence the classroom practice. They are so much part of the system that they go unnoticed but are nevertheless acted out by the players within. Where strong classification and framing take place the hierarchy between teachers and students will be clearer (ibid.:156). The students will respond by doing what the teachers tell them to do. According to Daniels (2001), when classification and framing are weak, students will be facilitated to be more active, more inquiring and to do collaborative work in groups at a pace they set themselves. The MEMKWA curriculum, described above, would seem to encourage more of this than the traditional formal curriculum for Tanzanian schools.

2.7.5.1 Collaborative and social learning

Mazrui was concerned that African pedagogies and epistemologies were suppressed and suggested that "It is indeed time that Africa counter-penetrated the western world" (Mazrui in Reagan, 2000:15). Perhaps this has begun to happen in terms of present-day thinking regarding pedagogy that encourages collaborative learning and community involvement in children's education? The so-called 'western world' has recently recognised the value of collaborative forms of teaching - learning as opposed to the individualistic and competitive pedagogy that had been the norm in 'western' education.

Vygotsky, in Russia, in the early 1900's, believed that higher mental functions arise from collective forms of behaviour (Vygotsky, 1987:126, 213, 259). He identified that speech is very important for the development of mental capacity. As indicated previously (section 2.2) African educational processes had been profiting from oral and collaborative pedagogies for centuries. Mainstream formal education models have been structured such that students are silent in the classroom as the teacher speaks. Student-to student interactions are controlled or, at worst, not permitted. Opportunities for social learning - whereby students exchange prior knowledge, and their present responses to new knowledge, in order to make new meaning together - are generally not formally provided for in structured and transmission-oriented syllabi

and learning modalities. Wals and Heymann (2004) define social learning as "an intentionally created purposeful learning process that hinges on the presence of the 'other' or others" (ibid.:131). In such social learning processes a student can recognise another's Zone of Proximal Development, that is; the area that is just outside one's full understanding, but still with which one can nevertheless engage if given some help. Bruner term's this help as "scaffolding" (Scott Baumann, Bloomfield and Roughton, 1997:73). In this way students can become "scaffolders" for their peers and the teacher is not the only scaffolder/teacher in the classroom. Thus the children will also become more aware of "principles of social relation" (Daniels, 2001:169) and not just acquire cognitive knowledge in school. Section 2.7.9.1 provides a greater elaboration of theories about learners' social and environmental empowerment through relevant education).

2.7.5.2 Active, learner-centred, discovery education

Scardamalia and Bereiter (1991) consider information-finding skills as one of six important aspects of learner preparation for the current 'knowledge society'.
Among other recommendations, Mushi et al. (2002:vii) advised that more participatory training methods could contribute to the learning opportunities for out of school and otherwise marginalised children/young adults. However, it has been found that Tanzanian teachers are not always prepared to adopt these methodologies: "It is possible that some of the more effective activities are shunned by teachers simply because they were more demanding in terms of effort at the planning or execution stages" (Mrutu et al., 2005:125). Teacher creation of learning materials for active learning is not common. Neither do teachers think it important that their students enjoy learning. Only 0.8% and 1.4 % of Tanzanian mathematics and reading teachers respectively thought that making mathematics or reading provide satisfaction / be enjoyable should be important pedagogic goals (ibid.:126).

In less structured, more contextually immersed pedagogies, prior indigenous knowledge can be mobilised in classroom discourse. O'Donoghue and Lotz-Sisitka (2006), examining three cases of teachers acting with the local community as

researchers, succeeded in mobilising "a cultural capital of indigenous ways of knowing" (ibid.:1). As discussed above the educational system of Tanzania has strong classification and framing resulting in a very clear institutional hierarchy which constrains teachers from moving towards facilitating greater learner control of the teaching-learning process, thus limiting learner opportunities to contribute indigenous and local knowledge. The MEMKWA facilitators' handbook (URT., MoEC., 2005a) promotes greater learner control, as does this case study.

2.7.6 Creativity - how the strength of classification and framing influences it.

Daniels (2001) findings from comparing schools in England show that schools with weak classification and framing nurture students' capacity to be creative (ibid.:164-165) and to make choices (ibid.:170). Engestrom (1999:231) supported by many other authors considers that "the most important aspect of human activity is its creativity and its ability to exceed or transcend given constraints and instructions". The MEMKWA curriculum provides for the weakening of classification and framing, which could nurture greater learner creativity. Creativity is one of the key resources suggested for humans to be able to manage the increased risk which they face in their environment. The IUCN meeting of renowned environmental and development thinkers including Mohammed Yunus[12] and Lester Brown[13] concluded that "imagination, vision, passion and emotion" are needed if we are to get out of the "prison for the imagination" in which the existing language of sustainability binds us (Adams, 2006:14). Jickling (2005), discussing environmental ethics, suggests that we re-imagine the world ; Le Grange and Reddy (2007:79) promote thinking towards new ways of living and new possibilities while Wals (2007) suggests that creative solutions will come from using diversity and conflict in social learning situations (ibid.:39,43). The nurturing of critical, transformative thinking and visioning ("ideas, dreams and perceptions") within formal education systems is promoted by these and other educators including Carlsson and Bruun-Jensen (2006:241). The weakening of the classification and framing of formal education systems could provide for the

[12] Grameen Bank instigator and Nobel Prize winner.
[13] World Resources Institute, Washington author of State of the World's Environment reports.

critical thinking and creativity which is called for. The Nyamakurukuru case study is a trial of such weakening of distinctions between academic subjects, and of the power positions of the teachers, learners and the wider community in order to open out possibilities for multi-disciplinary knowledge construction/meaning making in a participatory learning situation.

2.7.7 Educational Quality and relevance and how they relate to contextualisation.

With the expansion of basic education in Africa, much attention was given to enabling access. This was promoted by the Jomtiem Education for All agreement, and is still being promoted by key development initiatives such as the Millennium Development Goals. However, many have realised that access to schools is an inadequate pre-condition for achieving equity through education, and recently attention has turned to the *quality* of the education learners are receiving once they are in schools. In 2005 UNESCO released a Global Monitoring Report focussing on educational quality in low income countries. Thus having paid much attention to access issues in basic education, there is a recent trend in Low Income Countries towards paying greater attention to quality aspects of basic formal education (Mrutu et al., 2005).

2.7.8 Defining educational quality

But what is meant by the quality of education? Hopkins and Reynolds (1994:1) maintain that quality is protean, meaning that it will "defy precise specification" and is "recalcitrant to our most persistent attempts to analyse".

Quality is a "contested concept" we can only be sure that people will be "*Un* certain" about them (their emphasis) (ibid.). Notwithstanding this uncertainty it is helpful to summarise some trends in defining the term "quality", which is often used but seldom defined, in education. Authors agree that quality is based on sets of values (ibid.:35, Barrett, Chawla-Duggan, Lowe, Nikel and Ukpo, 2006:2; Nagel and Kvernbekk,1997:104). Clearly defined goals for education assist in defining quality parameters:

> "It makes no sense to discuss quality of education without a reasonably clear view of the ultimate goals or purpose of education" (Nagel and Kvernbekk, 1997:104).

> "…quality is related to what the school is trying to do for the students and for the community, both locally and in the larger society" (Hopkins and Reynolds, 1994:44).

According to UNICEF, for basic education to achieve a good quality standard, it needs to pay attention to five dimensions/principles. These are: Environments, Teaching/learning processes, Learners, Content, and School Management processes (UNESCO, 2000a:30). Others, such as Barrett et al. (2006) have framed their concerns regarding educational quality differently and include issues such as effectiveness, efficiency, responsiveness to needs, relevance, sustainability, durability, flexibility and stability.

2.7.8.1 The humanist/progressive approach and the economic approach.

Barrett et al. (2006), in reviewing education quality literature, identify two broad approaches to defining quality in basic formal education which they term the humanist/progressive approach and the economist approach (ibid.:2). The humanist/progressive approach concerns itself with the quality of classroom processes and focuses on learners. Although it measures quality by assessing learners' acquisition of cognitive skills it is more focussed on the learners and also gives attention to the acquisition of values. The humanist/progressive appears to be aligned with tradition African educational goal of developing a *good* person (Reagan, 2000: 42), as portrayed in section 2.2 above and with Nyerere's aspirations for alumnae who are not alone academically adept but also contribute to society (Lema et al., 2004:44). The humanist /progressive approach is concerned with broad social criteria and not just individual learner's development. The economic approach is focussed on value for financial investment in education and matching the needs of the workplace. Development planners have adopted the cost-effectiveness approach and so become

concerned with school inputs as a measure of provision of quality education; and enrolment rates, retention rates and cognitive achievements as measures of success in reaching quality goals (Verspoor, 1989). This approach, having been influenced by the humanist approach of the Education for All (EFA) movement (UNESCO 1990) which has a more holistic approach to what constitutes a quality education, has recently been tempered by adding outcomes in terms of students' academic achievements to the criteria for quality.

The 1990 EFA declaration sees education, which it does not conflate with formal schooling, as a human right and a conduit to a better world socially, economically and environmentally. However, by the year 2000, although the term "quality" is used often, (UNESCO, 2000b) its definition remains fuzzy except for the quantifiable criteria of access, learning outcomes such as literacy, numeracy and essential life skills. By 2005, the EFA movement shows increasing concern for educational quality by devoting its Global Monitoring Report to "the Quality Imperative" (UNESCO, 2004). An outline of four major factors which contribute to educational quality is sketched (UNESCO, 2000a). These four factors are: learner characteristics, context, inputs and outcomes. The report also presents some details on the quality elements within the four factors and refers to an inclusive learning environment and relevant content under the teaching/learning sub-heading of the inputs factor (ibid.).

2.7.8.2 Five dimensions of quality which recur

Both macro and micro studies of the meaning of quality education, as a preliminary to implementing it in Low Income Countries, are underway and have found "five dimensions of quality that are recurring themes of debate on quality" (Barrett et al., 2006:2). These are effectiveness, efficiency, equality, relevance and sustainability (ibid.:14). Writing from the field of environmental education, Lotz-Sisitka (2007) provides a heuristic, for researching the relationships between environment and sustainability education, educational quality and relevance, which sets these five elements around a core which she terms the "dynamics of educational relevance arising in shared purpose within the educational process". She further relates this to a

concept of relevance in which education (and environmental education) may enable learners to participate in processes of "…cultural risk negotiation in the everyday" (ibid.:6). The five elements which she describes as being in a perpetually changing relationship are: knowing (epistemology[14] and inter-epistemological dialogue), context (socio-economic and socio-cultural), process (pedagogical), relations (school-community) and purpose (ethics and values orientation). See Figure 4 below.

[14] Epistemology is a term for 'ways of knowing' or the philosophical theory of knowledge.

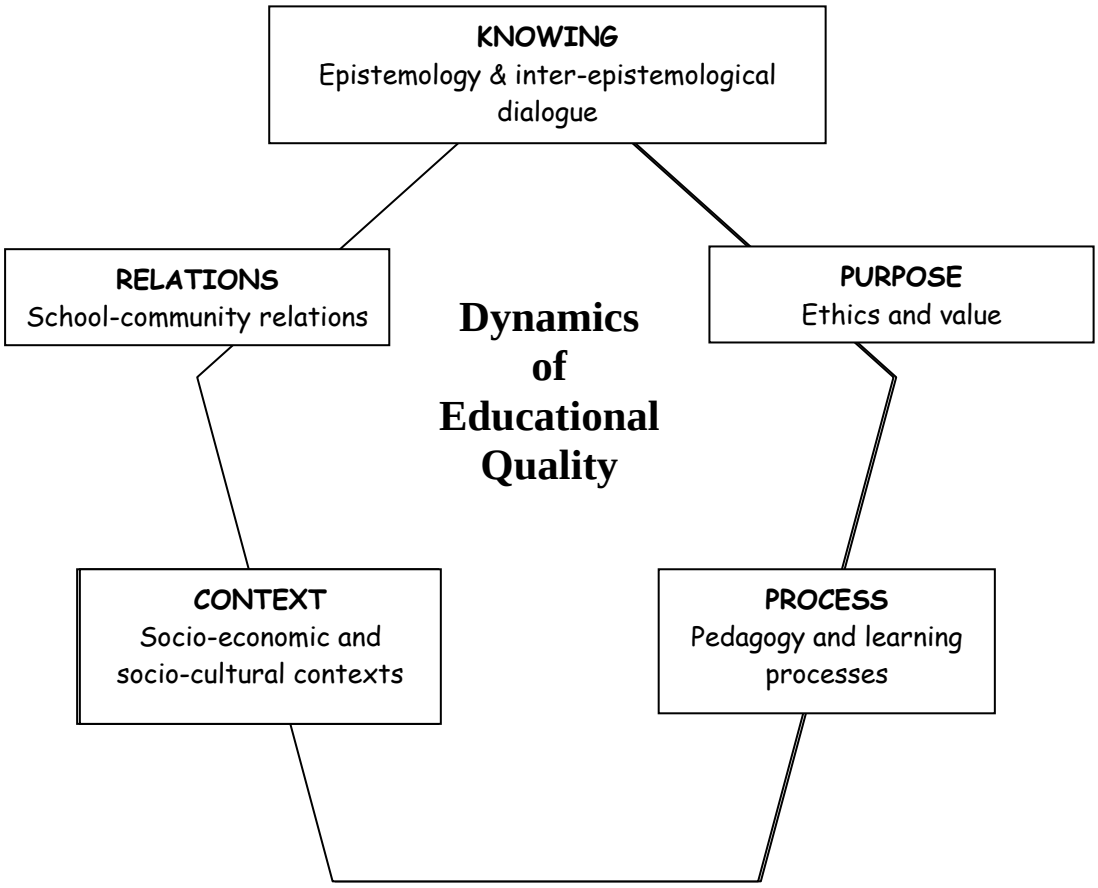


Figure 4. The Lotz-Sisitka Heuristic for researching educational quality and relevance. [Adapted from Lotz-Sisitka (2007)].

2.7.8.2.1 Educational Relevance and contextualisation

While research related to educational quality has firmly put relevance on the agenda as a key dimension of educational quality, the question of 'relevance to what?' is not always clearly dealt with. Those who emphasise the importance of a relevant content and process of schooling, which is often mistakenly conflated with education, mention one or more of three relationships of relevance: relevance to the context, relevance to the lives of the students and relevance to the lives of the wider community in the world (Barrett et al., 2006).

Moumouni (1968) assessed that traditional African education was effective because of its "very close relationship with life" (ibid.:29). He therefore considered 'relevance'

to life a factor in the quality of education. Within the "Content" dimension of the UNICEF five-dimensional framework, relevance gets much attention and is tied in with responsiveness (Nikel and Barrett, 2006) to children's needs. Also important to content relevance and responsiveness are local language, context and culture, indigenous representation and democratic processes in designing the curriculum (ibid.). The Education For All global Monitoring Report Team stated, "…pedagogy needs to respond to cultural contexts to enable relevance" (UNESCO, 2004:230). The same report advised, "knowledge that is specific to context and local circumstances is needed and can be generated in the region" (ibid.:231).

Relevant skills for Tanzania's country context and development needs include agricultural, vocational, artisanal, business, citizenship, political and public sector skills. In order to tackle poverty and compete globally the nation should develop a "core vision for lifelong learning" and the government should be proactive in "identifying and implementing skills development priorities" (Tikly, Lowe, Dachi, Garrett, and Mukabaranga, 2003:summary page). This advice suggests that Nyerere's ideas (Lema et al., 2004) of educating people for life in the place/environment of their life are still appropriate. He considered it a failure of the Tanzanian educational system that there was an inability or unwillingness to "really integrate education and life, and education and production" (ibid.:130). Nyerere was not suggesting that children only learn about their immediate surroundings in a narrow way (localizing education), but that they learn generic skills and about the outside world through their own context, thus linking what they see and do with international phenomena (contextualizing education). A current example might be that measuring rainfall in a village school ground can improve writing, mathematics, and recording skills while deliberating on global climatic phenomena such as global warming and their contribution to local droughts and floods.

With regard to Nyerere's emphasis on the relevance of education to the household's economic production activities mentioned in the quote above, Mrutu et al. (2005:64) found that families need the income that their children can earn and so prefer to let them work than go to school. Parents see that a Standard VII education is not a passport to a job and so not worth the investment. Mrutu et al. (2005), therefore

advised that: “The school system should revisit its learning objectives so that school is more responsive to the changing needs of society individuals” (ibid.:65). Their policy suggestion was as follows: “The Ministry in collaboration with the Tanzania Institute of Education should review the curriculum so that it becomes more relevant to the needs of society” (ibid.:232).

2.7.8.3 Contextualisation for relevance and thus improvement of quality

International educators are also emphasising that “teachers need to be oriented towards contextual models of curriculum development and implementation” (UNESCO, 2006b:13); “education itself if it is to earn the characteristic of quality: it must be holistic and contextual” (Nagel and Kvernbekk 1997:109). By contextualisation I mean making formal education more relevant to the surrounding environment and the learners’ life. I refer to changes/adjustments in the area which Bernstein (1990) terms the “Primary Contextualising Context” where Local Pedagogic Discourse (LPD) can take place (Figure 3, section 2.7.3). This is the interactive area between the three learning environments which school-children inhabit; the home, the community and the school. Chikunda (2007), in Zimbabwe, is proposing such an approach to avoid the school being “alienated from the community in terms of solving problems” (ibid.:167). He recommends that “improvement of basic education and re-orienting existing education should aim at developing knowledge and skills for citizens to jointly identify their problems and act on them in a sustainable manner” (ibid.:168). Taylor and Mulhall (2001:146), following research in four countries including Tanzania, and more recently Vandenbosch (2007:1) show positive results from their case studies of contextualisation, at school-home-community level. Vandenbosch (2007) gives examples from western Kenya and the Philippines which show how the content and the teaching-learning processes when adapted to the local environment, natural resources or agricultural surroundings improve the quality and relevance of education while “at the same time making relevant knowledge and skills available to communities” (ibid.:5-6,8) and contributing to development. Bridging the relationship between the school, the home and the community-or weakening the framing which separates school from the context of its operation-is a focus of both sets of studies which span many countries in Asia and

Africa. Both explore the constraints to effective contextualisation and here I summarise those constraints;

- rigid centralised curricula (strong classification),
- poorly trained teachers,
- learning support material deficits in schools,
- weak institutional and other support for teachers trying innovative methods and content,
- low levels of teacher reflexivity regarding own teaching practice,
- parental conception that local content may be of less value than formal 'book' knowledge and
- the heavy burden of work that teachers carry.

A small group of teacher-researchers in the Eastern Cape, South Africa, approached the curriculum-in-context question from a community cultural knowledge perspective starting with indigenous and local knowledge and making it a component of the curriculum (O'Donoghue, Lotz-Sisitka, Asafo-Adjei, Kota and Hanisi, 2007). Their experience indicates that knowledge classification, as in school curriculum subjects, and the indigenous versus scientific knowledge dialectic were broken down or of little import in these three situations where imperatives of finding ways forward in poor, risky environments bring out synergies and complementarities (ibid.) between different epistemologies.

The limited research done so far on the contextualisation process means that there is a limited understanding of it and therefore definitive recommendations about it are not yet possible. The Nyamakurukuru case study is intended to contribute to the understanding of contextualisation in practice. Education in the wetlands context and wetlands in the formal school curriculum: contextually relevant education for a sustainable future?

This is the United Nations Decade for Education for Sustainable Development (UNDESD) (UNESCO, 2006a). What might this mean to communities and educators in a remote wetland where humans have managed flooding and drought risk for at

least one millennium? What kind of education might prepare Rufiji's children to continue to handle increasing environmental and socio-economic risk while gaining a better quality of life for themselves and future generations of humans and other species? What educational means can be used to engage local and indigenous knowledge and` ways of knowing, with the formal education system and to contribute creatively and more directly and immediately to community management of risks in the local and global contexts within a neo-liberal globalised world economy? What kind of education in this locality can children use to prepare themselves for environmental citizenship in the place where they are born, rather than viewing education as a conduit to escape from rural living?

In the final section of this Chapter I discuss the current theories of environmental education which can inform educational research and may begin to answer some of these questions.

2.7.8.4 Education *for* the environment, action competence and environmental citizenship.

The expectation within Tanzania's formal education system is that behavioural change will derive from environmental education efforts: the Ministry of Education and Culture's guide for teaching environmental education considers that "…….*Elimu ya Mazingira ni nguzo kuu katika kubadili tabia*…." [Environmental Education is the main pillar for changing behaviour/habits] (URT., MoEC, 2005b:vi) and that "*Pia waweze kutumia elimu waipatayo kujenga dhana ya kubadili tabia,*…" [the education they get be used to form ideas for changing behaviour/habits] (ibid.: viii) [my translations].

Gough and Scott (2006:267) believe that the assumption that changed environmental behaviour would result from increased understanding of environmental problems is based on an underlying assumption that "environmental problems have environmental causes". It now is accepted that increasing environmental knowledge, awareness and concern does not necessarily lead to pro-environmental behaviour (Kollmuss and

Agyeman, 2002:241). Lotz-Sisitka (2004:25) concludes, “it is not necessarily that clear that a direct relationship between values and actions and behaviours exist”.

2.7.8.4.1 Education about, in and for the environment

Fien (1993) defined three approaches to environmental education; those which are *about, in/through* or *for* the environment. He surmised that education *about* the environment is focussed on transferring knowledge about natural systems and the economic and political factors that must be taken into account in decision making about uses of the environment. In this approach however, the technical and ecological are often given precedence over the human and social aspects of environmental problems, issues and solutions (ibid.:15). Fien defined education *through* (in) the environment as education through direct experience of the environment (ibid.:15-16). Here data collection activities are merged with social interaction skills through collaborative tasks and interviews with people in the environment. It is believed that this contact with the environment can stir learners’ emotions about the environment. According to Fien education *for* the environment entails “an overt agenda of values education and social change”. It is also “counter-hegemonic” (ibid.:16), that is it is questioning the *status quo* rather than taking the dominant worldviews for granted and thus supporting them by the educational system. Fien’s definition of education *for* the *environment* entails acquisition of action competence (see next paragraph) to plan and carry out some socio-political change that benefits the environment. Fien’s categorization of environmental education has been criticised by Gough and Scott (2006:269) because of, among other things, its “oversimplification of the nature and distribution of both environmental and social disadvantage”, for depicting teachers and students as “passive victims of wider economic forces” and for over- specifying in advance the decisions expected of the emancipated victims.

2.7.8.4.2 Action competence

Jensen has defined the difference between “activity” and “action” as part of and as results of environmental education, explaining that “action” involves “a conscious making up of one’s mind” (Jensen and Schnack, 1997:168). Carlsson and Bruun-

Jensen (2006:241) provide the following conditions for capacity to take environmental action: “insight and knowledge”, “commitment”, “vision”, “experience” and “social skills”. Essential to the development of “environmental citizenship” is group work, which provides the social context for nurturing of commitment. The social skills needed for action competence, according to Carlsson and Bruun-Jensen include “the ability to cooperate, self-consciousness and self-confidence” (ibid.:241). The experience mentioned by Carlsson and Bruun-Jensen as necessary for action competence and learning environmental citizenship is experience of “facilitating changes” which can be integrated into environmental pedagogy as some “concrete action” on a real environmental issue. However, the concrete action should not be considered as the sole end of the environmental education process but as an example for reflection and deliberation which builds up critical and creative skills and overall action competence (ibid.:242).

Gough and Scott’s (2006) categorization of environmental education into three types (type 1, type 2 and type 3) provide us with insights into how prescribed behaviour changes are expected from types 1 and 2 learning which are based respectively on the following “assumptions that environmental problems have environmental causes” (type 1 learning) (ibid.:268), or that “the problem of sustainability is not environmental at all but social” (type 2 learning) (ibid.:269). Environmental education based on the latter assumption leads to the “socially critical theory and the idea of an emancipatory curriculum” which Fien described (ibid.:269 on Fien, 1993), but Gough and Scott consider that a third type of environmental education which integrates learning, environment and citizenship needs to be considered if the gap between awareness and behaviour or learning and environmental citizenship is to be closed (ibid.:271). The assumptions underlying type 3 environmental education are “that for the present uncertainty is irreducible; that society and its environment coevolve, each reacting in incompletely predictable ways to changes in the other” (ibid.:283). Type 3 learning does not prescribe or agonise about which skills or capabilities should be prioritised for learners except for identifying that they need to learn to “manage, individually and collectively, a nexus of environmental and citizen behaviour in the context of problems that may have multiple, contested definitions and shifting, contingent solutions” (ibid.:275), that is learning how to make “reasoned choices”.

The heuristic suggested by Lotz-Sisitka (2007) in the discussion on educational quality and relevance is oriented towards a type of education which might enable 'cultural risk negotiation in the everyday' which appears to concur with the 'reasoned choices' agenda described by Gough and Scott (2006). This suggests the need for multi-disciplinary integrated education which takes the context as its central subject (curriculum) and relates core national curriculum requirements and assessment criteria to it rather than vice versa in an approach like that of the Eastern Cape, South Africa researchers mentioned above (O'Donoghue et al., 2007). In effect it is a proposal for weaker classification to allow contextualisation. Type 3 learning also suggests weaker framing, that is an erosion of the teacher-knows-all- and-actively-pours- it –into- the- empty-passive- student- heads model of schooling, to promote students' empowerment. Type 3 acknowledges students' prior knowledge and abilities and provides 'chinks' in its framing to allow bearers of knowledge other than formally educated teachers to contribute to and participate in the education process, thus strengthening school community relations. Such partnership in learning can accommodate exchange of knowledge between the home, community and school, nurture better respect by learners for their parents' non-schooled knowledge and better parental appreciation of their possible roles in their children's' education (Taylor and Mulhall, 2001; Vandenbosch, 2007), while simultaneously tackling locally identified socio-economic and environmental issues.

Gough and Scott (2006) come close to Carlsson and Bruun-Jensen's (2006) theories of action competence acquisition towards environmental citizenship except that the latter appear more prescriptive with regard to the learning outcomes; they expect the learners to learn *for* change, whereas Gough and Scott (2006), echo Jickling and Wals (2003:10) concerns that education should not be for any predetermined outcome because it would exclude the freedom for transformative, creative education.

UNESCO has used *about* and *for* categorizations in relation to education *for* sustainable development or ESD as it is termed during this UN decade dedicated to Education for Sustainable Development (UNESCO, 2006a:9) thus promoting a less open type of learning than Gough and Scott (2006); Jickling and Wals (2003); Carlsson and Bruun-Jensen (2006); and O'Donoghue et al. (2007) propound.

UNESCO in southern Africa has, however, started to temper this framing, by arguing that ESD can also be seen as education *as* sustainable development (UNESCO, 2006b), which involves a more open process orientation than the education *for* framing.

2.8 Concluding summary

In order to set the study in context, this chapter provided a history of education in Tanzania as a backdrop to a description of the general status of both education and environmental education nationally and in the geographical location of the study site. The study site, that is the school and the community in which the study was carried out, were profiled. A literature review, which explored in depth the theoretical concepts relevant to the research, concluded the chapter.

3 Chapter 3. Research Methodology

3.1 Introduction

This chapter describes the orientation of the research, the methodology which was chosen for approaching the research and the methods used for carrying it out. It explains why those orientations, approaches and methods were chosen. The languages of the research, the research schedule, the data produced, the methods for coding the data, the selection of the study site, the trustworthiness of the data and the ethics of the study are discussed.

3.2 Research orientation and knowledge interest

This was an interpretive study which had as its central endeavour to "to understand the subjective world of the human experience" (Cohen, Manion and Morrison 2003:22). Connole (1998) surmises that the primary emphasis of interpretive research is on understanding. She considers that the role of the researcher is to make meaning not by being detached but by being actively involved in the process of negotiated meaning (ibid.:14). Janse van Rensburg (2001:16) considers that an interpretive study is concerned with "…contextual meaning-making rather than generalised rules". The interpretive approach lends itself well to case study research which is discussed below. While not constituted as a fully fledged deconstructive study, this research is also oriented towards social deconstructionism in that it is based on a belief that the present reality of "meanings, description and representation" are derived from "social relationships, including power relations" (ibid.:19). The research tries to understand the social relationships in the context of the case, and to improve them in order to improve the quality of education. Through its interest in power relationships, the study could be described as having a critical knowledge interest, but given its strong interest in practical changes in situ, the primary knowledge interest in this study could be categorised as a "practical knowledge interest" because its underlying assumption is that if a better understanding of their situation can be reached, then people will be able to take practical actions within it (ibid.:17).

3.3 Case Study with Action Research

I chose the case study method for this research because I wanted to report about the "complex dynamic and unfolding interactions of events, human relationships and other factors in a unique instance" (Cohen et al., 2003:181). "Case study is study of a singularity conducted in depth in natural settings" (Bassey, 1999:47). This research was a study into a particular event in a real situation. It is defined as a case study with action research. What characteristics did it have to label it a case study? It gave attention to the subtlety and complexity of the case in its own right. It observed real effects in real context recognizing that context is a powerful determinant of both causes and effects (Cohen et al., 2003:181). Hitchcock and Hughes (1995:322 in Cohen, Manion and Morrison, 2003:182) give the following characteristics for case study that they suggest it is a useful method when the researcher has no control over events;

- it is concerned with rich and vivid description of events relevant to the case,
- provides a chronological narrative of events relevant to the case,
- blends a description of events with an analysis of them,
- focuses on individual actors or groups of actors and seeks to understand their perceptions of events,
- highlights specific events that are relevant to the case and
- attempts to portray the richness of the case in writing up the report

Significance rather than frequency of incidences is another feature of case studies.
As typical of case studies, this study is set in temporal, geographical, organizational institution boundaries. It contributes to the archive of descriptive material "sufficiently rich" to be interpreted in the future (Bassey, 1999:23). It was set up to be open to differing views of reality accepting that reality is to some extent a "construct of the human mind" (ibid.:43) and to record as much as possible those differing views in order to see more deeply into the way a particular group of wetland people would tackle the issue of adapting a module in a curriculum to their own context. The natural setting in this case is the sub-village and the school of Nyamakurukuru and the teachers, students, school committee and community who live there. As mentioned above, the study had an interpretive purpose, that is, it wished to describe and

interpret the phenomenon of this case so that it can be understood more deeply by the research participants and by others. This was done with the intention that theoretical insights would be gained which would inform others and might suggest possibilities without any certainty of what might happen in a similar case elsewhere. Bassey (1999) refers to such emerging theories as "fuzzy propositions" which result from "cause and effect relationships'. Such propositions acknowledge possible uncertainty and fallibility (ibid.:58). Fuzzy generalisations (see Chapter 5) can also emerge from case study research when the fuzzy propositions are extended to similar contexts elsewhere (ibid.:84).

This enquiry was carried out with the aim of understanding the effect of a change in order to consider whether change could bring improvement. I have tried to investigate without disturbing and to describe the phenomenon of contextualizing a module of curriculum as it occurred. Readers may well ask "were you not manipulating a community to adopt your ideas on environmental issues when you suggested that they make the model more appropriate to their environmental context?" My response is that, as a participant observer, I put forward the idea of making the curriculum more relevant to their context and facilitated their implementation of our co-constructed ideas on how this could be done. Then I observed, recorded, and had the participants correct and verify the records, of what they did. I also provided some contacts and suggestions for sources of information. Therefore, one could summarize as Bassey (1999:41) does that there was "mobility" between my role sometimes being an action researcher, sometimes a contributor of information and ideas (a participant-observer) from elsewhere but mainly being an observer (observer-participant).

It is also said that case studies are a "step to action" (Adelman in Bassey, 1999:23) since they take place in a world of action and so naturally offer new knowledge to it. Therefore it is true that this research was not done solely to contribute to the bank of knowledge about contextualization of curricula in the world but hopes to contribute to improving the quality of primary education by offering insights into how it can be done better by documenting a particular case of attempting it. These insights may be "directly interpreted and put to use".

The desire for change is subscribed to by the willing participants who took on this exercise in doing things differently to the usual; otherwise the case study would not have taken place! This defines the research as action research: trying out an action, reflecting on it in order to "understand, evaluate and change" (Bassey, 1999:41). Mac Donald and Walker's 1975 (in Bassey:24) definition of a case study as an "instance in action" reflects the action research element of this study. This, like many case studies, was a single site study: adapting and applying a single module of a single curriculum to a single class in a single sub-village school in Rufiji District, Tanzania.

The study was both theory-testing and theory-seeking. It was theory-testing in the sense that it drew on current academic theories about contextualization, indigenous knowledge, relevance, quality etc. (as outlined in Chapter 2) and reflected on those theories through practice (see Chapter 5). It was not theory testing in the tradition of overtly deductive studies, rather drawing on theory to inductively and abductively derive inferences (or deeper insight). Yin's concept of a case study's theory-seeking goal is an inductive process "to discover theory by directly observing a social phenomenon in the "raw" (Yin in Bassey, 1999:29). This study straddles all of Yin's (Yin in Cohen et al., 2003:183) forms of case study by being simultaneously exploratory, explanatory and descriptive. This case study explored the possibilities for adapting a set curriculum module to a particular context, it explains the effect of trying to do the adaptation (what caused what effect) and it describes the phenomenon in the setting.

3.3.1 Action Research

Cohen et al. (2003:227) write that action research can be a "powerful tool for change and improvement at the local level". I, as participant observer with the teacher staff and school management, sought to see whether a change in the content of a lesson (more use of local examples and knowledge) and the way it was taught (discovery and action based rather than inform and write down) could improve the relevance of the learning and the level of respect for indigenous knowledge. We were performing a "disciplined inquiry" (Ebutt, 1985:156 in Cohen, et al., 2003:226) in which we were

attempting to “understand, improve, and reform practice”. It fits Cohen et al.’s (2003:186) definition of action research as “a small-scale intervention in the functioning of the real world and a close examination of the effects of such an intervention” (ibid.:226-227). This was not research done **on** people but **by** particular people on their own work to help them improve what they do (Kemmis & Mc Taggart, 1988:5 in Cohen et al., 2003:227). It was collaborative; those responsible for action were involved actively in trying to change it for the better, with each of the teaching staff, the school management and the researcher being self-reflexive. Education research specialists talk about action research being an approach to “improving education by changing it and learning from the consequences of changes” (ibid.:229). This was the aim of the study: change the lessons to take in more of the local context and knowledge in a discovery fashion and observe and reflect on the consequences. I was keeping records to describe what was happening as well as recording the opinions, assessments and responses of the teaching staff and school managers.

One cycle of Lewin’s (Lewin (1946), (1948) in Cohen et al., 2003:234) four stages in action research; planning, acting, observing and reflecting, was carried out. Although reflection was occurring throughout the research, particular sessions and interviews were scheduled for reflection as a group or as individuals. This was done with the students as individuals in Interviews (Table 5, item 6) and as a group in the feedback lessons (Table 5, items 8 and 9). Teachers and the school committee members and district staff were deliberately engaged in reflective thought during focus group interviews (Table 5, items 2, 3 and 11). I have also been reflexive about the scope and the limitations of the research. I have presented the self-reflexive comments in Chapter 4, Section 4.6.

3.3.2 Sampling-Why choose Nyamakurukuru sub-village?

In Chapter 1, I mentioned some of the reasons for the choice of Nyamakurukuru school as a study area. Other reasons for the school choice were:

- The District Education Officer (DEO) directed me to this school and community as one that shows interest in progress through education.
- Despite its nearness to the district centre, this school has typical wetland

characteristics and is prone to isolation by floods and restricted motor access.

- During a preliminary visit, the enthusiasm of the teachers and community for education encouraged me to work with them.
- Being a new school with relatively recent beginnings, it is open to new ideas and willing to experiment with means of enhancing education.
- The community is concerned about illegal logging and hunting in the area and wishes its young people to appreciate the forests and their valuable products. There are rich natural assets here though it looks like a very poor disadvantaged area. This presented a challenge to choose sustainable ways to improve teaching and learning with little or no financial investment but which might provide opportunities to improve local livelihoods using natural resources.
- Participatory teaching methods such as students acting as researchers, or working in groups or inviting in local experts, as guests had not been tried.

Preliminary visits were made in August and December 2006 to negotiate access for the studies. During these visits some information for the school, students, community and teacher profiles was gathered.

3.4 Language and languages

Much of this dissertation is written in the first person as Somekh (Somekh, 1995:347 in Cohen, et al., 2003:240) argues that since I have been a participant observer-researcher I cannot detach myself from the experience and involvement by writing in anything other than the first person.

The language used is that of “everyday commonsense language of the participants” as per Elliot (1978:356 in ibid.:240) to the extent possible. At the district the staff uses Swahili and English to communicate for their work, therefore I had two common everyday languages in common with them. The teachers use Swahili as a school language and some English, but sometimes speak the local Kindengereko language to communicate informally with community members. Community members’ first

language is either Kindengereko or another Bantu language and use Swahili as a second language. Almost all of the fieldwork was carried out in the Swahili language, except where participants opted for English. One instance was where a teacher wrote the responses to his teacher profile interview in English (PT2–see Table 6, item 36; section 3.6). All the lessons and workshops which were observed were conducted in Swahili as were all meetings and informal discussions. I was sometimes recording in Swahili, sometimes in English and sometimes in a mixture of both languages. I am responsible for all translations, in the field, in the transcribed documents and in this dissertation and am aware that, although where in doubt I checked meanings with those concerned, some subtleties may have been lost in translation. Therefore, where possible and appropriate, I quote the actual Swahili data in italics (words, phrase or sentence) followed by my English translation in square brackets. The Swahili language does not have gendered pronouns, infixes or prefixes, such as those in the English language which indicate whether the person subject (she or he) or person object (her or him) is female or male. When translating sentences in which the gender of the person referred to is unspecified or unclear I have written both options, that is; s/he, her/him, her/his.

3.5 Methods

The methods used for studying this case were mixed in order to triangulate knowledge from different sources as a means of cross-verification. It was felt that the limitations of observations, such as observer misinterpretation of an observed action, would be overcome by supplementing the observation data with data from interviews that could verify the intentions behind the observed actions/behaviours. The mix of individual and group interviews was designed to ensure that those issues which were not freely discussed in group settings could be raised in individual or paired interviews. For this case study with action research the fieldwork was laid out as described in Table 5.

The data collection methods used were:

- **Focus Workshops**
- **Lesson Observation**
- **Active Research Observation**

- **Semi-structured Interviews**

Table 5 outlines where each method was applied during the study. The methods are described below the table.

Table 5. Fieldwork Layout/Timetable of the research process

	Task	Activity	My role
1	Spacing Identify school and module and negotiate access.	Discussions with Head School teacher, DEO/MEMKWA coordinator, and School committee.	Participate in, observe and document the discussions.
2	Adapt module to the local context	**Focus Workshop** Consultations with the Head School teacher, DEO/MEMKWA coordinator, and School committee. Nyamakurukuru school. District centre for some materials collection.	Participate in Observe and document (written and photographs) the process and the plan. Assist with acquisition of and making of learning support materials.
3	Prepare a series (5) of lesson plans and materials for teaching it. Teachers prepare for teaching/facilitating the lesson series and correct any problems.	**Focus Workshop** Teachers design lesson plans and make decisions about necessary materials.	Advise on participatory skills. Document the issues arising for teachers/facilitators in becoming facilitators rather than directive teachers.
4	Facilitate (teacher/facilitators) lessons 1 and 2 and set learners research assignments and group formation.	**Lesson Observation** Classroom and surrounds of Nyamakurukuru school.	Observe and record the process.
5	Learners carry out their research assignments.	**Active Research Observation** Nyamakurukuru sub-village and its environment.	Observe and record 2 groups of learners doing research.
6	Evaluate research assignments with learners and elders.	**Semi-structured Interviews** Nyamakurukuru sub-village and its environment.	Interview 2 (1 woman & 1 man) community resource persons who were consulted by the students
7	Lesson 3. Teachers facilitate students to prepare for feedback of their research results. Other students do biodiversity surveys. Students return with their research results.	**Lesson observation.** Nyamakurukuru school Teachers, students.	Observe. Ask some questions regarding presentations.
8	Lesson 4. Prepare, Present & Receive results, deliberate on them and suggest improvements.	**Lesson Observation** Nyamakurukuru school Teachers, Students.	Observe and document. Make some comments.
9	Lesson 5. Present & Receive results to the elders and the school committee and deliberate on them.	**Lesson Observation** Nyamakurukuru school Teachers, students, District participant. School committee, Elders.	Observe and document, ask questions and engage in the deliberations.
10	Interview teachers individually (3); school committee members (2).	**Semi-structured interviews.** Nyamakurukuru. School Teachers and Committee members.	Interviewer. Gather and sort & code documents for leaving and taking. Authentication of data collected.
11	Participatory evaluation of the action research process.	**Focus Workshop** Community elders and invited members, school teachers, committee.	Observer. Participant.

- **Focus Workshops**

These sessions could be referred to as large group (more than five people) semi-structured focus interviews, in that an agenda of issues was agreed but the order of dealing with them was free. The interactions between participants provided the bulk of the data recorded from these sessions. Apart from what was being said, attention was given to who was saying it, who was speaking to whom, how many people were speaking at once, the tone of the voices, the emphasis placed on particular words, issues, the interruptions, the mood of the speaker, what was not being said, and who was not speaking (Cohen et al., 2003:282).

- **Lesson Observation and Active Research/Discovery Observation**

As mentioned above, I was a participant observer for much of the study. Observation checkboxes and checklists were prepared but the observations were not confined to these (Appendix 2). There was a conscious effort to observe other unexpected/unanticipated actions and utterances which might give clues as participants were responding to changes in the teaching methods (Cohen et al., 2003:105, 310-312).

- **Semi-structured Interviews**

Interviews are a tool for gathering data through conversations between the researcher and the researched (Koul, 1984). Interviews were used to provide background information on the "players" in this action research, the teachers the students and the community members of the school committee. Such background information allowed profiles to be narrated (see Chapter 4). Eleven interviews (3 x teachers, 2 x committee members and 6 x students) were used to get the opinions of the players about education. All the interviews in this research were guided by interview schedules on which to focus the discussions (Appendix 2). However, the interviews were conducted in the order chosen naturalistically by the interviewees and opportunities were given for the interviewees to direct the discussion. This allowed for unanticipated issues to be raised and for attitudes to be expressed. Nichols (1991:37)

concedes that “it is harder to collect reliable data on people’s attitudes than on more factual matters”. He considers that “even well-designed questionnaires can only scratch the surface of what people really think” and that longer informal discussions are needed to “fill out the picture” (ibid.:37). Therefore a flexible questions’ schedule and an open-ended time allocation were given in order to permit free flow of interviewee’s points.

The interview answers were either written by the interviewees or transcribed in Swahili and verified by the interviewees. The contents used for interpretation and discussions were translated to English as necessary. Teacher names were not attached to the interview quotations but were given transcription indices; as T1, T2 and T3 to protect their identities somewhat in case they wished to provide sensitive data.

- **People and place profiling**

In order to facilitate comparison with the national status of items which support learning in the home. students were asked about learning support items available; six pupils were asked to indicate the number of possessions that were in their homes from a list of 13 possessions. These were a daily newspaper, a weekly or a monthly magazine, a radio, a TV set, a video cassette recorder (VCR), a cassette player, a telephone, a car, a motorcycle, a bicycle, piped water, electricity (mains, generator, solar), and a table to write on. Pupils were given a score of 0 for the item they indicated that they did not have, and a score of 1 for an item they had. The number of possessions in the home was summed for each pupil. The lowest score possible was zero for a pupil who did not have any of the items and the highest was 13.0 if a pupil had all the items (Mrutu et al., 2005:57).

- **Photography**

Photography was used as a supplementary method of data collection for profiling and to illustrate points made in the narrative. One group of students used a camera during their research. Photographs were also used to prepare a booklet for feedback to the community about the research project (see Appendix 4). The aims of distributing this booklet to the school, the community and the district council, were to:

- return data to sources as soon as possible,
- foster a community-wide understanding of the research,
- show appreciation for the support given to the research and
- foster pride in the local people and their environment.

3.6 Data produced

Table 6. Inventory of data produced

Data Item	What it is	Index - reference
1	Preliminary meeting with district Education Officer and staff. 24.08.06.	DEO1
2	Preliminary meeting with teachers and School Committee at Nyamakurukuru on 24.08.06.	SC1
3	Preliminary meeting with MEMKWA Coordinator at Utete District Education Office on 25.08.06.	MC 1
4	Feedback discussion with the District Education Officer (DEO) on 25.08.06.	DEO2
5	Planning visit to DEO's office. 08.12.06.	DEO3
6	Planning visit to Nyamakurukuru School with Mr.Mlay, Schools Inspector on 08.12.06.	SC2
7	Phone call to School Principal 15.01.07 Phone call to School Principal 24.01.07 Phone call to MEMKWA Coordinator, Rufiji. 24.01.07. Phone call to School Principal 29.03.07.	TelSP1. TelSP2. TelMC1. TelSP3.
8	Preliminary Observation of a MEMKWA class by T3. on 24.08.06	POMC
9	Meeting with DEO on 26.02.07	DEO 4
10	Module, epistemology and pedagogy discussion with School Principal and MEMKWA Coordinator. 26.02.07	SPMC1
11	Meeting with weather and flood record officer, District Agricultural Office with School, Principal. 26.02.07.	DASP1
12	Visit to District Environmental Resource Library with Natural resources Office secretary and School Principal. 26.02.07.	DERCSP
13	Observation of Module adaptation workshop with School committee and community members on 27.02.07.	OMAW (in OJ)
14	Informal discussion with teachers on 27.02.07	If T1-T3-1.
15	Informal discussion with teacher on 28.02.07.	If T2-1
16	Lesson Planning Workshop with teachers (to adapt module) 28.02.07.	LPW
17	Observation transcript of Lesson 1 of 01.03.07.	OL1
18	Observation Transcript of Lesson 2 on 01.03.07.	OL2
19	Observation Transcript of Lesson 3 on Saturday 03.03.07.	OL3
20	Observation of student research group 1 on Saturday 03.03.07.	OSRG1

21	Evaluation discussion with group 1 on Saturday 03.03.07.	EG1
22	Observation of student research group 2 on Sunday 04.03.07.	OSRG2
23	Evaluation discussion with group 2 on Sunday 04.03.07.	EG2
24	Observation of two groups of students' doing a biodiversity survey on 05.03.07.	OBS
25	Observation of lesson of Group Preparation of feedback results on Monday, 05.03.07.	OL4
26	Observation of lesson where groups present their research results on Tuesday 06.03.07.	OL5
26	School Yard Observation on February 27 th.	SYO
28	School Yard Observation on March 1st	SYO1
29	School Yard Observation on March 2nd	SYO2
30	Individual interview with parent and school committee member on	IPSC
32	Individual Interview with Sub-Village Chairman	ISVC
33	Profile Interview with three girl MEMKWA students on 01.03.07.	PSG Individual interviewees are indexed (SG1, SG2 and SG3).
34	Profile Interview with three boy MEMKWA students on 01.03.07.	PSB Individual interviewees are indexed (SB1, SB2 and SB3)
35	Profile Interview with the Head Teacher on 05.03.07.	PT1
36	Profile Interview with the second teacher on 05.03.07.	PT2
37	Profile Interview with the third teacher on 04.03.07.	
38	Profile Interview with the MEMKWA facilitator (teacher three).	PT3
39	Observation of Presentation by students to School Committee and Elders Wednesday 06.03.07.	OPSCE
40	Observation of Evaluation/review workshop on 06.03.07.	OEW
41	Data posted on the Teacher's office wall in Nyamakurukuru school.	TOD
42	Movie shots of school yard drill on 27.02.07 and 01.03.07.	Avi 1, Avi 2
43	Student Flipchart data presentations and copybook records.	SF& C
44	Photographs. (electronically filed)	Captioned

3.7 Methods of Analysis of the data

3.7.1 Steps in Data Analysis

In order to analyse the raw data listed in Table 6 above, I referred to the research questions and read through the data several times searching for organisational headings under which to code the data. I was guided by Bassey's (1999) stepwise illustration of how to move from research questions to empirical findings and case reports (ibid.:84-85) and also by Maxwell (1996). Maxwell describes analytical memos as notes that capture and facilitate "analytical thinking about your data, stimulating analytical insights" (ibid.:79). Through this process I was able to capture data under headings and thus reduce it into more manageable size. Thus I created four themes for analytical memos and put the data order against them. The initial four themes were;

Analytical Memo 1: Learner Participation and Responses

Analytical Memo 2: Teachers role and response

Analytical Memo 3: Community role and response

Analytical Memo 4: Use of learning support materials

Each analytical memo contained a table of three columns with three headings: Category, Issue/Comment and Source in the data. An example of one of the analytical memos is given in Appendix 3. A summary analytical memo emerged to answer how the responses under analytical memos 1-4 impacted on educational quality.

From the analytical memos I wrote the narrative of Chapter 4, "letting the data speak". I used 'thick descriptions' (Cohen et al., 2003:311), interspersed with 'vignettes' in order to provide adequate levels of raw data to illustrate important aspects. A vignette is like a mini-case study. Stenhouse (1988:52 quoted in Bassey, 1999:88) wrote that "vignette reporting has the status of a sketch compared to a fully worked picture. The selection of the subject of vignettes is an interpretive act, for a vignette crystallises some important aspect of a case". This led to the creation of

several sub-themes which arose as sub-headings in Chapter 4. On completion of Chapter 4, I re-immersed myself in the theory and background information of Chapter 2 and began to interpret the data in Chapter 4 against the conceptual frameworks of Chapter 2. In this way analytical statements emerged. Analytical statements are a means of trying to make sense of data by condensing them into "meaningful statements" (Bassey, 1999:70). One begins by forming analytical statements that answer the research questions and are based on the raw data. Therefore the analytical statements are "in accord" with the data (ibid.:70). I drafted analytical statements; checked them against the data and re-drafted them several times until they were in accord. The analytical statements gave concrete statements of what was the case, then I tried to analyse why the case was such. For example, Analytical Statement 3 states "Contextualisation allowed for indigenous knowledge to come into the classroom (and book knowledge to reach community members.)" and in Chapter 5, I give reasons based on the situation and the theoretical concepts to explain how and why contextualisation allowed for indigenous knowledges to come into the classroom "their knowledge which is local and indigenous was explicated because the pedagogy provided opportunities for it. The weakening of the framing also facilitated the weakening of the classification of the knowledge and so that merging of book knowledge, teacher knowledge, students' knowledge and several different community members' knowledge took place" (section 5.2.4). This is what Bassey (1999:71) calls "interpreting and explaining the analytical statements". Such interpretation enabled me to make fuzzy propositions and fuzzy generalizations which lead to forming recommendations in Chapter 5.

In summary the data analysis steps were;

1. Raw data were stored in case record as data items, each with a locatable reference (I called this the index).
2. Reading and re-reading the data and the research questions to find major themes led to preparation of analytical memos.
3. Writing thick descriptions and providing vignettes of the data.
4. Creative thinking about the data (Chapter 4) in relation to the context and to the theoretical framework (Chapter 2) of the study to create analytical statements.

5. Testing analytical statements against the data.
6. Writing the discussion of findings (Chapter 5).
7. Preparation of fuzzy propositions and generalisations as recommendations (Chapter 5).

3.8 Validity and trustworthiness

I have endeavoured to present a truthful account of the research story such that it is close enough to the context so "that people familiar with the context would recognise it as true, but far enough way so that it would help them to see the phenomenon in a new perspective" (Terre Blanche and Kelly, 1999:140). The statements, propositions and generalisations which I have made were established from cause and effect relationships which, Bassey (1999:58) advises, rely on internal validity. I have followed Cohen et al.'s (2003) advice on maintaining internal validity, that is, that the explanations proposed can be sustained by the data. The data is available as a case record in electronic and hard copy formats for verification. The research was underpinned by an ethic of respect for truth in order to ensure trustworthiness of the resulting data.

3.9 Ethics of the study

Bassey (1999:74) suggests that the three main aspects of research ethics which need to be taken into account are; respect for democracy, respect for truth and respect for persons. This research has considered the ethic of truth and has outlined my endeavours to make the research valid and trustworthy in section 3.8 above. This section explains how the research respected democracy and people.

3.9.1 Respect for democracy

The right to implement research carries with it responsibilities. The right to carry out particular research, especially social research in a government establishment must be with the agreement of the institutions involved and according to their rules. Therefore it was important for me to negotiate the right to research in Rufiji district and in Nyamakurukuru School. I got the District Education Officer's (DEO) permission and

support and also the support of the District Executive Director (DED) for this study through preliminary meetings and through presenting them the research proposal (DEO1. DEO2 and DEO3). The District Education Officer suggested the school and community where I should work and I then negotiated access with the school and community through meetings and using a Swahili version of the project proposal.
The community agreed that I carry out the research and also that they would participate in it (SC1 and SC2). Before the field work, in order to ensure that I would not upset the school or the community I requested advice on whether and how my presence might disrupt the village or the school. In focus group workshops I was conscious of dominators and shy participants and therefore made efforts to let the range of opinions find expression.

I acknowledge that the data belongs to the originators and thus have started to feed back the research data to the district and to the community. I have prepared a photographic booklet of the research process in Swahili and made 20 copies for the village community and the education department (Appendix 4). A summary of this thesis will be provided in Swahili to the district, the teachers, the school committee and community representatives. A full copy of the thesis will be provided to the DEO and her staff for comment. In acknowledgement of the value of the data to the education and environment sectors in Tanzania the link to thesis will be put on the website of the Tanzania Natural Resources Forum and other appropriate networks in Tanzania for access by educators, environmental educators and for peer review. A summary of the thesis will be published in a suitable journal for wider scale peer review. The thesis will be published on the Rhodes University website.

3.9.2 Respect for persons

I respected those who facilitated this research and those who took part in it as “fellow human beings, who are entitled to dignity and privacy” (Bassey, 1994:74). Permission was requested for interviews and the responses were verified with the respondents or written by themselves. Permission was also sought for photographs and photographs were returned to those photographed as soon as possible. By allowing events and situations “to speak for themselves” I withheld judgement and evaluation thus

showing respect for the participants involved. The schedules of those with whom I interacted were respected, even when it caused changes in the research schedule.

3.10 Concluding summary

In this chapter I have described the orientation of the research, the methodology which was chosen for approaching the research and the methods used for carrying it out. The logic and justifications for choosing those particular orientations, approaches and method were explained. The reasons for selecting the particular study site are given. The languages which were used during the research and the write-up are described. I have outlined the layout of the research including the schedule and the kinds of data produced. The methods for coding the data are elucidated. Finally I provide an exposition regarding the trustworthiness of the data and the ethics of the study.

4 Chapter 4. The Action Research Process: Contextualizing a MEMKWA curriculum module

The process and the results of an action research exercise are inseparable, as in a typical case study it *"blends a description of events with an analysis of them"* Hitchcock and Hughes (1995:322 in Cohen et al., 2003:182). Therefore, this chapter will mix both description of the players, the process and the results. References to data are given in brackets and follow the data indices provided in the inventory of data found in Table 6, Chapter 3.

4.1 The players-Profiles of a sample of the action researchers

In this section I have compiled data from observations (POMC, OMAW,) informal discussions, (SC1,SC2,IfT1- T3-1,IfT2-1) and interviews (OL1, OL2, OL3, IPSC,ISVC,PT1, PT2, PT3, PSG, PSB) to describe the teachers and the students at Nyamakurukuru school and the community members associated with the school. The purpose is to present the positions and perspectives of my main co-researchers in this action research process. The teacher descriptions cover their experience, own education and training, origins, experience in the area, motivation for being a teacher, attitudes to and use of various teaching methods, attitudes to formal curriculum content, attitudes to use of local resources as pedagogical and epistemological resources, attitudes to community involvement in school curriculum and pedagogical decision-making and views on the aims of education. I have combined the data regarding use of various teaching methods from both the teachers and the students into a table (Table 7, section 4.1.1) and compared the responses.

The student descriptions cover student ages, origins, home locations in relation to the school and the rivers, home language, duration of schooling to date, reasons for missing early school years, sources of learning at home, socio-economic status according to SAQMEC criteria, parental support, own attitudes to school, attitudes to teaching methods, links between home and school, sources of learning outside of school, sources of environmental education, aspirations regarding future careers, relevance of school education to their futures and opinions on how to improve school

attendance and success rates. The school committee member's and community leader's profiles include descriptions of their ages, origins, formal education levels, literacy capacity, views of home learning opportunities, attitudes to local knowledge and teaching in formal education, opinions of the quality of schooling at Nyamakurukuru, attitudes to parents involvement in curriculum content and teaching methodologies, views of how to improve access to education and relevance of local environmental education to students' future lives.

I have profiled, in section 4.2, the relationships between some of the players, by describing the interactions which this case study observed. This provides a snapshot of the level of framing, or differentiation of power positions, in place at the school.

4.1.1 Profiles of teachers

There are four teachers at the school. The only female teacher does not attend regularly and was not available throughout most of the exercise. Profiles were made of the other three teachers mainly through the data collected from them during their participation in individual semi-structured interviews (PT 1, PT2 and PT 3). The teachers are indexed T1, T2 and T3 according to their experience and seniority, that is Head Teacher, Second Teacher and Third Teacher. Two (T1 and T2) are experienced, twenty-two and twelve years respectively, trained teachers though one of these, (T2), has only recently begun teaching at Nyamakurukuru school. One is a Grade I teacher, the other Grade II, but one (T1) was recently promoted to Head Teacher[15] status to become principal of this new school. The third teacher, (T3), is a Form IV secondary school leaver who has been given a short training course to prepare him to facilitate the MEMKWA curriculum. Two of the teachers (PT1 and PT2) belong to the main local tribe, the Wandengereko while the third (T3) is an Mpogoro and a long-term resident in the sub-village.

All three enjoy the respect apportioned to teachers in the sub-village society. When asked "Do people treat teachers differently to other villagers e.g., farmers, fishers?" their replies were;

[15] The Head Teacher being also the School Principal is referred to as one or the other titles, but always indexed as T1.

- "*Na pata heshima kubwa dhidi yao*" [I get great respect from them] (PT1).
- "Higher hospitality from the villager and good respect, gift of food" (PT2).
- "*Ndiyo kwa sababu mwalimu anakuwa na uhakika wa kuishi ndiyo maana anapewa heshima*" [yes because a teacher has livelihood security s/he receives respect] (PT3).

Motivation for being a teacher differs between the three teachers. Their responses to the question "What do you like about teaching?" were as follows;

- "*Kusaidia wanafunzi ili wapate mafanikio*" [helping students so that they succeed] (PT1).
- "Teaching lesson theory and practical" (PT2).
- "*Napenda masomo ya hisibati na elimu ya viumbe hai*" [I like mathematics lessons and lessons about living things] (PT3).

One response was learner-centred, while the other two were teacher and topic centred. Teacher responses to the question "What do you like about being a teacher?" also differed. One of the teachers finds student success and effort a source of pleasure; "*na sikia raha watoto wafanyapo vema*" [I feel happy when the children do well] (PT1) while the two younger, less experienced and less qualified teachers' responses concerned their own development in life both professionally and monetarily. They mention "Free time. I want to do other activities to improve my life" (PT2) and "*Katika kuwa mwalimu napenda kujiendeleza na masomo*" [In being a teacher I wish to advance myself through studies] (PT3), as the reasons they like being teachers.

All three teachers mentioned that their own skill training is inadequate and that the quality of teachers coming into the system at present is inadequate:
"*Ili kazi za kufundisha na kujifunza ziende vema walimu wapewe kozi mbalimbali kuendana na mabadiliko ya mtaala*" [in order for teaching and learning to go well, teachers should be given various courses to coincide with changes in the curriculum] (PT1); "*uanzishaji wa shule nyingi za msingi ama sekondari uende sambamba na ubora wa walimu katika ngazi husika*" [let the establishment of lots of new primary and secondary schools be in accordance with the quality of teachers at the relevant

levels] (PT2).

When asked "what could make teachers happier in their work?" T3 replied "*Mafundisho ya mara kwa mara*" [training from time to time] (PT3). T2 mentioned "enough salary, enough teaching aids, more training" (PT2) while T1 said "*Kuwashirikisha katika maamuzi na mipango mbalimbali*" [to involve them in various decisions and plans] (PT1).

To the question "What would make the school day more enjoyable?" one teacher (T1) referred to relationships within the staff and with students, another to adequate staffing and scheduling (T2) while one, the temporary teacher (T3) who has no job security, reflected personal employment concerns;

- "*Kushirikiana vema kati ya walimu kwa walimu pamoja na wanafunzi (utulivu)*" [good cooperation between teacher and teacher together with the students (relaxed atmosphere)] (PT1).
- "Enough teachers and good timetable" (PT2).
- "*Ningefurahi kama nami ningeajiriwa kama walimu wenzangu, ningefurahi sana katika shule*" [I would be very happy if I was formally employed like my teaching colleagues, I would be very happy in school] (PT3).

Regarding use of various teaching methods teachers were asked "Do you ever try to use any of the methods below?" Students in the profiling interviews (PSG and PSB) were asked "Which of the methods do they (your teachers) use?"

In terms of attitudes to various teaching methods, all teachers believe in and claim to regularly give tests and homework. Teaching the whole class as one and tests are the most common methods the teachers say they use. Table 7 below shows the replies of the three teachers and the two student groups when asked about their use of a variety of teaching methods. Student responses are indexed according to Table 6, section 3.6 above. PSG refers to the group of three girl students interviewed and PSB refers to the group of three boy students interviewed.

Table 7. Responses regarding teaching methods used

Method	Never	Occasionally	Regularly/Usually
Teaching the whole class as a group			T1, T2, T3, PSG, PSB
Teaching in a small group	T3	T1, T2, PSB	PSG
Teaching individually	PSB	T3, T1	T3
Teaching through question and answer technique		T2	T1, T3, PSG, PSB
Giving positive feedback		T3, PSB	T1, T2, PSG
Relating to everyday life situations	PSB	T1, T2, T3	PSG
Using available local materials	PSB, PSG	T2, T3	T1
Using the outdoors	PSB, PSG	T1, T2, T3	
Doing experiments	T3, PSB, PSG	T2	T1
Using a science kit	T1, T2, T3, PSB, PSG		
Using the community knowledge	T1, T2, PSB, PSG	T3	
Puzzles		T1, T2, T3, PSB	PSG
Dramas, songs creation	PSB, PSG	T2, T3,	T1
Stories		T1, T2, T3, PSB, PSG	
Students Drawings		T1, T2, T3, PSB, PSG	
Asking students to do surveys/research	T1, T2, T3, PSG, PSB		
Making teaching materials yourself	T3, PSB	T2, PSG	T1
Giving tests			T1, T2, T3, PSG, PSB
Giving Homework		T1	T2, T3,
Other ways of teaching, mention Reading out individually			PSG, PSB
T1 =Teacher One, T2 =Teacher 2 T3=Teacher 3. PSG =Students Girls PSB = Students Boys			

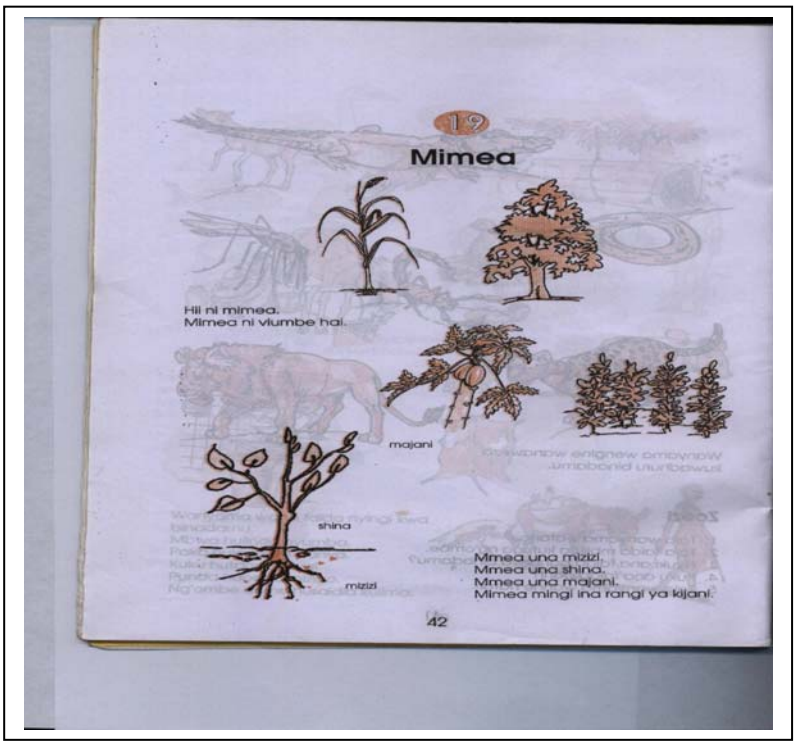
All three teachers said that they relate lessons to everyday life situations "occasionally" and some of the students said it was commonly done. One of the male students claimed that it is never done but data from observations of the lessons during the contextualisation process shows that at least two of the teachers are adept at situating the learning in the students' prior knowledge (OL1, Ol2). Lesson one began with the teacher (T1) asking the children to sing about "this season". The teacher followed this up with "Who can tell us what season this is?" and the main content of the lesson was comprised of explicating the students' prior knowledge of the seasons. Similarly teacher two spent the first half of the lesson asking the children "Where does water come from?", "Who knows a river?", "Who knows a lake?" How does water get to us?" (OL2 -T2). These questions were prepared in a very short time or perhaps even in situ by the two teachers, showing that it is not unusual for them to relate some lessons to the students' everyday life.

All interviewees agreed that the science kit (a nationally supplied equipment box for teaching science subjects in Ministry of Education run primary schools) is never used, the reason being that it had not been delivered to the school until the time of this research activity. The six students' (three girls and three boys) responses disagreed with the teachers' responses regarding their claims to use the outdoors, local materials, and drama and song creation (PSG and PSB).

Although the students denied the use of song-making as a teaching-learning methodology, I witnessed it several times during the research period (visits, SYO and SYO1 and know that at least two of the songs were created by the students themselves (OMAW). I believe that singing, if not always their own songs, is a commonly used pedagogy at the school.

Although students claimed that they are never taught individually, I witnessed individual attention being given to students whereby the teacher (T1) walked around the classroom checking each student's copybook and very quietly advised the individual on how to improve their efforts (OL1). Although the students claimed that teaching in a small group is done either occasionally (PSB) or regularly (PSG) and two of the teachers said that they use it occasionally (T1 and T2) my observations indicate unfamiliarity with this technique in the MEMKWA class (OL1, OL2). The students did not mention that homework is given (PSG and PSB). A community member did not think that homework was given often (ISVC).

The three teachers' attitudes to curriculum content largely concurred (PT1, PT2 and PT3). All three teachers feel that there are relevant and less relevant parts, in the COBET and the mainstream primary school curriculum for the students' lives. Irrelevant and confusing things include coffee growing (PT2) and drawings of red/pink coloured trees (see Photograph 5 below (PT3)). T2 said "Sometimes the curriculum is not related to the type of student in the environment e.g., coffee growing is not appropriate in Rufiji District" (PT2) while T3 said "*kuchora miti kwa rangi nyekundu haipo katika maisha ya watoto*" [drawing trees in red/pink colour is not in the lives of the children] as he pointed to a page in a Science (Sayansi) book for students of second class (PT3) (T.I.E., 1997:42).



Photograph 5. Page from a Science Book for students in Second Class showing red/pink coloured trees
(Source: T.I.E., 1997:42)

Two of the teachers think that there are resource people in the community who can teach relevant knowledge to the students. When asked the question "Do you think that there is anything /or knowledge or anyone in the locality which/who could be used in teaching any subject/module?" they cited examples of Mr. Moto, a villager, who knows a lot about floods (PT3), and of the agricultural extension officers from the district (PT2). One teacher thought that local people are not capable of teaching anything useful to schoolchildren (PT1).

All three teachers consider it appropriate to teach children about their local environment and people and gave the following reasons: "to learn something practical and real" (PT2), "*kwa sababu wanajenga uhusiano katika jamii*" (PT3) [to build a relationship with the community] and because "*si wote watakaotoka katika Mazingira yao, hivyo yatwasaidia katika maisha yao ya baadaye*" [not all the children will leave this environment, therefore such education will help in their future lives here] (PT1).
Of the three teachers, none had participated in a formal environmental education course (PT1, PT2 and PT3), one is a carpenter and has tree harvesting experience (PT3).

All three teachers think that the parents and school committee should be involved in influencing the content of the children's education for the following reasons;

- To avoid losing historical information about the area "Yes, should be involved. It is important to the children education e.g., looking about the history of their village that has (been) lost." (PT2).
- To get advice from the community to guide the teachers and higher levels of management. "*Watatoa ushauri kwa mwalimu ikiwezekana atalipeleka mbele*". [They will give advice to the teacher and if it is possible s/he will carry it forward (to higher levels of management)] (PT3).

One of the teachers had doubts about the community's capacity to reflect on curriculum issues because of their low levels of education, "*Ndiyo - lakini kuna kasoro ndogondogo*" [yes-but there are some inadequacies] (PT1).

When asked what the aim of education should be, the teachers replied individually as follows;

- "*Kupata msaada utakaoweza kumsaidia katika maisha yake ya baadaye*" [to get assistance which will help her/him in her/his future life] (PT1).
- "To enable people to survive and do other things in the environment" (PT2).
- "*Kumjenga awe na tabia nzuri pamoja na maisha mazuri hapo baadaye*" [to build her/his personality to have good habits/behaviour and a good life in the future] (PT3).

4.1.2 Profiles of students

In this school of 139 students, the majority of whom are boys, the MEMKWA/COBET class comprises eighteen girls and sixteen boys (IfT2-1). Six MEMKWA students (three girls and three boys) were interviewed at random using an interview schedule (Appendix 2). This section is written using information provided mainly through those interviews (PSG and PSB). All three girls interviewed were thirteen years of age and two of the boys were sixteen years of age while one was

fifteen years. The overall age range in the MEMKWA class is eleven to sixteen years (PSG). All were born here or came here when under three years of age except for one boy who came to live here four years ago.

All the boys and two of the girls live within three minutes of the school. One of the girls lives 30 minutes away but must cross the River Lug'onya, therefore cannot come to school during flooding or periods of fast currents in this river (SG3). At least one third of the students cross the Lug'onya or both the Lug'onya and the Rufiji rivers to come to school (IfT2-1).

Two of the boys and one of the girls are Wandengereko tribe (the most common local ethnic group), while two girls and one boy are Wangindo. Their home-spoken languages are Kindengereko (all three girls and one boy, SB3), Kingindo (1, SB1) or Kiswahili (1, SB2). Therefore, for five out of the six pupils the official school language, Kiswahili, is their second language.

Two of the girls (SG1 and SG3) and one boy (SB2) have been in school for five years while two of the boys have only 2 (SB3) -2.5 (SB1) years in schools and one of the girls (SG2) has fours years of schooling. The most common reason given for missing out on school at age seven was that, before the school was built at Nyamakurukuru, the school was too far away (11 kms at Utete). The girls all claimed to have learnt some mathematics from their mothers before going to school (PSG). Two of the boys said they knew a little maths and writing (SB1 and SB2), the other said he knew nothing of school type knowledge before attending (SB3). The girls had three, four and five of the thirteen items of home possession used in the SACMEQ[16] (Mrutu et al., 2005) national study, while all three boys had only two of the items in their homes. The average for Tanzania is 3.4 of the items (Mrutu et al, 2005). Therefore the girls' homes seemed above average while the boys' were below the national average in terms of possession of items linked to formal primary educational success.

In terms of parental formal education as a support factor in child's success in school,

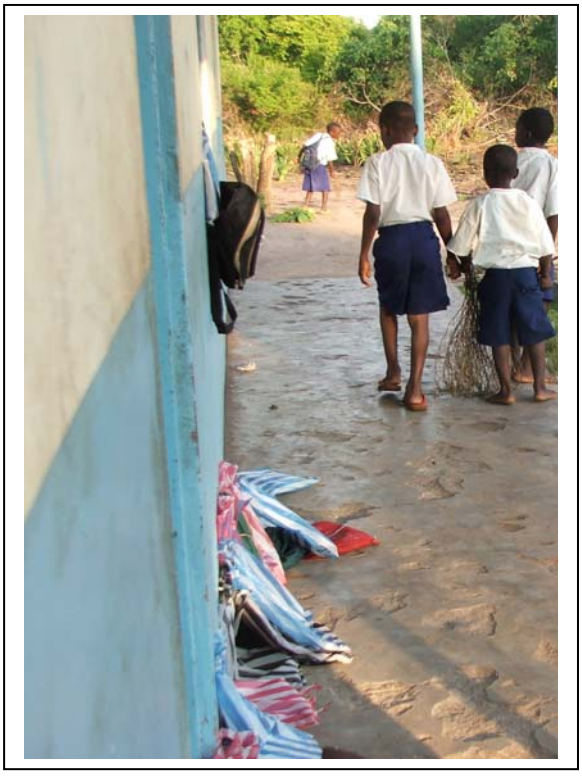
[16] Please see Question 9 in student's interview schedule in Appendix 10.2 for the full list of these items which are linked to success in formal education.

two of the girls (SG1 and SG2) and one of the boys (SB1) had both parents with Standard VII education. This would give a score of 3 if following the SACMEQ coding system (Mrutu et al., 2005). This is close to the Tanzanian national average of 3.1. The other three children had one parent who completed primary schooling putting them below the national Tanzanian average for the educational level of parents of primary school children. All six students said that their parents support their schooling. They do this in a variety of ways: help with lessons, talk to teachers regularly, help with school buildings and grounds, reduce home chores in favour of homework, provide money for school copybooks, praise and criticize their children's attainment at school. All said that they like class and games and four of the students interviewed said that there was nothing they disliked about school. Two of the boys (SB2 and SB3) said that they did not like the "*ugomvi*" [quarrelling] that goes on between students. One girl appreciated that she had got to know more people in the neighbourhood through going to school (SG2).

All six students said that they did not find school a strange place to be and that the peace and ease "*amani na utulivu*" was similar to home. Also sweeping and picking up rubbish from the yard were known from home. They all said that the teachers use examples of things in their lives to explain lessons. Examples given were the national flag (SG1), drawing hearts (SG2) and things like boxes (SG3).

Photograph 6. Some of the learners in the MEMKWA class

All students said that they had had no teaching about environmental issues from their family or community. Other community members who provide education are the choir teacher (SG1), the initiation teachers (SG3), and the Koran teachers (SG2). Two of the girls said that in school they learn nothing about the local environment whereas one girl said they learn a bit about agriculture (SG2). One of the boys said he learnt not to light fires or to cut trees (SB2). All six students said they would like to learn more about the environment and natural resources. One specifically mentioned that there were wild animals in the area whom they had not seen and they would like to be taken to see them (SB1). One girl wants to learn about preventing malaria caused by holes which accumulate water in which mosquitoes breed (SG1).



Photograph 7. School bags (the type is an indicator of cash wealth)

Photograph 8. Breakfast miwa (sugarcane)

Two of the girls want to be doctors (SG1 and SG3) and two of the boys want to be pilots (SB1 and SB2). One girl wants to be a principal teacher (SG2) and one boy wants to be a teacher (SB3). None of the girls felt that they were yet learning anything which will help them with their future careers but all three boys said that being able to read would make a difference to their future. One of the girls suggested that a canoe would help to improve school attendance (SG1) while a boy suggested that families should move to live nearer the school (SB1). More and more enthusiastic teachers (SB1) and more student effort in studying (SG1) would increase the success rate of the students.

4.1.3 Profiles of School Committee and village leadership

A school committee member, a woman, and the sub-village chairman (administrative leader), a man, were interviewed individually. The data from these interviews (IPSC and ISVC), from preliminary meetings (SC1 and SC2) and from observations during the module adaptation and evaluation workshops (OMAW and OEW) were used to create the following profiles.

Both interviewees are forty years old and the woman has lived here all here life while the man lived for twenty years elsewhere. Both have Std 7 education which is the highest level of education in the community members of the school committee, some of whom cannot read and write (OMAW). Many of the parents of this village cannot read and write (IPSC) and the sub-village chairman had been acting as facilitator to an adult literacy class which has been suspended because of lack of funds from the education department to pay the teacher's stipend (ISVC). Parents say that their children learn to be disciplined, to take care of their younger siblings and to cook and keep the house clean from their families in an informal way at home (SC2). Also, they learn about relationships during their three-day initiation teaching by the traditional initiation instructors (SC2). Small children learn counting through ball games such as "ready". "Fathers show sons how to select trees for various parts of house construction" (SC2). Adults fear that local culture and historical knowledge about wars, floods and drought is being lost (SC2).

Both the school committee member and the sub-village chairman think that the relationship between the school and the community is "good" (IPSC and ISVC): "If it was a problem we would not have succeeded in building the school" (ISVC), "parents would not send their children to school if they did not believe that the teaching is good" (IPSC). However, teachers are sometimes missing and some of the school committee members do not volunteer as much effort as others. Some parents do not send their children to school.

With regard to school teaching methods both interviewees suggested that practice and experience is better than theory for helping a student to remember. They both advised that teachers should use the outdoors, experiments, community knowledge, discovery methods, puzzles, drama, stories (especially to sustain culture) and groupwork. The school committee member said that there should be no fear involved in teaching-learning (IPSC). The relationship between the District Education Office and the village community is considered distant. Currently parents are not involved in decisions regarding the content of the lessons taught.

The sub-village leader and the school committee member think that children's access to education could be improved by parents moving their households to the school side of the river (ISVC); "parents should move this side of the river" (IPSC). Access to schooling could also be improved if parents sent their children to school. They could be motivated in this if it was emphasised that ignorance increases poverty; "tell them to send their children to school or they will get poorer" (ISVC). The interviewees think that student performance could be improved by teaching practical things, by better teachers and by supplying books, copybooks and pens. Both interviewees consider that environmental education is taught to some extent in the school e.g., children collect seedlings of fruit trees and out plant them (IPSC). They are also told not to cut down trees and some local cultural knowledge (ISVC). Local teachers include the woman interviewed who teaches choir and culture, the man interviewed who teaches literacy, initiation teachers, religion teachers and grandparents. Both interviewees feel that local environmental education is important as a school subject in order to avoid deserts and for future generations to appreciate the value of forests (ISVC and IPSC).

4.2 Player interaction-How framing plays out at Nyamakurukuru school

District education staff, education inspectors and the MEMKWA coordinator are of a higher rank than the Head/Principal Teacher of the school. When the district personnel are present they are given special respect, they sometimes give orders. The inspector gave orders about the remaining requirements for school registration; the list of furniture needed, the digging of latrines and the planting of fruit trees, and the school development plan (SC2). District staff are allowed to lead the proceedings in meetings with the school committee, the MEMKWA coordinator was allowed to chair the meeting to adapt the case study module (OMAW).

On a day-to-day basis the school is managed by the teachers led by the Head Teacher. There is a hierarchy amongst the teachers according to seniority of official position, which is decided by the higher education authorities, the District Education Office and the Ministry of Education and Culture. The teacher–teacher hierarchy is observed in daily proceedings whereby the Head Teacher, sits in the top chair in the teachers' office and leads discussions and decision making (LPW). The higher the rank, the greater opportunity to give inputs in discussions, the lower, the lesser. The third teacher, T3, said very little during the case study sessions. The pupils are lower in the hierarchy than the teachers; they seldom ask the teacher a question (OL1, OL2, OL3, OL4, and OL5), they take instruction and marching drill orders (SYO, SYO1) from the teachers. They salute the teachers from their drill lines in military style (SYO and SYO1). Students collect water and firewood for the teachers' domestic needs, and mine as a guest (SYO2). Within the pupils, the older pupils are superior to the younger ones and give them orders regarding school yard cleaning and drill positions (SYO1). Some students are designated special tasks, for example one of the MEMKWA students was the class timekeeper and supposed to tell the teacher when the time is up (OL2) and then go and beat the school gong.

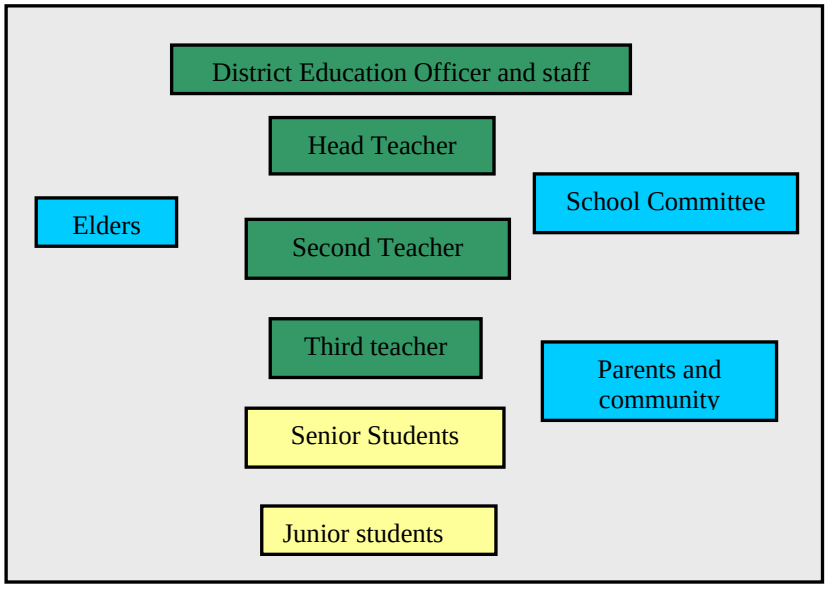


Figure 5. Diagram of the Nyamakurukuru school hierarchy.
[My interpretation] The top is the most powerful.

4.3 The Process-Planning Phase

4.3.1 Choice of Module, Description and Critical Review

The Maarifa[17] (General Knowledge) curriculum of the MEMKWA includes science, social studies, health and nutrition topics and is the main Primary School subject dealing with environmental issues (T.I.E., 2005a and 2005b). Its multidisciplinary mode represents a breaking down of the horizontal subject classification which separates the remaining epistemologies in the MEMKWA and primary school system whereby the subjects taught are History, Geography, Politics, Mathematics, Swahili, Science and English. I chose the MEMKWA General Knowledge curriculum and requested the School Principal, and the District MEMKWA coordinator to guide me (SPMC1) as to which Cohort and which year the students at Nyamakurukuru school were following (TELSP2 and TELMC1). The students are Cohort One, Year Three and we looked at the environmentally related modules within the relevant textbook. The choice between a land conservation module and a season's module was discussed between the three of us and the seasons module, Module 6, (T.I.E., 2005a:77-81) was chosen for its brevity and its flexibility for adaptation to the Nyamakurukuru/ Rufiji

[17] In 2006 the new Minister of Education, Mrs.Sitta, removed the subject Maarifa ya Jamii (General Knowledge) from the primary school curriculum.

situation. Ideas to enliven the lessons were mooted. These included rain gauge making, comparison of local seasons versus other parts of Tanzania, the water cycle, use of maps from Utete resource centre, people's activities, living things and diseases in different seasons, a class visit to Utete weather station, a project on global climate change and weather extremes (SPMC1). A visit was made by the School Principal (T1) and I to the Environmental Resource Centre at Utete (DERCSP) and the School Principal borrowed a map, an aerial photo of the school's location, and some reference books to assist the teaching. A short meeting was also held with the manager of the weather station, rainfall and water level records in the District Agricultural and Food Security Office at Utete.

The decision regarding choice of module was presented as a *fait accompli* to the school committee and the other schoolteachers at the beginning of the workshop for adaptation of the module (OMAW).

4.3.1.1 The seasons module (see Appendix 1)

The *Misimu mbalimbali* [Different Seasons] module on pages 77- 81 in the students book (T.I.E., 2005a) comes after the module on protecting our nation and before the economic status module. Within the module the sequence of the sections is as follows:

1. Know the seasons-Lesson 1.What season is this?
2. Types of seasons-Lesson 1. The dry season. Lesson 2. The wet season.
3. Each season's work-Lesson 1.The dry season's work, Lesson 2. The wet season's work.

An example of a work calendar for a cultivator in the Coast Region, which is the region in which the case study is taking place, is given (T.I.E., 2005a:81).

Each lesson is accompanied by an exercise, which consists of a series of questions for the student e.g., why is pottery done well during the dry season? What is a good sign of the wet season? The facilitator's workbook advises to get the students to read the paragraphs in the student's book and answer the questions. The facilitator's book also

advises to get the students to do research in the community about the activities of humans during the seasons a week before the lessons start "*Wiki moja kabla ya somo hili waelekeze wanafunzi kufanya utafiti kijijini kwao…*" (T.I.E., 2005b:81). Other teaching methods suggested including questions and answers, singing, group discussions, study tours making an inspection of a specific environment (ibid.:74,76,78,80,83).

In the module, only two main seasons (Wet and Dry) are acknowledged to exist, but at least four weather seasons and two flooding seasons are known in Rufiji. The short rains (*Vuli*) are treated as a part of the wet season rather than a stand-alone season of "*Vuli*." The seasons are only discussed in terms of the weather and the activities of humans during different seasons. There is no mention of the life cycles of other species and how they are affected by and /or adapted to the seasons. There is no nurturing of a sense of wonder at the changes in the seasons and the amazing ways that nature adapts to drought, floods, extreme heat or the impacts of these on the landscape.

4.3.2 Module adaptation process - workshop to adapt module

Three women and three men members of the school committee, i.e., members of the local community comprising parents and village leaders, were requested to participate in this exercise in a classroom at the school (OMAW), (Photograph 9). The District Coordinator of COBET/MEMKWA also participated in this workshop. Proceedings were opened with songs and poems from the students. The students had written the words themselves. The final song was a plea for help because of their "poor" condition. The District MEMKWA Coordinator led the facilitation.

Each pair of participants was provided with a copy of the MEMKWA Cohort One, Year three student's textbook first edition (T.I.E., 2005a). A member read out each section of the season's module and we discussed the local implications of the information given. When the whole section had been finished in this way I asked

“What is important to know about seasons in order to live in this area?” The committee members responded with several interesting facts including “if the rains begin in the east there will be no floods”, but “if there is thunder from the west in the morning in September/October floods will ensue”. A discussion about how many seasons there are took place because the book has mentioned only two seasons and locally at least four types of weather seasons are recognised. A local weather expert was named and then there was an argument about what a weather “expert” is. This was an opportunity to explain that the whole contextualisation exercise was taking place because “local knowledge” was not being recognised in the world as expertise and that it was important for the students to respect local knowledge as well as the book knowledge they would get in school.

The Head teacher asked “Is there a way to bring rain if there is a drought?” This resulted in the information that there is still a rainmaker in the area and a “rainmaking site” which is protected by a specially designated person. The Head teacher then asked, “What happens if too much rain comes?” The response was that one could not ask the gods to stop the thing they have requested but can ask that the rain not be harmful. There were specific questions about other experts on the village e.g., experts on birds, animals, fish, wild foods, floods and droughts to whom the students could pose questions. The reply was “yes” and the students would be welcomed except that it might be good to send the children with the questions one day and return the next day for the answers.

A committee member asked what gain the committee would get from all these questions. I answered that the reason was to make learning easier for the students and also to keep important local culture and knowledge alive in the face of outside knowledge being given priority in the school curriculum since colonial times.

I asked whether it was best to bring the local experts into the classroom or to send the students out to meet them. It was agreed that a mixture of both activities would give good balance. The Head teacher thanked the group and said that he had learnt about signs of rain and floods from the older men. The session closed.

The workshop participants approved the idea of contextualising the module and of engaging the students in the discovery technique of interviewing community members about the seasons.

Photograph 9. Focus group workshop with school committee to adapt module (OMAW)

4.3.3 Lesson Planning Process

A workshop was held with the three school teachers to prepare lesson plans for teaching the adapted module. This workshop is recorded as LPW in the data inventory.

The Head teacher (T1), the second (T2) and third (T3) teachers and I sat in the school office and the Head Teacher provided background to the two other teachers on the discussions which had been held at the district on the previous day. He finished by saying that we need to make a timetable for teaching the chosen module. I said that I thought that the teachers/facilitators instructions given in the COBET/MEMKWA book for the module made the theory part unnecessarily long and that ideally I would like the action research activity to cover three lessons only. I criticised the anthropocentricity of the module saying that there was no mention of species other than humans and suggested that life cycles of fishes were relevant to the students of

this wetland area. I also reminded the Head Teacher (T1) that we had had several activity/discovery type ideas during our discussions at the district on the previous day (SPMC1); for example, the use of a home-made rain gauge. The second teacher (T2) suggested "let's find out what they know already". The Head Teacher responded "We have to start with the general idea of seasons, so the children know what a season is" (T1). The Second Teacher had several questions about the content and the methodology for teaching the module: "We should get the students to look at questions like why are there elephants all over the road at some times in the year"
"Won't we have to divide up the students?"
"We have lots of learning support tools like the map and the aerial photo; let us discuss how we can use them for learning about seasons" (T2).

We looked at the map and photograph together and recognised the lake, rivers and the general location of the school. We agreed that the aerial photograph was a dry season one because it showed that the river was not in flood and the sandbanks were exposed. I drew the discussion back to the lesson plan and suggested that we begin, as instructed in the books, with a question about the meaning of seasons. The Second teacher said "Let's find out what they know already". The Head Teacher said "We have to start with a general discussion of seasons, so that the students know what a season is" (T1). I asked how we could deal with the different interpretations of seasons e.g., the mango flower season, the *mlau* [flood recession season], the fishing season, the sowing season etc.

The Head Teacher suggested that we leave these questions open and that the students will get an opportunity to list all the seasons they know. Then we can summarise them on the blackboard and make sense of them for everybody. He said we can ask them the question "How do you know what season it is? Give the signs of each season." Another question could be "Why is a particular season at a particular time of year?" There followed a discussion about the possibility of making balls to represent the earth and the sun to show the sun's movement north and south and how it affects tropical weather.

I asked whether a water cycle experiment could fit in with the lesson and showed the

teachers the instructions for this in one of the school's library books (English language) and in the REMP environmental Swahili language education manual (Doody, Ndasi, Kombe and Hogan, 2003). The second teacher took the instructions and said he could find the water bottle needed for the demonstration. He also mentioned that we have the Science Kit as a new set of teaching tools and it would be possible to use it for the seasons lessons. I said that we already have lots of ideas and would rely on the teachers who are skilled at knowing timescales for lessons to decide which ideas were most appropriate for the time available.

The Head Teacher asked "What size will we make the groups?" The third teacher suggested "Lots of small groups" from the thirty-four (eighteen girls and sixteen boys) who comprise the MEMKWA class (T3). The Second Teacher said "Give the groups looking at the seasons the job to look at all beings and not just people's activities as in the book" (T2). Six groups would be made, four to look at a season, each asking questions about all living things, people's beliefs, and all season's signs. One group to look at health patterns over all the seasons, and one group to go to the weather station in Utete and learn about weather and flooding and drought patterns in Rufiji district. The Head Teacher started to lay out the order of the lessons, saying that if we did the preliminary lessons before the weekend the students could do the interviews with the community during Saturday and Sunday and prepare and start to present their feedback on Monday. Each one of us wrote down the following schedule:

Lessons' Schedule

Day 1 -Thursday

Lesson 1. The meaning of the term "season"

Lesson 2. Water cycle. What it is, how rain is made, demonstration in a bottle.

Day 2. Friday

Lesson 3. Rainfall measurements; records and why keep them. How to make a rain gauge.

Lesson 4. Form groups and plan the questions and the people in the community whom the students might visit.

Day 3 and Day 4. (Weekend)

Students do research in the community, on their own except when being observed by Rose.

Day 5.

Lesson 1. Prepare data for presentation

Lesson 2. Present information and discuss.

It was agreed that there would be a period of presentation during which the community experts (elders/ “old people”) would be invited to participate, improve on the findings and reflect on the overall contextualisation work.

I asked whether we would give the MEMKWA books to the students. A decision, that although there were adequate students books, books would not be distributed to the students was made for the following reasons; “If we give them the books they will only copy the books and not do their own work or use their imaginations” (T1). It was also agreed that the lessons are quite different to what is provided in the book and therefore they might only get confused if they use the books.”(T2)

I asked whether the students had ever done discovery methods before. The answer was no (T1). I declared that I was a participant in this planning session but that I would be participating less and just being an observer throughout the implementation of the lessons. The Head Teacher said he would explain my role to the students. The second teacher asked the others to share the preparation and teaching tasks and they agreed to share responsibility for the lessons as follows:

Day 1. Lesson 1. Head Teacher.
Day 1. Lesson 2. Second Teacher.
Day 2. Lesson 3. Third Teacher.
Day’s 3-5. All teachers as and when available.

4.4 Action Phase of the Action research - Lessons’ Implementation

This section describes the action phase of the contextualisation process. Since the transcribed data from the observations of the lessons and student research take up twenty typed pages, I have summarised the data under five headings and used ‘thick descriptions’ rather than present the whole data set here. The headings follow the analytical memo headings given in Chapter 3, section 3.7.1; learner participation and responses, teacher role and responses, community role and response, use of learning support materials. An extra heading is added to describe the classroom setting.

4.5 The Classroom setting

The classroom in which the indoor lessons for this contextualisation process took place (Photograph 10), is a few months old, has bare walls and adequate desks for the thirty-four MEMKWA students to sit and write. There is a chair and a desk for the teacher here. There are blackboards at each end off the classroom, though only one of the blackboards, the one nearest the door, seems to be used regularly. All desks face towards that blackboard and are set in three lines with two aisles in between.

Photograph 10. The Classroom for MEMKWA classes

Girls and boys sat in separate rows; this appeared to be by choice rather than by the teacher's direction. For the group work the desks remain in position and half of the students sit backwards in their desks in order to be face to face with the other half of the group (Photograph 11). I sat at the back, silently, for the most part, taking notes and photographs.

Photograph 11. Groupwork

The lessons were conducted in the Swahili language with occasional terms given in English, for example “rain gauge”. I was translating from Swahili to English as I took notes.

The schedule was implemented in the order which had been planned but the timetable was disrupted on Friday. Some of Friday’s schedule was taught on Saturday to half the class (17 students), who did the field interview work on Saturday and Sunday. Saturday and Sunday are not normal school going days. On Monday, the remaining 17 students were engaged in biodiversity surveys adjacent to the school yard as a means for them to do some research and to have an opportunity to present data alongside their classmates. The visit to the district meteorological station had to be postponed because of the unavailability of the relevant district officer.

4.5.1 Learner participation and responses

In this section I present the data, from my observations of lessons the lessons (OL1, OL2, OL3, OL4 and OL5), the two observations of student research (OSRG1 and OSRG2), the two evaluations with the student research groups (EG1 and EG2), on how the learners/students/pupils participated and responded to the adapted module as it was taught through methods which were new to them.

4.5.1.1 Learners' responses to group work methods

Group formation by designating numbers to individuals (you are number 1, next is number 2, next is number 3, next is number 1 etc...) appears to be a new technique for the students. When T2 tried it, some of the students got confused (OL2). Within the new groups, to begin with the students were very quiet in the groups (OL1) and the teacher told them to "Talk to each other" (OL1, T1). It took some minutes for the students to start talking, but once they started their group discussion they argued so much that the teacher was worried that they would take too much time to conclude or suppress some opinions; "Don't argue, if someone thinks it is a season let it be written down"(OL1). Therefore I conclude that the students adapted to groupwork quickly. The photos of the group work show that they found it engaging and were enjoying it (Photograph 12). Some students engaged more than others in the group. Some sat within the group but did not enter the discussion, they read books instead (OL2). Students spoke more loudly and animatedly in their groups when the teacher was out of the room (OL2). I observed for the second contextualisation lesson (OL2) that; The teacher leaves the classroom. The group talking rises from whispers to quite excited talk. Students were persistent with the tasks given in the groups and continued until finished even though the teacher was pressurising them to hurry up (OL2).

Photograph 12. MEMKWA Students engaged and enjoying groupwork

The students, particularly when they were preparing to do the unsupervised group work of interviewing their elders, were conscious of group organisation. One boy asked "Is it only the group leader who will pose the questions?" (OL3[18]). Even though the teacher (T2 in OL3) advised that any group member could ask questions there tended to be a hierarchy within the groups, whereby the group leader, whether a girl or a boy, led the interview procedure and posed all of the questions to the elders (OSRG1and OSRG2). Some 'storming' occurred in group 1, when a female group member angrily challenged the male leader's monopoly of the interviews and of the school camera (ESRG1). All the students with whom I evaluated the group interviewing tasks liked doing this group work (EG1 and EG2). Further evidence of their enjoyment of groupwork was seen during lesson 4 when they were preparing their research data for presentation. During that session I observed; "The groups get busy and seem to have one designated writer while the other two or three talk and laugh. They are enjoying themselves" (OL4). I also recorded that the biodiversity survey groups returned "in lively mood" from their group survey activity (OBS) and that some members of those groups, who had finished their presentation sheets early, spent the waiting time "singing in a corner, others are chatting…" (OL4).

4.5.1.2 Learner responses to, and perceptions of, outdoor research activities

"This is their first time doing surveying" (OPSCE, T2) was the remark of the second teacher during the evaluation of the action research with the school committee and the community elders. The sub-village leader, was so impressed with the students that he took over the job of congratulating each group of students (OPSCE), deciding on a special clapping methodology for the occasion. Both the teachers and the community were impressed by the students' capacity to adopt the outside-of-classroom research methods. Mzee[19] Moto, one of the elders, was impressed with the precision of the students records; "The students wrote down just what I said. It is correct" (OPSCE). The students themselves were apprehensive of interviewing some of the elders. I observed that; "the group's chat en route indicated that they were afraid of some older people in the sub-village" (OSRG1).

[18] This was the only incident recorded in this case study where a student asked a teacher a question.
[19] Respectful title for old or senior person.

I also observed that some of the students had a pro-male bias in their choice of interviewees. For example, when I asked one student group if they would like to interview women, the response from their male leader was negative while the response of the other members of the group was positive (OSRG1). I did not find a gender bias in the work of the other groups.

The students were innovative in carrying out the research. The groups had been given general themes to research with the elders:

Group 1: People and their tasks in each season.
Group 2: Wild animals during different seasons.
Group 3: Fish and aquatic animals in different seasons.
Group 4: Birds in different seasons.
Group 5: Wild foods in different seasons.

The students were told to ask relevant questions, "You need to ask appropriate persons about the issue; for example a fisher about fishing seasons", "different groups may have different questions to ask the same person" (T1 in OL2). The students were given the freedom to decide on what questions they would pose to specific named elders. The students showed the capacity to frame questions and pose them in ways which the interviewees understood (OSRG1, OSRG2, SF&C). The five interviews I observed were conducted very ably by the students (OSRG1 and OSRG2). All but one interview flowed smoothly (OSRG2). This smoothness may be in part because the elders who were interviewed responded positively to the students and also because they gave long responses to the questions they were asked (SF&C). Also one could posit that the students allowed the adults to lead the proceedings. For example, Group 1, when called into a compound by elders whom they were not assigned to interview went in and interviewed them nonetheless (OSRG1). Conversely, this incident could be interpreted as student innovativeness, opportunism and enthusiasm to do as much and as diverse research as possible. Student creativity was undeniable when one of the groups was asked by an elder "What is in this?" (OSRG1) meaning would he and his family get any profit from this research. The student group leader responded without hesitation that "The teachers will invite you to a party at the school" (OSRG1).

All the students said that they enjoyed doing this kind of research; “We get to talk to older people who know a lot”, “It removes our shyness” (EG1). The consensus of one group was that “It should be half the time learning outdoors like this and half the time in the classroom” (EG2).

4.5.1.3 Student responses to making presentations to plenary

The students had never before made presentations from flipchart sheets in front of the class. Some of the students were daunted by the task of presenting their flipchart sheets to the plenary on the first occasion they are asked. During lesson two, I observed; “the first two students are too shy to say anything about their drawing. A third one comes forward and explains clearly the purpose of the drawing” (OL2). Following this, a fourth student comes forward and reads very shyly in a low voice. (OL2). The teacher dismissed her “Go back to your seat.” The fifth student, a boy, came forward when summoned by the teacher but “says nothing”. The sixth (a boy) and seventh (a girl) students successfully completed the presentation of their groups’ posters despite three or more interruptions by the teacher (OL2).

On the next occasion when the students are asked to present their findings (four days later) to the same teacher, the students, although tired, showed more confidence in giving their presentations (OL5). All seven groups presented their findings audibly-except one who was prompted to speak more loudly, and subsequently did so-and were praised by the teacher who led clapping for them. On the third occasion when the students were required to present their group findings, this time to the elders and the school committee, as well as the three teachers, there was no hesitation on their part (OPSCE). They were not given any directions to speak more loudly or improve their presentation methods. Attention was focussed on the content of their presentations -including fishing methods, lakes in the locality, reasons for wild animal deaths, stresses on birds in the dry season, forest loss, fish survival and regeneration, mushroom availability and habitats-rather than the presentation skills of the presenters (OPSCE).

The students received praise from the teachers, the committee members and elders

for their presentations. I conclude that they presented clearly and understandably enough for the audience to understand them even to the extent that the audience were provided with enough information to engage on content issues. Their public presentation skills and confidence had improved.

4.5.1.4 Students' perceptions of sources of knowledge

Students respect the teachers'/classroom /book knowledge and that of the elders. When asked the dualistic question "Who knows more, old people or teachers?" some of the students choose old people, others the teachers. As seen in section 4.5.1.2, students think that old people know a lot: "We get to talk to older people who know a lot" (EG1). They think that the information gathered by doing research in the community is useful; " If you get lost in the bush and you see a fruit that the Mzee mentioned then you can eat it and survive" (EG2). The students also think that teachers know a lot; when asked "Is this learning better than in the class with the teacher?" One girl replied "No, because the teacher teaches us a lot". (EG2). The students' perceptions of school as a source of knowledge relevant to their lives and future careers are given in the student profiles (section 4.1.2). Students' perceptions of school as a source of environmental knowledge are also given in the same section above.

4.5.1.5 Students' attitudes to the environment

I did not research directly the students' attitudes to the environment therefore can present very brief data. Empathy with other species was shown by three out of the five groups who did research with the elders. One expressed sensitivity to the birds' plight in the dry season (OL5), another to the fish and another to the wild animals who die during droughts (OL5). When asked to sing about the seasons a girl lead the class to sing about flowers showing a sense of appreciation of the beauty of nature. (OL1) "Nice flowers and give pleasure."

4.5.2 Teacher role and responses

In this section I present the data, from my observations of the contextualised lessons (OL1, OL2, OL3, OL4 and OL5) on how the teachers responded to their changed roles as they applied teaching methods which they had not commonly used previously.

4.5.2.1 Teachers' response to contextualisation of the pedagogy

From the outset, the teachers showed their willingness to try teaching methods appropriate to the contextualisation process and they planned those methods into the proposed lessons. This enthusiasm is seen the data, presented in sections 4.3.2 and 4.3.3, which depicts teacher commitment during the module adaptation and lesson planning tasks of the contextualisation process. One teacher voiced his approval of collaborative learner-centred methods when he told his students "The beginning is hard. It is good to learn in groups because you get a chance to discuss and exchange; better than learning alone" (OL2-T2). All three teachers used learner-centred approaches. These were, situating the learning in the students' prior knowledge, assigning and facilitating group tasks, planning learner presentations in front of the whole class and the teacher, facilitating student research. Other seldom-used methods, which the teachers used during this contextualisation process, were students' drawings, use of the outdoors, use of demonstration//experiments and use of local knowledge.

4.5.2.1.1 Situating the learning in the students' prior knowledge

As mentioned in section 4.1.1, Teacher Profiles, at least two of the teachers demonstrated familiarity and skill at giving students opportunities to mention some aspects of the lesson content with which they are familiar, by asking them questions relevant to the topic. For example, in Lesson One about the seasons, the question "Who can tell what season this is?" is followed by seven further questions and a group assignment to name all the seasons (OL1- T1). Likewise, in the second lesson which is about the water cycle eleven questions are used at the beginning of the lesson to explicate the students' prior knowledge (OL2-T2).

4.5.2.1.2 Group task setting and facilitation

All three teachers became involved in assigning and supervising group tasks.
The teachers put considerable effort into forming the groups, especially in forming the groups for the research tasks with the elders in community. On this occasion the three teachers were involved, Head Teacher leading, in choosing capable students to be leaders of the groups (OL2). Gender appeared not to be issue as many girls as boys were chosen for leadership roles. Two different group formation methods were used for classroom work on the other occasions; one teacher just formed groups by putting those sitting near each other together (OL1) another used a numbering system (OL2). Some students confused the numbering system and this frustrated the teacher. My record reads; "one boy gets mixed up and is admonished very crossly" (OL2).

Instructions were given to students about choosing group leaders and finding a good writer. The teacher noticed the students' unfamiliarity with group work and realised they needed to be given permission to "talk to each other" (OL1-T1). The teachers' response was to walk around the classroom to visit each group (OL1 and OL2) in turn and advise them to brainstorm rather than discuss until consensus was reached, "Don't argue. If someone thinks it is a season let it be written down". He was giving an opportunity for many views to emerge from the group tasks (OL1-T1). Perhaps he was also fostering harmony within the groups. A similar situation occurred in lesson two with T2 where (See next box);

T2 says: "Are you ready?" Student responds "Not yet." Teacher advises "Don't argue, discuss by the strength of your argument, not by the strength of your voice…" (OL2)

The teacher's concerns may have been the maintenance of group harmony and getting the work done on time.

In all cases, there is a tension about the time spent in group work; both the total amount of time spent and the difference in time taken by different groups. The teachers responded by congratulating the groups who finished quickly (OL1) and chivvying the other students to hurry, "Are you ready? No? What is delaying you?"

(OL1-T1). “You are all talking. That is why you have not succeeded until now!” (OL2 - T2). This teacher response suggests that the teacher was uncomfortable with the students talking to each other and not convinced that all the students’ discussion was leading to fruitful outputs. I recorded, at one point during lesson 2; “The teacher gets up with his cane in his hand and gives a threatening look” (OL2). When I ask this teacher (T2) “They are not used to groups?” his response was; “I don’t know, I am only working here a few weeks, but they seem to be messing and arguing a lot in groups. The government has been emphasising group and participatory ways of learning to increase the amount of learning/things remembered”(T2). When I asked, during the participatory review of the contextualisation process with the school committee, teachers and elders (OEW), “Has anyone among you got participatory skills?”, teacher (T2) responded “I got a one-week course, so group work is easy. But it depends on what kind of children. The ministry of education wants us to do Elimu Shirikishi, participatory education”. The Head teacher responded “We need more training in these skills, formal training. This is completely strange to the committee. Participatory education *iko mbioni* [is coming in fast].” In the individual interview with the second teacher (T2) he wrote, “Participatory method is good to be used but in a class of few pupils” (PT2). Therefore, I conclude that the teachers are committed to implementing the methodology but do not find it easy and wish to have training to do it.

4.5.2.1.3 Facilitating learner presentations to plenaries

The main teacher involved with facilitating students to present to plenaries was the second teacher (T2). He was involved with all the cases of student presentations (OL2, OL5 and OPSCE). The first occasion on which students are asked to present their work in front of the class and the teacher is in Lesson 2 (OL2) of the contextualisation process (Photograph 13). The teacher invited them to come forward as in the following vignette.

Teacher: “Now we’ll all look at the blackboard and go back over everything we did. I asked your groups to explain using a drawing, how rain comes. Which group will start, group three? Group two?” (*T2 is waving his cane as if counting)* “Two people come up and hold the drawing and another can have the stick as a pointer.”

The first two students are too shy to say anything about their drawing. A third one comes forward and explains clearly the purpose of the drawing.

Teacher: "Can anyone repeat what was said by group two?"
Teacher: "Can you read out the groups answer?"

A girl comes forward and reads very shyly in a low voice.

Teacher: "Go and sit down. Where is Ali? Come forward. *Taja* [mention] just means list out."

Ali comes forward but says nothing.

Teacher: "Go back to your seat. Group1?"

A boy comes forward and reads but is interrupted three times by the teacher.

Teacher: "List the things needed for rain."
Boy: "Sun, vapour."
Teacher: "What did they forget in their drawing?"
Girl: "Clouds."
Boy: "Water."
Teacher: "Water is the rain."
Teacher: "Third group."

A girl comes up to the blackboard and is reading from her group's poster. She gets interrupted several times by the teacher.

Teacher: "Say the four things needed for rain…wind is missing."
Student: "Water is needed."
Teacher to the whole room crossly: "Don't think this is just a joke. Some of you are serious and will get to secondary school."
Teacher: "The beginning is hard. It is good to learn in groups because you get a chance to discuss and exchange; better than learning alone. Did the head teacher tell you that you would have special tasks to do tomorrow?"
Break time

This vignette of the proceedings in the classroom shows that the students were finding it difficult to speak at all or to speak loudly enough to be heard when they went to the front of the class. The teacher was encouraging at first, but later dismissed those who didn't speak or who spoke too quietly; "Go and sit down.", "Go back to your seat." (OL2). Subsequently when the students were speaking loudly enough the teacher interrupted them three or more times during their presentations.

The next presentations that students were invited to do occurred four days later; after they have been researching with the elders in the community (OL5). The same teacher (T2) facilitated the session which flowed as follows:

T2: "Now two groups will present before lunch break. Welcome one group to present your findings. Where's the problem?"

John of Group 1 presents their findings.

T2: “Rose do you want to say something?”
Rose: “Just praise for a job well done. This group had a camera. Perhaps they can tell us what photographs they took?”
John: “Photos of our own group, and photos of the people we interviewed, and a cultivated field.”
T2: “Let’s praise them.”

Everyone claps

T2: “Receive the praise.”

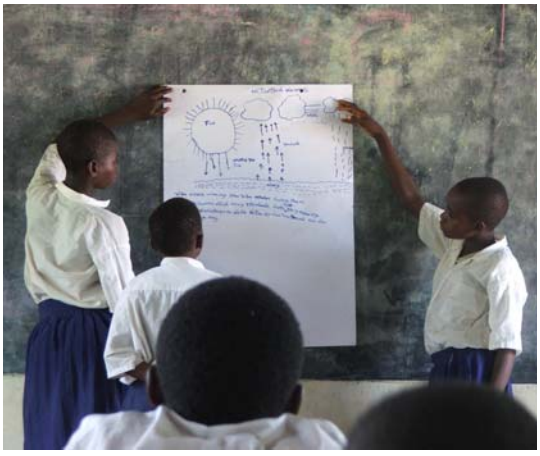
John bows.

T2: “Next group. Hurry up, you just want to waste time.”

Zawadi comes forward from Group 5 and starts to present. T2 interrupts her to ask her to speak more loudly. She finished her presentation.

T2: “There are plants that grow by the river and give us food. Today I am learning this information. Can anyone add more names of wild foods?”
Students mention: *ukwaju, mbigicho, masaidia*.[wild fruit names]
T2: “Honey.”

Students add other names that are subsequently written in on the flipchart sheet.



Photograph 13. Student's first presentation

Photograph 14. Students' presentation four days later

On this second occasion (Photograph 14), the teacher praised the groups formally. The teacher also acknowledged that he was learning from the information which the students had presented; “There are plants that grow by the river and give us food. Today I am learning this information.” This was another way in which he affirmed the students’ work. He interrupted the presenters less than on the first occasion. On the third occasion that the students presented to a plenary, they presented to the school committee, village elders and the four teachers (OPSCE). The teachers affirmed the students firstly by using their drawings and data feedback sheets to decorate the bare walls of the classroom. Seven groups were facilitated to make presentations and they were not interrupted by the teachers during their presentations.

After the students had presented the teachers sometimes repeated some of their findings (T2 after Group One, OPSCE) but usually asked the audience to make corrections or opened discussions about the content of the presentations. Each group was praised, and the second teacher was the first to solicit praise for the students, “This was their first time surveying” (OPSCE-T2). This teacher also remarked about the students, during the participatory review of the contextualisation process, that “they are better at explaining things and at representing themselves” (OEW-T2). I conclude that the teachers responded adventurously and positively to facilitating students to present to plenaries, but that they experienced frustrations with student shyness at the beginning. Teacher confidence in the students’ capacity later increased to the point that they allowed and supported them to present to the school committee and the village elders. The teachers never admonished the students in front of this outside audience, only praised them and solicited further praise from the audience.

4.5.2.1.4 Facilitating student research

The teachers were willing to try out student discovery methods and scheduled student research into the contextualisation process. They assisted the students to decide which elders to interview about what subjects, they helped the students to form research teams and they equipped them with copybooks and pens to write down the information supplied by the elders (OL3). Most of the interviewees listed by the teachers were men, therefore, I asked, “Wouldn’t women know some specific

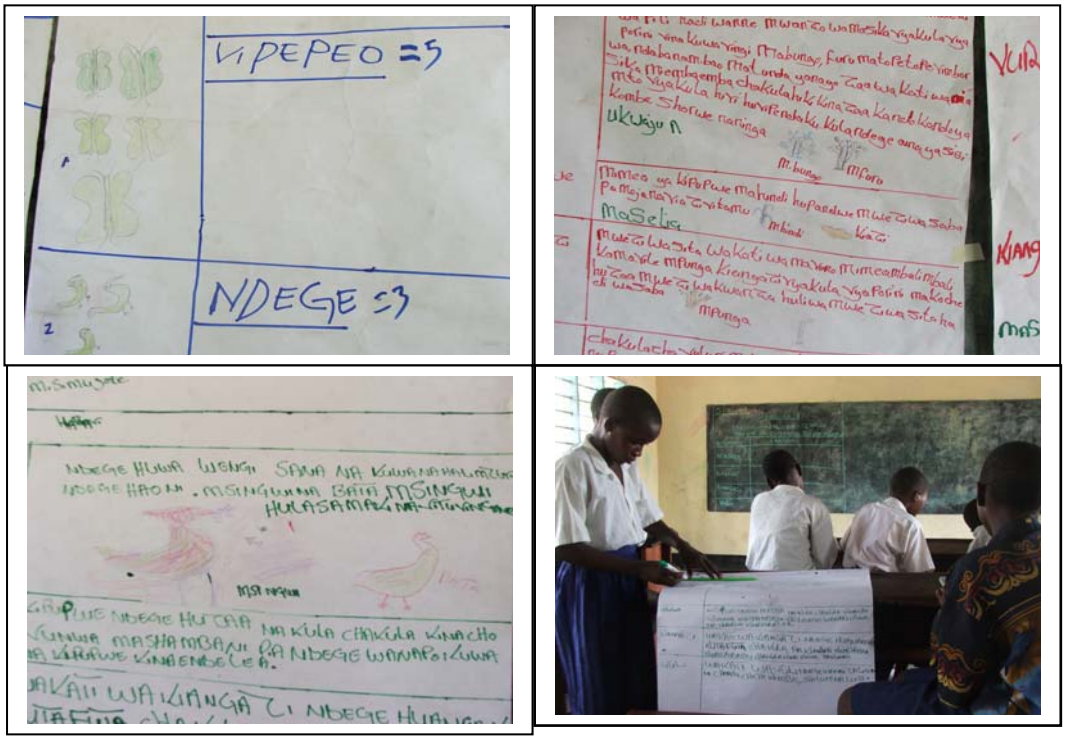
things?" T2 agreed that women should also be interviewed. The teachers wanted to accompany the groups on their research assignments; I asked them to let the students go alone as teacher presence could inhibit the students (OL3). One of the teachers (T3) accompanied some groups. The teachers were fearful that the children might not come home safely; "We worried whether the children would come back safely" (OEW-T2).

The biodiversity surveys were a last minute suggestion, by me, to fill the gap when some of the students had missed out on the community interviewing assignments. The teachers were enthusiastic about trying out the idea and immediately read the instruction given in the Environmental Education manual which I had brought (Doody et al., 2003:35-37). T2 took the students outside and gave them their instructions. When the students results were not complete (OL5) the teachers asked them to repeat the survey. This demonstrated the teachers' commitment to having the research done properly and getting good results from it. The teachers linked the results of the survey to the negative changes they themselves effected to the biodiversity in the school yard. The Head Teacher saw the purpose of the students' biodiversity survey was "to prove that when you remove trees you remove the opportunity for lots of other things to live." The teachers felt that the research activities stimulated more curiosity and creativity in the students. T2 said "The students got more creative….They became more inquisitive" and "*Tulipata moyo* [We got encouragement] that our students are able to do lots of things that we don't expect" (OEW).

The Head teacher responded to the question "Do you notice any difference in teacher-learner interaction?" thus; "Yes. We let them get much closer to us; instead of feeding them we let them ask us questions." He also thinks that the contextualisation process "gave us light (*mwanga*) and "made science ideas seem easier to carry out in practice" and that "The students showed increased enthusiasm." But the teachers feel that they "need more experience of research. We should also tell the old people in advance what the students are going to them for. Research takes time, materials and education" (OEW-T2). The Head Teacher also felt that, "It needs more thought… also we went outside our plan and changed our timetable." At least one session of student outdoor research was facilitated after the end of the contextualisation process (Tel SP3).

4.5.2.1.5 Facilitating students' drawings

The teachers were open to student drawing but free hand drawing was not a culture in the classroom. I had supplied flipchart paper and colour pencils and in Lesson Two the groups were asked to copy the drawing the teacher had done on the blackboard. (OL2). They succeeded in this task such that the teacher did not remark on their drawing skills, but concentrated on what was missing as compared to his own blackboard drawing; "What did they forget in their drawing?" (OL2). When facilitating the students to make a flipchart presentation of their community research, teacher three (T3) did not specifically mention drawings until I asked if they had returned with drawings or artefacts. T3 then prescribed, "You must do a drawing of each season" and gave two colour pencils and flipchart paper to each group. He had also prescribed a grid/matrix format for each group's page and he began to direct the students in more detail about what to do on their pages. I, being concerned that too many instructions would cramp creativity, advised "If you tell them to put everything in boxes they will not use their imaginations." The resulting student presentations were a mixture of words and drawings, some following a matrix format, some not (Photograph 15).



Photograph 15. Students' research results presented on flipchart sheets

4.5.2.1.6 Use of the outdoors

The teachers were willing to use the outdoors for the contextualisation process. They took the students out during Lesson one (OL1) to see signs of the season in the sky and in the vegetation, during Lesson 3 to erect the rain gauge (OL3) and during the biodiversity survey (OBS).

4.5.2.2 Teachers perceptions of student and community responses

"It all went well and the students will present their research in a moment", the Head Teacher said as he opened the session where students would present their results to the school committee and the elders (OPSCE-T1). He was acknowledging that the contextualisation process was a success and that the students, and indirectly the teachers, had something to show for this success. As previously mentioned, Teacher Two (T2) was impressed with the students' efforts; "the youth are able to do lots of things that we don't expect" (OEW-T2).

The Head Teacher was appreciative of the community's response to this contextualisation process; "I wish to thank these who helped the students with their answers. I beg that you go ahead helping like this in order to contribute to their education. Education is not just inside the school. Your contributions show that parents and teachers are together in this effort. I hope that this cooperation will continue during other times when we will just be ourselves without Rose" (OPSCE – T1).

The Head Teacher repeated his desire to see the community taking more responsibility for the content of the children's education; "Let us maintain this state where we were not just dependent on the school to teach the children. Let us get rid of the "go ask your teacher" attitude and all play a part in educating our children" (OEW-T1).

4.5.2.3 Teacher perceptions and use of various knowledge sources

4.5.2.3.1 Students' knowledge

During this contextualisation process the teachers allowed the students knowledge to come into the lessons by asking a series of question at the beginning of the classes on seasons and on the water cycle (OL1 and OL2). It is not possible to comment on the value the teachers' place on the students' knowledge except to mention that when the students were presenting their findings to the teachers, school committee and elders it was not seen as the students' knowledge but the elders knowledge. In that session, the students were not asked any questions regarding their presentations (OPSCE).

One incident of standardisation of knowledge occurred; when the students mentioned *mlao*[20] [flood recession agriculture] as a season the teacher deleted it from the list of seasons because, "A season is a period in the year when similar weather occurs." In this case, weather was the only criterion used for designating seasons, whereas Tanzanian rural people consider agricultural activities and crop cycles as criteria for naming seasons (e.g., "the season of the mango flowers", "the rice sowing season" etc...) (OL1-T1). The teacher said, "I am wiping out *mlao* [flood recession agriculture] because it is a period of agriculture at the beginning of the dry season. So there are four main seasons here." (OL1-T1).The uniqueness of this agricultural season to the Rufiji floodplain agricultural system was not valued by the teacher.

4.5.2.3.2 Elders' knowledge

The teachers acknowledged the elders' knowledge, indirectly through the students (OL5 –T2) and directly during the module adaptation session (OMAW) and the presentation session (OPSCE) when they asked them questions and engaged in discussions with the elders about the seasons, forests, fishing, wild foods and the socio-political-economic issues around them; "How many seasons are there, only two?"(OMAW-T1), "Is there any way to bring rain if there is a drought?"(OMAW-T1), "Isn't there some new fishing technology?" (OPSCE-T1), "What about bird diseases, like Newcastle disease that kills chickens? When does that happen?" (OPSCE-T2). The vignette in the box below shows the head teacher's respect and value for Mrs. Mkumbenda's knowledge about mushrooms.

[20] Also spelt *mlau*

Head Teacher: "You mentioned that mushrooms are available in the wet season. Are they really here? I seldom see them."

Mama Mkumbenda, an elder, explained that mushrooms occur only in special places like under mtondo or *mpandapanda trees*.

Head teacher: "So since the loggers are removing most of these trees we will have no mushrooms left?"
Mama Mkumbenda: "There are three main types of mushrooms 1. *Ligululwa* 2. *Lipoa* (white, big and flat) and 3. *Utembo* (easy to dry). You boil them a bit and then dry them." **Woman member of the school committee**: "And do mushrooms have seeds?"

I explained about the spores and how to see them when the mushroom is ripe.

Head teacher: "Why don't we see them in the markets? I know a man who grows them and sells them in Dar es Salaam for a high price, why can't we make money from them?"
Mzee Mtambo: "We need to find markets for them".

4.5.2.3.3 'Book" Knowledge

The teachers readily used new resources found in the books which I had brought, for example, the water cycle in a bottle from a Swahili language manual on environmental education (Doody et al., 2003).

When I arranged for the Head teacher to visit the District Environmental Resource Library he was interested in the books, reports and particularly the items containing information on Rufiji there. He chose a map and an aerial photograph showing the location of the sub-village of Nyamakurukuru to borrow for teaching purposes. The resource centre is not open regularly and although it is managed by the district education department, there is no staff member in attendance and there seems to be confusion between the education and natural resources departments as to who should provide the resource library service to visiting teachers and students (DERCSP).

The Head Teacher also wanted to use the Utete meteorological station and the District Officer in charge of it as resources to teach the students about weather, floods and rainfall. Unfortunately use of the latter's knowledge was not possible during the contextualisation process, because of his busy work schedule. However, the head teacher still intends to take students to the meteorological station (TelSP3).

Access to resource books and to district technical personnel is difficult because of

physical access problems. District cars seldom come here; therefore resources can lie at the district centre 11 kms. away for months because of lack of transport. Two gunny sacks full of children's' books which had been donated to the school by a UK charity had lain at the Head teacher's house in Utete for several months until my vehicle was available to transport them (on 27.02.07). Perhaps access to resources is also limited by the fact that the school, which began as a voluntary school, has yet to be officially registered by the Ministry of Education (SC2, PT1). "*Shule ziwezeshwe katika mahitaji yake* [Let schools be provided with their needs]" (PT1). Financial support for books, shelving and for maintaining a school library is limiting (ISVC, PT1). Reference books for scientific identification of local plants, animals, birds, fishes, reptiles and amphibians, insects and other species are unavailable at this school (and most schools in Rufiji District and other parts of Tanzania) except for one on birds. For this process we used books which I lent (Kingdon, 1997; Spawls, Howell, Drewes and Ashe, 2002; Stevenson and Fanshawe, 2002; Coates Palgrave, 1983). Such books are very expensive (30-50 Euros each) and the text books for primary school available to the teachers generally show only generic descriptions of species, no scientific names and giving little sense of the worldwide importance of Tanzania as a place of high diversity of native species (T.I.E., 1997, 2005a). There is little opportunity for schools and their communities to make accurate inventories of the species occurring in their lands.

4.5.2.4 Teachers' knowledge of the environment and attitudes to teaching about it

I have not gathered data directly on this issue but the teachers acknowledge that they "need more education about the environment. We all agree that it is wide and that we need deeper knowledge." The Head Teacher also said that "We have never done this… you made science ideas seem easier to carry out in practice" (OEW-T1). This statement suggests that there is a gap between teachers' knowledge regarding the environment and their confidence and capacity to apply that knowledge in their teaching practice. As previously mentioned the teachers acknowledged that they learnt more about the environment during this process. Throughout the

contextualisation process all the teachers showed enthusiasm to teach and learn about the environment (OMAW, LPW, OL1, OL2, OL3, OL4, and OL5). The Head teacher felt that the local environmental knowledge taught during the contextualisation process was relevant to the students lives; “Even when they finish Standard Seven they will be here in this environment so all the things they learnt this week are relevant to their lives. If we don’t teach them those things we will lose them. We want them to be independent people, anything else is extra” (OEW-T1).

4.5.3 Community role and responses

From the outset the community, represented by the sub-village leader and members of the school committee welcomed the contextualisation process (SC1, SC2, and OMAW). This was to be expected because of the District Education Officer’s remark during a preliminary visit to select a school for the case study during August 2006 “People are enthusiastic…. It is their enthusiasm that has changed a satellite[21] school into a full school up to standard IV” (DEO2). I had witnessed their commitment to education for their children when I witnessed their school building work (Photograph 16) on that date and up to the time of the action research activity in late Feb/ early March 2007. On each of the four occasions when the school committee was asked to be involved either six or seven of the seven villager members (two women and five men) of school committee participated (SC1, SC2, OMAW and OEW). The six elders who were invited came willingly and participated actively in the discussions (OMAW and OEW). On two occasions during the process a community member asked what they might gain from this process; “You are asking us lots of questions, what we will gain from this?” (OMAW), “What is in this (for me and my family)?” (OSRG1). The elders, when asked, after the students had interviewed them, whether students’ interviewing old people is a good idea they agreed that it was. Mzee Mpalandabo replied “Yes, the kids are learning” (OSRG2). Mama Nyamkima also thought that it was good (OSRG2) and similar responses came from the other elders interviewed (OSRG1).When asked if it is a nuisance, all replied that it was not.

[21] A temporary outreach branch of a school.

Photograph 16. School committee members and other community members building the teachers' house

Some community members showed that they valued the contextualisation idea as an important contribution the children's education; "The children are learning about their environment in their environment" (OEW-Mzee Mtambo), "It is important that we protect our environment so that we get rain and animals. All these important things will disappear" (OEW-Mama Mbande). "The children need to know the difference between forests and open areas" (OEW- School Committee member). When asked, "Will it help their lives?" (To get knowledge from the elders about the locality) answers were affirmative; "They will know these things", "We and the children learnt lots".

The school committee felt that the students were more interested in their schooling during the contextualisation process; "We agree that they were very enthusiastic" (OEW-School Committee members).

When asked if the contextualisation process had had any impact on the relationship between the school and the school management committee the sub-village leader replied "That has improved because this activity showed us that we have a role to play in the education itself" Sub-village leader (OEW).

4.5.4 Use of learning and teaching support materials (LTSM)

During the contextualisation process the teachers showed enthusiasm to try making their own learning and teaching support materials (LTSM); “We have lots of learning support tools like the map and the aerial photo; let us discuss how we can use them for learning about seasons”(LPW-T2). The lesson planning process described in section 4.3.3 demonstrates their enthusiasm.

As part of the water cycle lesson the teacher followed memorised instructions from a manual and made a ‘water cycle in a bottle’ experiment demonstration using a PET bottle (OL2-T2). The demonstration was prepared in front of the MEMKWA class in which two of the students followed the teachers instructions (OL2-T2) regarding procurement of the ingredients–sand , water, a leaf, a stone–and putting them in the bottle (Photograph 17).

Photograph 17. Making a water cycle demonstration in a bottle

A home made rain gauge was made by teacher three in cooperation with teacher two. They used a PET bottle and made a special tripod stand for the rain gauge using bush poles tied with natural fronds (Photograph 18). The cylinder from the science kit was demonstrated as an appropriate vessel to measure the rainfall trapped in the rain gauge (OL3). The water cycle bottle and the rain gauge continued to be used after the contextualisation research was completed (TelSP3).

Photograph 18. Homemade rain gauge on stand

4.6 Own reflections on own role in the process

4.6.1 Action Research, Participatory Action Research or somewhere in between?

I was the instigator of this research activity and lead its design. I was a leading participant in deciding on the site, the participants and the strategic planning throughout. I also funded the activity. Therefore I was in a position of higher power in comparison to some other participants especially in the planning of the initial stages of the process. I may have been prevented from learning by my dominant position of power over the whole exercise (Chambers, 1997:75). I therefore cannot define this as a fully participatory action research process because it was not instigated by a community of practise on its own initiative.

4.6.2 My social identity and biases

This study was "open to different views of reality" but since I am the one who wrote this document it is a subjective exercise in which my reality/ies are the predominant ones. I interpreted the results using theories which I chose, because they resonated with my own knowledge and opinions, from outside in a language different from the language used in the case study. Those theories have come from highly academically educated people who are predominantly male and who are limited by their

professional biases. The topics I chose to explore, the questions which I asked the framework within which I worked, how I interpreted the data what I counted as important data are all affected by my personal biases and prior experience. Bassey (1999:90) believes that researchers should reveal their "social identity". Here follows a brief biographical history and a statement of the relevant beliefs and biases which I hold.

I am a rural Irish woman who received her basic education in a small (Approximately 100 pupils total, 3 teachers, 3 classrooms) ill-equipped rural school in the 1960's in Ireland. It was a highly framed schooling system, with an authoritative pedagogy which included the use of corporal punishment for failure to regurgitate academic facts. I have a first degree in Agricultural Science and a Master's degree in Crop Science. A working life in environment and rural development, mostly in rural Tanzania, has led me to studying environmental education to better understand how people learn. My interesting life experiences have resulted in my current beliefs that;

- Children should be educated in fun and discovery rather than fear and fact.
- Practical active learning is conducive to producing capable and confident students while talk and chalk, indoor, inactive schooling actually disables people from being able to gain confidence to do things for themselves.
- Emotional (affective) and relational (social) development are neglected when emphasis is on the cognitive/academic in the education for "normal Professionalism" (Chambers, 1997).
- Nothing is objective, no matter what reductionist, positivist science tells us.
- The aim of education should be how to live well where you are considering your interactions and impacts on the wider world. This implies a curriculum (in the broadest sense) that mixes the local with the distant and the global and engenders a wonder in the complex rather than a satisfaction in the narrowing of the complex to the simple.
- Sustainability efforts should have a rural emphasis because urbanisation is exacerbating inequalities and human misery.
- My main purpose in life is to contribute to removing inequalities.

4.6.3 In wetland research flex with the clay

The research process was fluid and schedules did not go exactly according to plan. To paraphrase Chambers' (1997:43) Sea voyage versus Swiss train journey analogy this was a wet day's journey on a black cotton soil road through a floodplain, not a smooth run on a tarred highway on a sunny day. Flexibility, patience and good humour were essential.

4.7 Concluding summary

This chapter told the story of the action research processes that led to the contextualisation of the MEMKWA curriculum module in Nyamakurukuru school. It provided a detailed profile of all the participants in the process, and a detailed description of the planning and action phases of the study through 'thick description'. I ended the chapter with a brief reflection on my own experience and background, in order to contribute to a reflexive interpretation of the action research processes. The next chapter reviews the findings as presented in this chapter in more depth, and provides a critical discussion of these, drawing on insights into curriculum contextualisation and the Tanzanian education system as outlined in Chapter 2.

5 Chapter 5. Curriculum contextualization, local cultural knowledge and relevance in education

5.1 Introduction

In this chapter I reflect on the findings presented in Chapter 4 with reference to some of the underpinning theoretical perspectives presented in Chapter 2. These reflections are made in the context of the original questions I set out to answer and of the purposes of conducting the research presented in Chapter 1.

The major research question, which I wished to answer for one specific case, was:

Does integrating local environmental cultural knowledge into formal schooling contribute to curriculum relevance? If so, in what way?

Further questions were:

- *What opportunities exist for contextualizing environmental learning in the current curriculum and with materials available to this school?*
- *What is necessary to make contextualisation of a curriculum possible in terms of the curriculum adaptation processes, stakeholder capacity-raising and materials and in terms of other issues which the study might uncover?*

The purposes of conducting and narrating the contextualization process were to:

- *Show that recontextualisation is possible by providing an example.*
- *Identify major pedagogical (teaching-learning), and epistemological (ways of knowing) issues which arise during the contextualization process.*
- *Highlight the lessons learned from the experience.*
- *Identify whether and how contextualization can make schooling more relevant to students' lives.*
- *Recommend means to make contextualization (if appropriate) a more common practice in schools.*

In section 5.2, I answer the major question of the study. In doing so, I show how the purposes of the study have been fulfilled. Outline recommendations are given in Table 8.

5.2 Does integrating local environmental cultural knowledge into formal schooling contribute to curriculum relevance? If so, in what way?

This action research study found, like others (Taylor & Mulhall, 2001; O'Donoghue et al., 2007) that integrating local environmental cultural knowledge successfully contributed to curriculum relevance both epistemologically (i.e., locally relevant knowledge, and to different ways of knowing) and pedagogically (active, engaged learning processes situated in local context and cultures). It also fostered stronger school-community relationships and involved the teachers and communities in ethical deliberations about environmental concerns. This accords with the heuristic provided by Lotz-Sisitka (2007) who proposes that these inter-related factors influence curriculum relevance, and the quality of education, and may assist learners to better negotiate risk (e.g., the influence of changing seasonal patterns) in everyday contexts. As explained in Chapter 4, through the action research process efforts to bring about curriculum contextualization are at the heart of enabling curriculum relevance. The following Table 8 of analytical statements therefore focuses on the ways in which contextualization effects education. The final statement explores how these effects impact on educational quality. This if followed by a discussion regarding the reasons why contextualization is not the present norm either in Nyamakurukuru school or in general primary education or MEMKWA education in Tanzania.

The third column of Table 8 outlines the recommendations which arise from discussion of the analytical statements which will be put forward at the end of this chapter.

Table 8. Analytical statements summary-Emerging insights into how contextualization processes influence aspects of education

Category	Analytical statements	Recommendations for education in such a case.
Effects of contextualisation on aspects of education		
1. On framing	Contextualisation broke traditional frames/barriers between teachers and students, students and elders and community and teachers. Contextualisation allowed education to take place outside of the school –broke the physical frame of conflating education with schooling.	Give more explicit government policy and strategic support for community involvement in educational content – epistemologies and pedagogies. Weaken framing (hierarchical power positions) to encourage greater partnership between school, home and community to improve relevance. Provide education beyond schools.
2. On pedagogy	Contextualisation necessitated a change in pedagogy to more learner-centred, discovery methods.	Provide practical teacher and community training on use of learner-centred, discovery and active pedagogies. Provide literacy education to the communities so that they can independently analyse formal modules.
3. On epistemological balance and classification of knowledge.	Contextualisation allowed for indigenous knowledge to come into the classroom (and book knowledge to reach community members.)	Provide teacher and community education on biodiversity and the environment. Provide relevant reference texts and research data on the ecology, biodiversity, vegetation, hydrology, agriculture, sociology, history and other relevant subjects.
4. Effect on creativity and adventurousness/confidence.	Contextualisation stimulated creativity and increased confidence.	Officially nurture a culture that learning should be enjoyable.
5. Effect on local environmental issues.	Contextualisation brought local socio-political environmental issues into the classroom and provided a school-home-community forum for discussing them.	Allow the curriculum freedom in these times of increasing risk for rural communities to make the curriculum fit the local issues rather than vice versa.
6.How all of these contribute to quality	When the curriculum content and pedagogy were more relevant to context better relations occurred between the players and the purpose was also challenged to be more locally relevant.	
7.Why contextualisation is not the norm	Teacher competence is limited. Reference resources are inadequate.	Nurture critical analysis of the curriculum in local pedagogic discourse i.e., at the local contextualisation level of the home, community and school.

	The community role in curriculum is not recognised officially. Community illiteracy is a limitation or a perceived limitation. There is inadequate reflexivity about relevance and irrelevance, values and missing texts.	

5.2.1 Analytical Statement 1: Contextualisation broke through traditional frames/barriers between teachers and students, students and elders and community and teachers.

Contextualisation broke through traditional frames/barriers between teachers and students, students and elders and community and teachers; “We let them get much closer to us; instead of feeding them we let them ask us questions.” is how the Head teacher explained this change in the relationship between teachers and students. The students felt that it gave them a different kind of access to older people and they became less shy and afraid of them; “We get to talk to older people who know a lot”, “It removes our shyness” (EG1). The community members could see that their relationship with the teachers “… has improved because this activity showed us that we have a role to play in the education itself” Sub-village leader (OEW). This represents a move towards the “new dynamics” which Mushi et al. (2002) wished to see “between teachers, students and community knowledge holders” in order to enhance learning opportunities in Tanzanian education. It appears that a shift in the power relations of the Local Pedagogic Discourse (Figure 3, section 2.7.3) has occurred. Bernstein (1990:194,199) claimed that this could influence the content of schooling and I support this view because in this short case study it brought local and indigenous knowledge into the classroom. This constituted a change to the usual content mainly drawn from prescribed books. This concurs with O’Donoghue et al. (2007) who found that in less structured, more contextually immersed pedagogies, prior indigenous knowledge can find openings to enter classroom discourse. This could be a subject for further research.

Vandenbosch found that the breaking down of the barriers between schools and rural

communities can "encourage inter-generational learning and relevance of the curriculum to the needs of rural people" (Vandenbosch, 2007:7). He shows that the outward movement of school knowledge can also occur; "parents and community members can learn new ideas, methods and techniques from their children and teachers…" thus contributing to development. The elders claimed to have learnt "lots" (OEW), but the scope of this case study did not allow for data collection regarding the outflow of knowledge from the classroom to the community.

As stated in Chapter 2, section 2.5, there is no consideration of a parent or a community role in lesson planning or curriculum decisions in the MEMKWA system of schooling (URT., MoEC, 2005a). As mentioned in Chapter 2, section 2.7.3, the majority of Tanzanian teachers are not convinced of an important role for the home community in educating children. This is a reflection that the Tanzanian school management culture does not overtly provide a forum whereby the community (Bernstein's primary contextualising field in Figure 3, section 2.7.3) is encouraged to give regular input to decisions about what is taught in school and how it is taught. This case study provided an opportunity for three teachers to reflect on that question and, although still somewhat uncertain whether the competence exists in the community, they have asked the community to continue their involvement; "Let us maintain this state where we were not just dependent on the school to teach the children. Let us get rid of the "go ask your teacher" attitude and all play a part in educating our children" (OEW-T1).

5.2.2 Analytical Statement 2: Contextualisation allowed formal education to take place outside of the school.

The acknowledgement, during this case study, that learning was taking place outside the classroom and away from the school "education is not just inside school" (section 4.5.2.2) represents a significant break in the conceptual 'frame' that assumes that education is schooling. In other words it challenges the conflation of education with schooling to which many governments and educationalists implicitly subscribe. It also disrupts the notion that schooling must take place within the four walls of a building. This is a significant, though not necessarily appreciated as such, demonstration that

education does not have to depend on a child's access to a central building. Providing school buildings and ensuring children's attendance at them are challenging issues which dog education providers in wetlands because building is difficult and children have difficulty travelling to them. This notion that children can learn away from school could be researched further.

5.2.3 Analytical Statement 3: Contextualisation necessitated a change in pedagogy to more learner-centred, discovery methods.

In order to give opportunities for local and indigenous knowledge to enter the classroom this case study found it necessary to change the pedagogy from teacher-talks-student–listens to one where both students and teachers talk and listen to each other. Such a shift is promoted by the MEMKWA programme (URT., MoEC, 2005a) which emphasises greater learner control. Section 4.3.3.1 provides data on how the teachers changed their pedagogy to more learner-centred methods. This weakening of the hierarchy (weakening of the framing as Daniels posited (2001:175)) facilitated the students to be more active, more inquiring and to do collaborative work. Students were facilitated to talk to each other, in groups and while on outdoor research assignments, thus providing opportunities for the social learning described by Vygotsky (1987) and Wals and Heymann (2004:131). Also, new voices entered the pedagogic discourse (those of the communities, as mentioned above). Students were permitted to be teachers, giving presentations of their findings (OL4 and OL5), from whom the teachers and elders learnt. The case study teachers made learning and support materials for active learning which they had not done before and which is not a common activity in Tanzanian government primary schools (Mrutu et al., 2005). For the first time the teachers used the outdoor environment and the local community as educational resources. This represented a very adventurous breaking of norms by the teachers, "We have never done this before" (OEW-T1) who, like most Tanzanian primary school teachers, usually employ teacher-centred one – to-many pedagogies (Mrutu et al., 2005). The ingredients for a successful change to learner-centred pedagogies which were adequately available during the case study action research period included; teacher enthusiasm, teacher competence, reference resources (some borrowed), compliant students, scaffolding from an outsider, support from the higher

authority, support from the school management and the community. There were frustrations on the part of the teachers and hesitation on the part of the students in applying the new pedagogies (sections 4.5.2.1-3, 4.5.3.1 and 4.5.3.1). As to be expected, it was not a complete change of approach and some norms still persisted even if they were incongruous with the more partnership type methodology. For example the presence of the cane was incongruous with encouraging participation (OL2, OL4). While learner-centred pedagogies were taking place in the MEMKWA classroom the overall framing of the Nyamakurukuru school organisation continued elsewhere in the school as part of its "implicit" curriculum (Eisner, 1985). For example the marching drills and formal salutations to teachers described in section 4.1.4. The teachers do not feel that they have adequate training and resources, and think more preparation and small classes are needed for using learner-centred approaches (section 4.5.2). Therefore the long-term sustainability for such pedagogies will not be assured without attention to teacher training, supply of reference resources, better general staffing and other resources and a weakening of framing at higher level to allow teachers and communities more latitude in selecting pedagogic approaches to suit their contexts.

5.2.4 Analytical Statement 4: Contextualisation allowed for indigenous knowledge to come into the classroom

As mentioned in section 5.2, the weakening of framing provided the opportunity of closer relationships to give space for knowledge other than teacher-selected knowledge or 'book' knowledge to enter the classroom. Also mentioned was that the subject Maarifa (General Knowledge) in the MEMKWA system is less classified in terms of its knowledge than other subject categories of the primary school curriculum (section 4.3.1), meaning that it is not in a language that is insulated from other subjects but rather allows a multi-disciplinary approach and invites a variety of epistemologies. The contextualization of a more classified curriculum subject e.g., mathematics, might not have been as conducive to a variety of epistemologies. This action research allowed for the students and the community members to also be teachers, thus their knowledge which is local and indigenous was explicated because

the pedagogy provided opportunities for it. The weakening of the framing also facilitated the weakening of the classification of the knowledge so that merging of book knowledge, teacher knowledge, students' knowledge and several different community members' knowledge took place (OL5). O'Donoghue et al. (2007) witnessed a disregard for the dialectic classification of indigenous and scientific knowledges. However, this study noted some differentiation between local knowledge and other knowledge as shown in the following vignette (OPSCE);

Head Teacher: "Are those local names and does anyone else understand them?"
Mzee Mtambo: "These are the names we use and even the loggers' agents understand these names, but they sometimes have other names as well."
Head Teacher: "I suppose it is good to know the local and the scientific names so that we can all understand each other."

This mixing of epistemologies provides for the reappropriation of the rich heritage of indigenous knowledge which has "intrinsic efficiency and efficacy" to complement "the western framework" and to once again provide "cultural reference points" in tackling the issue of sustainable development and human poverty that Odora – Hoppers desires (2002:3). It is the type of scholarship "that combines indigenous knowledge with external knowledge at a collegial level" which seventy – six African delegates proposed at a recent conference in Ghana (Millar et al., 2006:171) and endorsed by UNESCO (UNESCO 2006b:1). For such a mixing of epistemologies, teachers need to recognize the value of school-home-community relationships and the community members need to appreciate that their knowledge has value. Such dynamics were witnessed at Nyamakurukuru.

5.2.5 Analytical Statement 5: Contextualisation stimulated creativity and increased confidence.

Both teachers and students responded creatively to the weakening of classification and framing which the contextualization process facilitated (section 4.5.1.2). The creative responses concur with Daniels' (2002) findings for schools in England where a weakening of classification and framing nurtured students' capacity to be creative and to make choices. Creativity is seen as a crucial skill for getting out of the "prison for the imagination" in which the existing language of sustainability binds us (Adams,

2006:14). Creativity, visioning, re-imagining the world, critical thinking, are seen as essential to good environmental and sustainability education (Carlsson and Bruun-Jensen, 2006; Wals, 2007; Le Grange and Reddy, 2007; Jickling, 2005).

Students' confidence improved as a result of the learner-centered and discovery pedagogy. An example was the increase in their confidence to make presentations in public at the end of the process compared to the first time they tried it (OL2 versus OL5 in section 4.5.1.3). This concurs with Bruun-Jensen's (Bruun-Jensen, 2002) suggestion that empowerment/increased confidence can arise from appropriate teaching-learning techniques that make the curriculum relevant to the child's environment. This was done by providing active learning opportunities to engage the learners in researching indigenous knowledge from resources in their locality.

Official sanction for the weakening of the distinction between academic subjects and between the power positions of the players in formal schooling is found in the MEMKWA curriculum, but such weakening is not yet common in Tanzanian schools. Active learning is, as mentioned previously not yet the norm in Tanzanian schools.

5.2.6 Analytical Statement 6: Contextualisation brought local socio-political environmental issues into the classroom

Another change in content, which this shift in power relations brought about at Nyamakurukuru, was that local socio-political-economic environmental issues, including the control of forest logging and the marketing of mushrooms, were discussed in the classroom setting. The penetration of such issues into formal education provides openings for students to get the "insight and knowledge" and "social skills" needed for their engagement in "concrete action" with their communities *for* the environment as discussed by Carlsson and Bruun-Jensen (2006:241). This case study experimented with development of information-seeking and collaboration skills. Within the dialogue there was mention of laws, which encouraged some questioning about environmental phenomena but not about the socio-political issues relating to the environment (OPSCE and OEW).

There is a quotation on the wall of the District Education Officer's (DEO) office: "it is recognised that where everybody thinks the same, not much is developed." Providing young people the opportunity to think critically and creatively is an important foundation stone to their increased capacity to find better ways to live in the world. However, in this case study, where new relationships were being forged, between myself and the teachers and students, between teachers and children and children and older people, and given the newness of the process, we were not 'ready' (Hart, Jickling and Kool, 1999) for deep critical analysis. Also, the level of students' developmental maturity needs to be taken into account in order to introduce critical thinking. Some critical thinking happened during the final workshop, stimulated by the contents of the students' presentations. Therefore, I conclude that this action research was weak on educating *for* the environment but showed the potential to be able to do so if it had been a longer cycle of action research.

Limited to one phase this action research did not test the possibility of students, teachers and community members tackling one of the important issues in their environment, but the opportunity and desire for such a collaboration existed with regard to the over-harvesting of timber, over -fishing or the sourcing of a mushroom market. This concurs with Chikunda's (2007:168) recommendation that "improvement of basic education and re-orienting existing education should aim at developing knowledge and skills for citizens to jointly identify their problems and act on them in a sustainable manner". Some education scholars are suggesting that for education to be truly relevant the local socio-political environmental context should be made the core of the curriculum and the national curriculum and assessment criteria would be applied to the contextual curriculum rather than vice versa as currently. Such ideas are aligned to Gough and Scott's (2006) Type 3 learning which focuses on learning to "manage, individually and collectively, a nexus of environmental and citizen behaviour in the context of problems that may have multiple, contested definitions and shifting, contingent solutions" (ibid.:275). Bringing the issues into the formal educational setting could be a first step in tackling locally identified socio-economic and environmental issues. As described in Chapter 2, responding to socio-political issues and risks in education may require attention to interacting dynamics of curriculum relevance (as shown in Chapter 4) if this is to also contribute to educational quality (Lotz-Sisitka, 2007).

5.2.7 How all of the above contributed to educational quality

As indicated in Chapter 2, educational quality is being widely debated in educational circles, and there is consensus that relevance is a key dimension of attaining a qualitatively different and better learning experience for children in Africa and elsewhere. Lotz-Sisitka (2007) proposed that while relevance is identified as being important, there seems to be little insight into how teachers might begin to think about relevance in relation to the prescribed curricula that they are to implement. Drawing on cases of teacher research in environmental education, she outlined a heuristic explicating five interacting dynamics of relevance in relation to educational quality notably:

- Context (socio-economic and socio-cultural relevance).
- Knowing (epistemology and inter-epistemological dialogue),
- Process (pedagogical),
- Relations (school-community) and
- Purpose (ethics and values orientation). (Figure 4, section 2.7.8.2)

This action research case study has provided an example of how focussing on the local context can improve the epistemological content of education by using pedagogical processes which allow mixing of knowledges and improve relations both within the school and between the school and the community.

Contextualisation allowed for indigenous knowledge to come into the classroom and for education to happen out in the community. This improved the relevance of the education to the students and to their community context. Improving relevance improves learning, and thus quality.

Contextualisation improved the quality of the pedagogical processes by necessitating a change in pedagogy to more learner-centred, discovery methods. Through the changes in pedagogy contextualisation broke through traditional frames/barriers between teachers and students, students and elders and community and teachers. The changed pedagogy stimulated creativity in both teachers and students and increased students' confidence.

Contextualisation brought local socio-political environmental issues into the classroom, thus providing opportunities for discussing tripartite (school-community and students) actions to tackle local issues and improve local lives. Thus contextualisation provided new insights on the purposes of education, providing an opening for considering the ethical/value orientations of environmental citizenship as an important element of formal education. This implicitly moots the proposal that education can respond to solving local problems.

In engaging the interacting dynamics of relevance through efforts to contextualise the curriculum and draw on local cultural knowledge in teaching a module, the education of the youth living in the wetlands was qualitatively changed and improved. Hence it could be proposed that the contextualisation process contributed to the achievement of greater educational quality in the context of the objectives of the MEMKWA curriculum module, and the lives of the learners in the wetland.

5.3 Why is contextualisation not the norm in Nyamakurukuru school?

The profile data in Chapter 4, section 4.1, shows that, although some situated learning and use of students' prior knowledge is common at Nyamakurukuru school, it is not usual for deliberate contextualisation of the curriculum (epistemologically, pedagogically, ethically or relationally) to take place there. Background data for Tanzania finds that the case is similar to the national situation where the one-to –many transmission of 'book' knowledge is the norm (Chapter 2). This case study provides insights into why contextualisation worked for the case and why it is not the norm.

Why did it work in this case? I use the case data, and my observations of the things that were not said and done during the case study together with the experiences of others to reason abductively as to why teachers and the community successfully contextualised one module of the MEMKWA Maarifa curriculum during the action research at Nyamakurukuru:

- The MEMKWA Maarifa curriculum is relatively weakly classified –the distinction between subjects is not strongly defined and lends itself to complex

multidisciplinary content/epistemologies.

- The MEMKWA curriculum is more weakly framed than the general primary school curriculum –the power relation between teacher and student is less hierarchical. The teacher is considered a facilitator of learning rather than the only font of knowledge.
- The teachers had the support of their higher authority, the District Education Department, for the contextualisation process.
- The teachers and the community had "scaffolding" from me which gave them confidence to go beyond their Zones of Proximal Development (ZPDs) (Scott Baumann et al., 1997:69-78; Schunk, 1996:192-193).
- The teachers were challenged/stretched a little beyond their norm- especially to be critical of the module as it was presented and whether its contents and proposed pedagogy were relevant to the lives of Nyamakurukuru students.
- Necessary resources and reference materials were provided or support was given to acquire them.
- An atmosphere of adventure, fun and discovery was nurtured throughout the process. Initiated by me but maintained by the team.
- The teachers had the support of the school committee to which they were accountable to ensure the process was carried through.
- The process was a novelty. I was a novelty. Why not engage in the visitor's little experiment?
- I was not a threat to the teachers as professionals because I am not a trained teacher. I was in the role of a student, a learner about how schools work and teachers teach. They could admit they did not know everything about the seasons or how to contextualize modules. They did not have to prove their skills and knowledge to me and so could simultaneously be teachers and learners. A co-creation of knowledge could occur.

So if it worked once, why does contextualisation not always happen? The data suggests that teachers consider their skills are not adequate and that participatory learner-centred active pedagogies need more time, more research and small numbers of students. These findings concur with those of Taylor and Mulhall (2001) and Vandenbosch (2007). The teachers also feel that the resources are not adequate. My

observations support their point, which is also made by Taylor and Mulhall (ibid.) and Vandenbosch (ibid.). These are the stated limitations to making contextualisation the norm.

In Nyamakurukuru the normative epistemological base comprises the syllabus, the textbooks and the teachers' knowledge. There is very little other reference material available at the school and the community knowledge is not usually sourced. The narrow epistemological base limits contextualisation of the curriculum.

It is not usual for community at Nyamakurukuru to engage in school curriculum decision-making. During this case study some community members and the teachers began to recognise the value of community involvement in the "education itself". Such a role has yet to be officially recognised in the MEMKWA education programme. The capacity of adults in the community to engage in this role may be limited or perceived to be limited by adult illiteracy which is identified as a problem in the sub-village (section 4.1.3).

Apart from the data in terms of what teachers, students and community members said and did, it is important to consider *what did not happen* and *what was not said* during this case study. What is handed down from the dominant theories in the world (field of production (Figure 3, section 2.7.3), the ministry of education (the official recontextualisation field in Figure 3) and the academic institutions and text writers (field of pedagogic recontextualisation, Figure 3) and is usually accepted without question? What is usually left out of the curriculum sent down from these fields the absence of which is not noticed by the teachers (transmitters) in schools (the field of reproduction Figure 3)?

5.3.1 What is handed down and accepted without questioning the higher recontextualisation fields?

5.3.1.1 Pink coffee trees stay pink

The teachers in this case consider the primary school and the MEMKWA curricula as being 'generally' relevant to the lives of their students. However, they pointed out

some modules and images that they did not feel were relevant to their situation. For example, they do not think that lowland wetland children should be taught how to grow coffee, which is a highland crop; neither did they think that trees printed in the colour pink were appropriate since trees are green (aren't they?). So anyone who knows her or his local ecosystem can spot the 'pink coffee tree' in the curriculum, syllabus or textbook (section 4.1.1). But what is their response to the 'pink coffee tree'? In this case the teachers, have their own ideas about replacing the coffee tree with, say, a cashew tree, which is grown in the coastal zone of Tanzania, but do not seem to take action to change the tree species for their lessons. They think that the national syllabus preparation team should provide lessons relevant to the various ecological zones and do not see themselves as recontextualizers (Wilmot, 2005). There was no evidence during this case study that there is a culture of changing or adapting the irrelevant modules or of reporting such matters to the recontextualising fields.

5.3.1.2 The fish may not notice the water they are swimming in! Implicit values are not questioned

The values contained in the curriculum seem to be going unnoticed by the school level transmitters. During this case study there was no unsolicited questioning or discussion of the underlying values in the MEMKWA curriculum or the module which was contextualised. Implicit in all curricula is a set of values. Grant and Zeichner as quoted in Fien state that "there is no such thing as a neutral educational activity" (Fien, 1993:14).

5.3.1.2.1 Environmental values.

It is implicit in the MEMKWA curriculum that the environment, land and natural resources are there for the use of humans. All references to natural resources entail human use of them (T.I.E., 2005a:41–64) the seasons are only relevant in terms of their influence on what people can do during them (ibid.:77-81). There is no suggestion that species or things other than human have intrinsic relevance and rights to being. There is also an unquestioned positivist rationalisation of the environment into understandable parts and no appreciation of the integrated holism of the world in

which we live. It is therefore implied that that wonder and enjoyment of being in a fascinating world of high biodiversity is not important. The neglect to link spiritual education to the environment implies that the place where we live is not important to our emotions and aesthetics.

5.3.1.2.2 Economic values

Economic values are also reflected in curricula. For example the MEMKWA curriculum states that traditional pastoralism is bad (T.I.E. 2005a:5-6) for the environment, that it is not viable economically, that pastoralists clothes were patched clothing (ibid.: drawing on page 5, see Photograph 19) and therefore implies that traditional pastoralists are poor and their cattle are too numerous and too thin. The experience of pastoralism in Nyamakurukuru is short, as the waSukuma and waBarbaig pastoralists have only moved here within the past 2-3 years, but they appear at least as well off as the original residents (see Photograph 20) and their animals look healthy (OSRG1). Also global analyses of traditional pastoralism show its economic success (Hatfield and Davies, 2006:9) to be twice to ten times that of the ranching alternatives. During this case study there was no reaction to this set of values portrayed in the first module of the book which we were using. What should the teachers of Nyamakurukuru school and other MEMKWA curriculum users do to contextualise this module, which is biased, simplistic and based on limited and incorrect information? Hart et al. (1999:119) suggest that teachers can present knowledge as “closed and complete” or as “open and subject to critical examination”.

Wafugaji wananchi

Jamii kadhaa za Tanzania ziliendelea kufuga baada ya 1964. Mifugo iliyofugwa zaidi ni ng'ombe, mbuzi, kondoo na punda. Baadhi walifuga ndege kama kuku, bata na kanga. Ufugaji uliendelea kuwa wa jadi, yaani wafugaji walimiliki mifugo mingi. Mifugo hiyo ilishinda malishoni na kurudishwa zizini jioni.

Ni kama vile walifurahia kuwa na idadi kubwa ya mifugo. Lakini faida yake ilikuwa kidogo mno. Mifugo ilitoa maziwa na nyama kidogo sana. Ilitoa pia ngozi ambazo ziliuzwa kwenye viwanda vya viatu na mikoba. Wafugaji hawakutaka kuuza baadhi ya mifugo kujipatia fedha za matumizi kama kujenga nyumba nzuri, kusomesha watoto shule, kuvaa na kula vizuri, au kujipatia matibabu. Baadhi ya wafugaji, mfano Wamasai, walilazimika kuishi kwa kuhamahama. Siku zote walikuwa wakitafuta usalama, malisho na maji ya mifugo yao.

Ufugaji duni wa jadi.

Mikoa iliyokithiri kwa ufugaji wa jadi ni Arusha, Mwanza, Mara, Shinyanga, Tabora Singida na Dodoma.

Photograph 19. Page of MEMKWA book depicting a pastoralist with patched clothing.
(Source: T.I.E., 2005a:5)

Photograph 20. MEMKWA students interviewing a pastoralist man

5.3.1.2.3 Educational structure values

The conflation of education with schooling is an underlying assumption in Nyamakurukuru. There is a very strong imperative, mentioned by the teachers , members of the community and the students to move the people to be near the school seems as the main solution proposed to increase children's chances of receiving education (sections 4.1.2 and 4.1.3). This has been the norm nationwide but fails to

effectively raise educational standards in Rufiji's wetlands (Chapters 1 and 2). This is not the only solution and it might beggar the families, as they will have less control on what is happening in their rice and maize fields and lose greater percentages of crops to wild animals (Hogan, 2006). Other means of providing education to children in seasonally inaccessible floodplains were not being suggested during the action research. Reagan (2000:206) advises that we become more conscious of the difference between formal schooling and education. Such consciousness was stimulated by this action research. The Head Teacher urged *"let us maintain this state where we are not just dependent on the school to teach the children"*. Such an attitude could take the emphasis off daily attendance at a single central school building and focus some attention on supplementary methodologies to enhance wetland children's access to education.

5.3.2 What was left out of the curriculum which was not noticed/noted?

5.3.2.1 Where are the elephants and the epiphytes? The absence of the environment/ native biodiversity goes unnoticed.

The explicit curriculum (Eisner, 1985:87-103) that is put out in print in front of the teacher by the national and district education departments is easy to criticise. In other words if the "pink coffee trees" described in the curriculum are not relevant to the specific context, in this case wetlands, it will be obvious to the reader. But the things that are important for the lives of the students that are missing in the curriculum, forming what Eisner termed the null curriculum (ibid.), are much harder to identify. The skills to think critically about the null curriculum in relation to basic education, for example in the Rufiji wetland, demands primarily an awareness of living in a wetland, a deep local and scientific knowledge of the wetland, book knowledge about wetlands elsewhere and then the ability to look at the curriculum for places where the wetland should have been given a space. For example, in our case the teachers did not notice that wild animals and native species of plants were not explicitly considered in the MEMKWA module on seasons we were reviewing. The outsider, I, pointed it out. Missing concepts e.g., about the awesome beauty of the natural environment, about the importance of biodiversity to the ecosystem, about why land gets destructed, were not automatically considered. Local, non-book knowledge is not automatically considered because it is not there in print.

I conclude that irrelevance, implicit values and that which is missing in the curriculum are not usually questioned by the teachers/ transmitters at school level (in the field of reproduction, Figure 3, section 2.7.3). Taylor and Mulhall (2001:143) felt that teachers were wary about moving away from what was found in the textbooks and syllabi and partly blamed rigid curricula and examinations for this reluctance. This case does not have adequate data to reach such a conclusion, and this may need to be the subject of future research.

5.4 Recommendations

Before concluding this dissertation, I propose a set of recommendations, with full recognition that these recommendations would be most applicable to the Nyamakurukuru case where this study took place. However, I draw on Bassey's (1999) notion of 'fuzzy generalisation' to propose that many of these recommendations *may* be useful beyond the boundaries of this case, and thus propose that others interested in questions of curriculum contextualization may find them useful.

1. **Give more explicit government policy and strategic support for community involvement in educational content – epistemologies and pedagogies**

An official statement, in the description of stakeholders' roles in education, which clearly defines involvement in curriculum content and teaching and learning methodology decisions by the parents and the communities would firmly establish this role. Official financial support for parental and community involvement and competence rising in these matters would further sustain such a role.

2. **Weaken framing (hierarchical power positions) to encourage greater partnership between school, home and community to improve relevance**

The conceptualization of teachers as facilitators of learning rather than transmitters of knowledge in all curricula and not just the MEMKWA one would weaken the divisions between teachers' and students' positions. The first recommendation (above) would disturb the power positions between the teachers and the community in relation to epistemological and pedagogical decision-making at the school. More

learner centered pedagogy could also foster closer partnership between teachers and students.

3. **Investigate the provision of education beyond schools**

Wetland children's access to education other than by daily attendance at a central school building could be explored.

4. **Provide practical teacher and community training on use of learner-centered, discovery and active pedagogies**

Teachers are willing to use learner-centre pedagogies and communities are interested in a greater role in their children's education. Provision of training in such pedagogies could foster their wider use in schools and communities. Environmental Activists in the communities could also be trained in these pedagogies.

5. **Provide teacher and community education on biodiversity and the environment**

Teachers explicitly identified environmental education as necessary for them to be able to effectively teach relevantly to the local environment. Community members who are involved with curriculum decisions and teaching could be supported through ecological and biodiversity training to explicate their knowledge into the formal curriculum.

6. **Provide relevant reference texts and research data on the ecology, biodiversity, vegetation, hydrology, agriculture, sociology, history and other relevant subjects**

Provision of relevant reference texts and research data on the ecology, biodiversity, vegetation, hydrology, agriculture, sociology, history and other relevant subjects will support the broadening of the knowledge base. A range of ministries and non-governmental agencies and programmes can be involved in providing such reference materials to schools. Teachers and local communities could be trained in how to maintain and lend such resources and also in methods for using such resources.

7. **Officially nurture a culture that learning should be enjoyable**

Education which is enjoyable attracts attendance and engagement. A relaxed fearless atmosphere can nurture creativity. Ministerial directives, teacher trainers, syllabi and curricula could emphasize the importance of making education an enjoyable process.

8. **Allow the curriculum freedom, in these times of increasing risk for rural tropical wetland communities, to make the curriculum fit the local issues rather than vice versa**

A reversal of the approach of using pre-set curricula towards an approach which allows the local context to set the core curriculum could facilitate communities to use the formal education system to solve local environmental problems. This could make education contribute more effectively to the sustainability of livelihoods and the environment. In this case, instead of beginning with the set curriculum on season, lessons might have begun with a core topic of the current livelihood and environmental issues and have reached the point of discussing what to do about local problems earlier in the process.

9. **Nurture critical analysis of the curriculum in local pedagogic discourse i.e., at the local contextualization level of the home, community and school**

From the case study evidence it is recommended that teachers and communities could be encouraged by higher authorities (official recontextualising field and pedagogic recontextualising field) to feed into the curriculum development processes by critically analyzing the relevance and the implicit values presented in curricula and by pointing out the important items which are missing. Since most curricula are presented as printed media, raising adult literacy levels is further challenge to the educational system.

5.5 Concluding Summary

This study tested a process of curriculum contextualisation in a wetland community context in the Rufiji District in Tanzania. Through an action research process, involving a participatory process with teachers, community members and students, local cultural knowledge was integrated into a MEMKWA curriculum module. The study found that through this dynamic process, of engaging with mixed knowledges, school-community relationships, discovery and learner-centred pedagogies, the

curriculum achieved a changed outcome in terms of educational quality mainly in terms of greater relevance to the lives of the community. Through a deeper analysis of the data, useful insights into curriculum recontextualisation at a local level were gained, and the study identified that contextualisation:

- Broke through traditional frames/barriers between teachers and students, students and elders and community and teachers.
- Allowed formal education to take place outside of the school.
- Necessitated a change in pedagogy to more learner-centred, discovery methods.
- Allowed for indigenous knowledge to come into the classroom.
- Stimulated creativity and increased confidence.
- Brought local socio-political environmental issues into the classroom.

This study provides a case example of how education processes, when engaging local cultural knowledge, can improve the relevance, and thus an aspect of the quality of teaching and learning in school-community contexts, while providing a conduit for integrating environmental education into the formal school curriculum. It provides insights into the key issue of relevance which currently faces educators of children in wetlands in Tanzania.

References

Aang Serian. (2004). *Intercultural education: A research and discussion program to supplement the secondary curriculum*. *Book 1: History, language & culture*. Facilitator's handbook. Arusha, Tanzania: Aang Serian.

Abdullah, A-R.S. (1982). *Educational theory: A Qur'anic outlook.* Makkah, S. Arabia: Umm Al-Qura University.

Adams, W.M. (2006).*The future of sustainability: Re-thinking environment and development in the twenty-first century*. Report on the renowned thinkers meeting 29-31 January, 2006. Retrieved May 30, 2006, from www. iucn.org

Alpers, E. A. (1969). The coast and the development of the caravan trade. In I.N. Kimambo & A.J. Temu (Eds.), *A history of Tanzania*. The Historical Association of Tanzania. Nairobi: East African Publishing House.

Barrett, A., Chawla-Duggan, R., Lowe, J., Nikel, J., & Ukpo, E. (2006). *Review of the 'international' literature on the concept of quality in education.* EdQual. Bristol: University of Bath & University of Bristol.

Bassey, M. (1999). *Case study research in educational settings*. Buckingham: Open University Press.

Bernstein, B. (1990). *The structure of pedagogic discourse*. *Volume IV: Class, codes and control*. London: Routledge.

Brock-Utne, B. (2002). Stories of the hunt – who is writing them? In C.A. Odora Hoppers (Ed.), *Indigenous knowledge and the integration of knowledge systems: Towards a philosophy of articulation* pp. 237-257. Claremont: New Africa Books.

Bruun Jensen, B. (2002). Knowledge, action and pro-environmental behaviour. *Environmental Education Research, 8*(3), 325-334.

Buchert, L. (1994). *Education in the development of Tanzania 1919-1990.* Eastern African Studies. London: James Currey.

Buston, O. (2003). *Education for all: Fast track or slow trickle? Donors seem to prefer the "slow trickle" approach to the "fast track" approach to education.* Oxford:
Oxfam.

Carlsson, M., & Bruun-Jensen, B. (2006). Encouraging environmental citizenship: The roles and challenges for schools. In A.Dobson & D. Bell (Eds.), *Environmental citizenship* pp. 237-261. Cambridge, MA: MIT Press.

Chambers, R. (1997). *Whose reality counts? Putting the last first.* London: Intermediate Technology Publications.

Chikunda, C. (2007). Zimbabwe better environmental science teaching programme: A step towards education for sustainable development. *Southern African Journal of Environmental Education, 24,* 158-170.

Coates Palgrave, K. (1983). *Trees of Southern Africa*. Cape Town: Struik Publishers.

Cohen, L., Manion, L., & Morrison, K. (2003). *Research methods in education* (5th ed.). London: Routledge Falmer.

Connole, H. (1998). The research enterprise. In *Research methodology in education.* Study Guide. Geelong, Australia: Deakin University.

Cornbleth, C. (1990). *Curriculum in context*. London: The Falmer Press.

Daniels, H. (2001). *Vygotsky and pedagogy*. New York: Routledge Falmer.

District Planning Office. (2005). Halmashauri ya Wilaya ya Rufiji Maelezo ya Hali Halisi ya Wilaya. [Rufiji District Profile 2005].Draft version. Utete: Rufiji District Council, District Planning Office.

Doody, K.Z.D., Ndasi, F., Kombe, O., & Hogan, R. (2003). *Elimu kwa uzoefu wa Mazingira. Jarida la Mwezeshaji.* Rufiji Environment Management Project, Rufiji District Council, Utete.: IUCN.

Education system. (n.d.) Tanzania Online-A gateway to information on development issues in Tanzania. Retrieved February 13, 2007, from www.tzonline.org/education.htm

Eisner, E. (1985). *The educational imagination* (2nd ed). New York: Macmillan.

Engestrom, Y. (1999). Innovative learning in work teams: Analysing cycles of knowledge creation in practise. In Y. Engestrom Y,, R. Miettinen & R.L.Punamaki (Eds.), *Perspectives on activity theory*. Cambridge: Cambridge University Press.

Fien, J. (1993). *Education for the environment: Critical curriculum theorising and environmental education*. Geelong, Australia: Deakin University Press.

Gough, S., & Scott, W. (2006). Promoting environmental citizenship through Learning: Toward a theory of change. In A. Dobson & D. Bell (Eds.), *Environmental citizenship* pp. 263-285. Cambridge, MA: MIT Press
.

Hart, R., Jickling, B., & Kool, R. (1999). Starting points: Questions of quality in environmental education. *Canadian Journal of Environmental Education, (4*), pp 104 -124.

Hatfield, R., & Davies, J. (2006) *Global review of the economics of pastoralism.* World Initiative for Sustainable Pastoralism. Nairobi: IUCN.

Hogan, A.R. (2006). *An environment, health, and poverty profile of Rufiji District, Tanzania with particular reference to educational interventions*. An unpublished

study undertaken as a contribution to SADC's review: "Education for Sustainable Development in a Context of Risk and Vulnerability". Howick: SADC, REEP.

Hopkins, D., & Reynolds, D. (1994). The concept of quality and the provision of quality schooling: International concern. In D. Hopkins & D. Reynolds, *Quality schooling:, A pragmatic approach to some current problems, topics and issues*. London: Cassell.

Hountondji, P. (1997). (Ed.) *Endogenous knowledge: Research trails.* Dakar, Senegal: Council for the Development of Social Science Research in Africa (CODESRIA).

Ittleson, W.H., Proshansky, H.M., Rivlin. L.G., & Winkel, G.H. (1974). *An introduction to environmental psychology.* New York: Holt, Reinart and Winston.

Ivic, I. (1989). Profiles of educators: Lev. S. Vygotsky (1896-1934), *Prospects*, *19* (3), 427-36.

Janse van Rensburg, E. (2001). *An orientation to research.* Research methods course notes. Rhodes University, Environmental Education Unit., Grahamstown.

Jensen, B B.J., & Schnack , K. (1997). The action competence approach in environmental education. *Environmental Education Research, 3*(2), 163-178.

Jickling B. (2005). Ethics research in education. *Southern African Journal of Environmental Education, 22*, 20-34.

Jickling, B., & Wals, A.J. (2003). *Environmental education in transition: Looking beyond sustainability and sustainable development*. Paper prepared for the First World Environmental Education Congress, Espinho, Portugal, May 20-24, 2003.

Kimambo, I.N., & Temu, A.J. (Eds.). (1969). *A history of Tanzania.* The Historical Association of Tanzania. Nairobi: East African Publishing House;

Kingdon, J. (1997). *A field guide to African mammals*. London: Academic Press.

Kjekshus, H. (1977). *Ecology control and economic development in East African history.* London: Heinemann.

Kollmuss, A., & Agyeman, J. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research, 8*(3), 239-260.

Koul, L. (1984). *Methodology of educational research* (2nd ed.). New Delhi: Vikas.

Latour, B. (1999). *Pandora's hope:. Essays on the reality of science studies.* Cambridge, MA: Harvard University Press.

Le Grange, L., & Reddy, C. (2007). Learning of environment(s) and environment(s)

of learning. *Southern African Journal of Environmental Education, 24,* 76-89.

Lema, E., Mbilinyi, M., & Rajani, R. (2004). *Nyerere on education – Nyerere kuhusu Elimu: Selected essays and speeches 1954-1998.* Dar es Salaam: Haki Elimu Ltd.

Lewin, K. (1946). Action research and minority problems. *Journal of Social Issues, 2* (4), 34-36.

Lewin, K. (1948). *Resolving social conflicts*. New York: Harper.

Lotz-Sisitka, H. (2004). *Engaging ambivalence in context: Ethical dilemmas in/ as environmental education processes*. Notes to guide the planning and presentation of a seminar and critical review of Environmental Education programmes. M. Ed. (Environmental Education) lecture notes 2004-2005, Rhodes University, Grahamstown.

Lotz-Sisitka, H. (2007). *Environment and sustainability education research contributions to educational quality and relevance debates in South/Southern Africa.* Paper prepared for the UKFIET Conference 'Going for Growth', Oxford, 11-13 September 2007..

Masuku van Damme, L.S., & Neluvhalani, E.F. (2004). Indigenous knowledge in environmental education processes: Perspectives on a growing research arena. *Environmental Education Research, 10*(3), 353-370.

Maxwell, J.A. (1996). *Qualitative research design: An interactive approach* . Thousand Oaks, Calif: Sage.

Mazrui, A. (1978). *Political values and the educational class in Africa.* Berkeley: University of California Press.

Mazrui, A., & Wagaw, T. (1985). Towards decolonising modernity: "Education and culture conflict in Eastern Africa". In *The educational process and historiography in Africa.* Paris: UNESCO.

Mbelle, A., & Katabaro, J. (2003). *School enrolment, performance and access to education in Tanzania*. Research in Poverty Alleviation. Dar es Salaam: REPOA.

Millar, D., Bugu, S., Kendie, A., Apusiga, A., & Haverkort, B. (Eds.). (2006). *African knowledge and sciences: Understanding and supporting the ways of knowing in Sub-Saharan Africa.* Papers and proceedings of an International Conference on African Knowledges and Sciences, 23-29 October 2005, Bolgatanga U/R Region Ghana. COMPAS Series on Worldviews and Sciences No 3. Leusden, NL: Compas.

Mkombozi Centre for Street Children. (2005). *Demonstrating the potential of MEMKWA to respond to the learning needs of street children.* Dar es Salaam: Mkombozi Centre.

Mokuku, T., & Mokuku, C. (2004). The role of indigenous knowledge in biodiversity conservation in the Lesotho highlands: Exploring indigenous

epistemology. *Southern African Journal of Environmental Education, 21*, 38-49.

Moll, L.C., & Greenberg, J. B. (1990). 'Creating zones of possibilities: Combining social contexts for instruction'. In L.C. Moll (Ed.), *Vygotsky and education: Instructional implications and applications of sociohistorical psychology* pp. 319-48. Cambridge: Cambridge University Press.

Moore, R., & Maton, K. (2001). Founding the sociology of knowledge: Basil Bernstein, intellectual fields and epistemic device. In A. Morais, I. Neves, B. Davies & H. Daniels (Eds.), *Towards a sociology of pedagogy: The contribution of Basil Bernstein to research.* New York: Peter Lang.

Moumouni, A. (1968). *Education in Africa*. New York: Praeger.

Mrutu, A.S., Ponera,G.E., & Nkumbi, E.M. (2005). *The SACMEQ II Project in Tanzania: A study of the conditions of schooling and the quality of education.* Tanzania Working Report. SACMEQ, Harare:D.S.M: Ministry of Education and Culture.

Mulkeen, A. (2005). *Teachers for rural schools: A challenge for Africa*. Food and Agriculture Organisation.Rome: FAO.

Muller, J. (2001). Intimations of boundlessness. In A. Morais, I. Neves, B .Davies, & H. Daniels (Eds), *Towards a sociology of pedagogy: The contribution of Basil Bernstein to research.* New York: Peter Lang.

Mushi, P.A.K., Malekela, G.A., & Bhalalusesa, E.P. (2002). *Moving beyond the Classroom: Expanding learning opportunities for marginalised populations in Tanzania.* Forum for African Women Educationalists. Nairobi: FAWE.

Nagel, T., & Kvernbekk, T. (1997). A dialogue about the quality of education. *Quality Assurance in Education, 5*(2),101-109.

Nichols, P. (1991). *Social survey methods: A fieldguide for development workers.* Development guidelines No. 6. Oxford: Oxfam Publications.

Nikel, J., & Barrett, A. (2006). "*What does education quality mean for low income countries?*" Presentation to EdQual/ICS Seminar, Graduate School of Education. Bristol: Bristol University.

O'Donoghue, R. (2006).(Lecture to M.Ed. Students). Environmental Education Unit, Education Department, Rhodes University, Grahamstown.

O'Donoghue, R., & Lotz-Sisitka, H. (in press). *Situated learning, rubbish and risk reduction in Southern Africa at the start of the UN decade of education for sustainable development.*

O'Donoghue, R., Lotz-Sisitka, H., Asafo-Adjei, R., Kota, L., & Hanisi, N. (2007). Exploring learning interactions arising in school-in-community contexts of

socioecological risk. In E. Wals, (Ed.),. *Social learning towards a sustainable world* pp. 435-558. Wageningen: Academic Publishers.

Odora Hoppers, C.A. (2002). (Ed). *Indigenous knowledge and the integration of knowledge systems: Towards a philosophy of articulation* . Claremont: New Africa Books.

Popkewitz, T.S., Pereyra, M.A., & Franklin, B.M. (2001). History, the problem of knowledge, and the new cultural history of schooling. In T.S. Popkewitz, B.M. Franklin,M.A. Pereyra.(Eds.), *Cultural history and education: Critical essays on knowledge and schooling.* New York: Routledge Falmer.

Rajani, R., Bangser, M., Lund-Sorensen, U., & Leach, V. (2001). *Situation analysis of children in Tanzania*. Tanzania Online retrieved, 05.07.07: www.tzonline.com,.

Ranger, T. O. (1969). The movement of ideas, 1850-1939. In I.N. Kimambo & A.J. Temu. (Eds.),. *A history of Tanzania.* The Historical Association of Tanzania. Nairobi: East African Publishing House.

Reagan, T. (2000). *Non-western educational traditions: Alternative approaches to educational thought and practice* (2nd ed.). Mawah, NJ: Lawrence Erlbaum.

Rufiji Environment Management Project . (2001). *Weaving a web of awareness.* Proceedings of Rufiji's first World Environment Day Celebrations held at Ikwiriri on June 5th 2001. Tarimo, B.D.,Hogan, A.R. and Ndasi, F. Technical report No. 22. Dar es Salaam: IUCN.

Scardamalia, M., & Bereiter, C. (1991). Higher levels of agency for children in knowledge building: A challenge for the design of new knowledge media. *The Journal of Learning Sciences, 1*(1), 37-68.

Schunk, D. (1996). Vygotsky's socio-cultural theory. In D. Schunk, *Learning theories* (2nd ed.) pp. 193-195. Columbus: Prentice Hall.

Scott-Baumann, A., Bloomfield, A., & Roughton, L. (1997). *Becoming a secondary school teacher*. London: Hodder and Stoughton.

Shava, S. (2005). Research on indigenous knowledge and its application: A case of wild food plants of Zimbabwe". *Southern African Journal of Environmental Education 22*, 73-86.

Shorter, A. (1974). *East African societies*. London: Routledge & Kegan Paul.

Sinclair M.E., & Lillis, K. (1980). *School and community in the Third World.* London: Croom Helm.

Spawls, S., Howell, K., Drewes, R., & Ashe, J. (2002). *A field guide to the reptiles of East Africa.* London: A&C Black.

Stevenson, T., & Fanshawe, J. (2002). *Field guide to the birds of East Africa.* London: Poyser.

Tanzania. Institute of Education. (1997). *Sayansi 2 kitabu cha Mwanafunzi – Darasa la Pili.* Dar es Salaam: Mture Educational Publishers Ltd.

Tanzania. Institute of Education. (2005). *Completion of COBET cycle: A tracer study of COBET graduates in the former five pilot districts*. Dar es Salaam: The Institute.

Tanzania. Institute of Education. (2005a). *Maarifa –Kitabu cha Mwanafunzi Kundirika la Kwanza, Mwaka wa Tatu*. (General knowledge student's book, cohort 1, year 3) (2nd ed.). Dar es Salaam: The Institute.

Tanzania. Institute of Education. (2005b). Maarifa –Kitabu cha Mwezeshaji . Kundirika la Kwanza, Mwaka wa Tatu. (General knowledge facilitator's book, cohort 1, year 3) (2nd ed.).. Dar es Salaam: The Institute.

Taylor, P., & Mulhall, A. (2001). Linking learning environments through agricultural Experience: Enhancing the learning process in rural primary schools. *International Journal of Educational Development, 21*, 135-148.

Terre Blanche, M., & Kelly, K. (1999). Interpretative methods. In M. Terre Blanche & K, Durrheim (Eds.), *Research in practice* pp. 123-146. Cape Town: University of Cape Town Press.

Tharp, R.G., & Gallimore, R. (1988). Rousing schools to life. *American Educator, 13*(2), 20-25, 46-52.

Tibawi, A. L. (1972). *Islamic education: Its traditions and modernization into the Arab National Systems.* London: Luzac & Co.

Tikly, L., Lowe, J., Dachi, H., Garrett, R., & Mukabaranga, B. (2003). *Globalisation andskills for development in Rwanda and Tanzania.* London: Department for International Development.

UNESCO. (1990). *World Conference on Education for All*. Jomtiem, Thailand. Paris: UNESCO.

UNESCO. (2000a). *Defining quality in education.* Paper presented by UNICEF at the meeting of the International Working Group on Education, Florence, Italy, June 2000. Paris: UNESCO.

UNESCO. (2000b). *Dakar Framework for Action - Education for All: Meeting our collective commitments.* Proceedings of the World Education Forum, Dakar, Senegal. Paris: UNESCO.

UNESCO. (2004). *Education for All Global Monitoring Report 2004: The quality imperative.* Paris: UNESCO.

UNESCO. (2006a). *Traditional knowledge*. Information sheet developed during the 48th week (07-13/08/2006) of the 60th anniversary of UNESCO. Paris: UNESCO.

UNESCO. (2006b). *Towards the implementation of the decade of education for sustainable development (DESD) in Sub-Saharan Africa (SSA).* Workshop report, 27-30 November 2006,Windhoek, Namibia. Windhoek: UNESCO.

United Republic of Tanzania. (2004). *The Environmental Management Act 2004.* Dar es Salaam Government Printers.

United Republic of Tanzania. Ministry of Education and Culture..(1996). *Social Studies syllabus for Primary Schools, standard III-VII*. Dar es Salaam: The Ministry.

United Republic of Tanzania. Ministry of Education and Culture. (2005a). *A guide for COBET facilitators.* Dar es Salaam: The Ministry.

United Republic of Tanzania. Ministry of Education and Culture. (2005b). *Mwongozo wa Ufundishaji Elimu ya Mazingira kwa Shule y*a *Msingi*. Dar es Salaam: The Ministry.

United Republic of Tanzania. PMO-RALG /MOEVT. (2006). *Primary education development programme: Stocktaking report on the implementation of COBET programme in Tanzanian Mainland, September 2006.* Dar es Salaam: MOEVT.

United Republic of Tanzania. Vice President's Office. (2005). *National Strategy for Growth and Reduction of Poverty*., Dar es Salaam: Vice President's Office.

Vandenbosch, T. (2007). *Contextualising learning in primary and secondary schools using natural resources*. Paper presented at the World Environmental Education Congress, Durban, July 2-6 , 2007, pages 1-11. Farmers of the Future. Nairobi: ICRAF/CGIAR.

Verspoor, A.M. (1989). *Pathways to change: Improving the quality of education in developing countries.* Washington, DC: World Bank.

Vygotsky, L.S. (1987). *The collected works of L.S. Vygotsky. Vol 1: Problems of general psychology,* including the volume *Thinking and speech*. In R.W. Rieber & A.S.Carton. (Eds.), N. Minick (trans.) New York: Plenum Press.

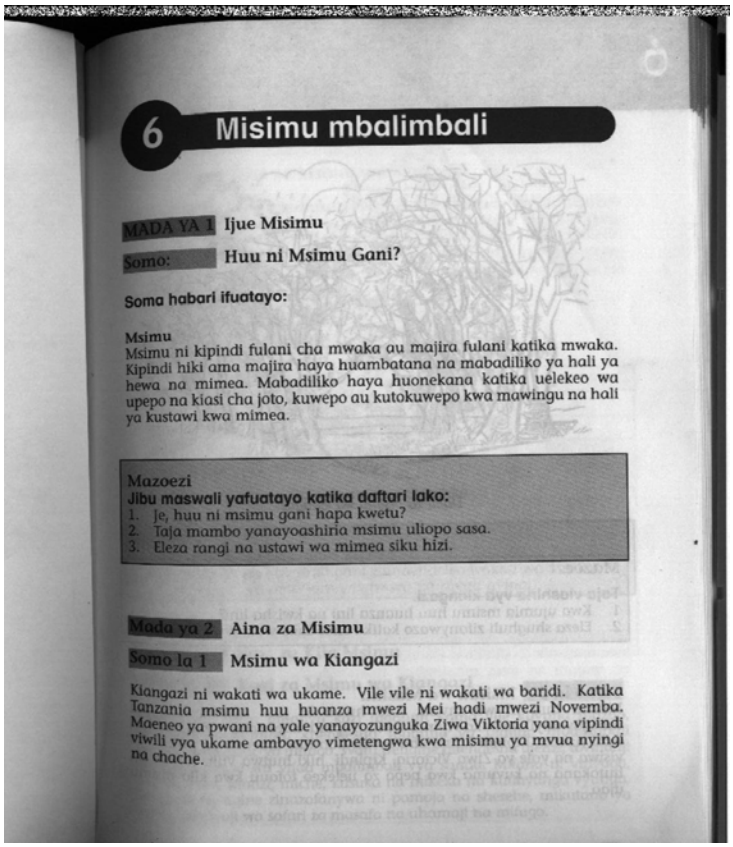
Wals, A.E.J. (2007). Learning in a changing world and changing in a learning world: Reflexively fumbling towards sustainability. *Southern African Journal of Environmental Education, 24,* 35-45.

Wals, A.E.J., & Heymann, F.V. (2004). Learning on the edge: Exploring the change potential of conflict in social learning for sustainable living. In A.L. Wenden, (Ed.), *Educating for a culture of social and ecological peace* pp. 123-145. New York: State University of New York Press.

Wilmot, P.D. (2005). *Teachers as recontextualizers: A case study analysis of*

outcomes-based assessment policy in the Human and Social Sciences learning area of Curriculum 2005 in two South African schools. (Chapter 5: Methodology). Unpublished doctoral thesis, Rhodes University, Grahamstown.

Appendix 1. Seasons Module–pages from Student's text book.



6 Misimu mbalimbali

MADA YA 1 **Ijue Misimu**

Somo: **Huu ni Msimu Gani?**

Soma habari ifuatayo:

Msimu
Msimu ni kipindi fulani cha mwaka au majira fulani katika mwaka. Kipindi hiki ama majira haya huambatana na mabadiliko ya hali ya hewa na mimea. Mabadiliko haya huonekana katika uelekeo wa upepo na kiasi cha joto, kuwepo au kutokuwepo kwa mawingu na hali ya kustawi kwa mimea.

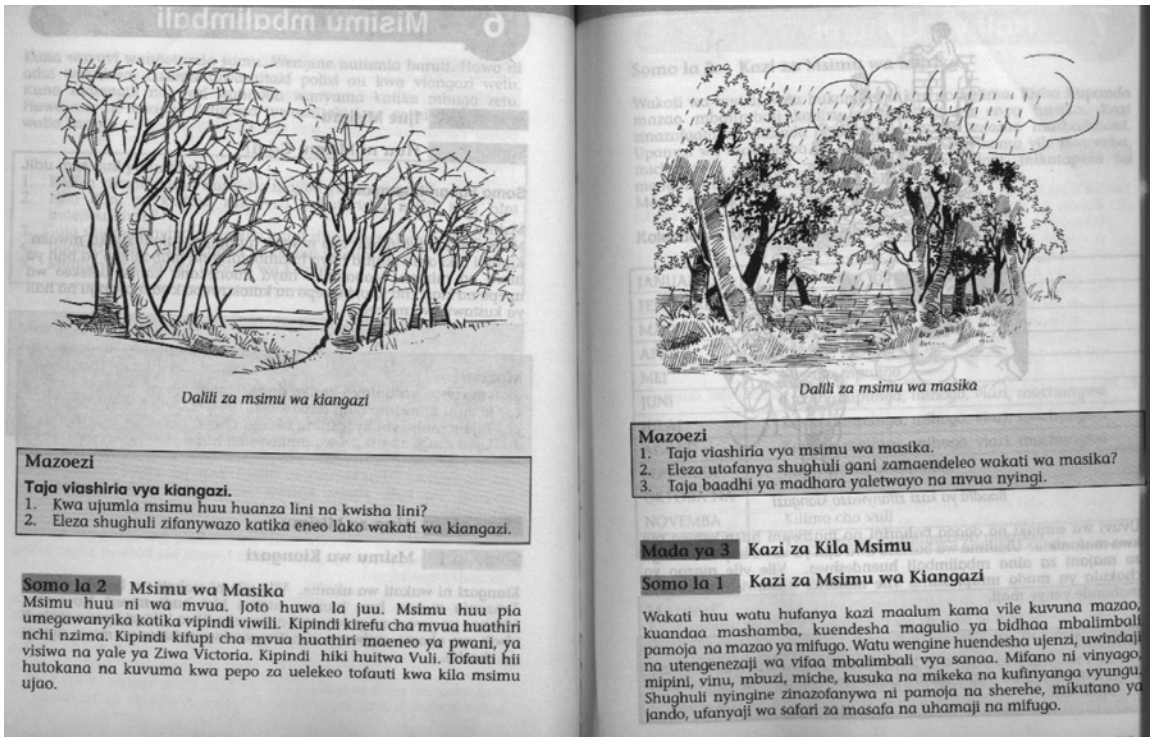
Mazoezi
Jibu maswali yafuatayo katika daftari lako:
1. Je, huu ni msimu gani hapa kwetu?
2. Taja mambo yanayoashiria msimu uliopo sasa.
3. Eleza rangi na ustawi wa mimea siku hizi.

Mada ya 2 **Aina za Misimu**

Somo la 1 **Msimu wa Kiangazi**

Kiangazi ni wakati wa ukame. Vile vile ni wakati wa baridi. Katika Tanzania msimu huu huanza mwezi Mei hadi mwezi Novemba. Maeneo ya pwani na yale yanayozunguka Ziwa Viktoria yana vipindi viwili vya ukame ambavyo vimetengwa kwa misimu ya mvua nyingi na chache.

(Source: T.I.E., 2005a:77)



Dalili za msimu wa kiangazi

Mazoezi
Taja viashiria vya kiangazi.
1. Kwa ujumla msimu huu huanza lini na kwisha lini?
2. Eleza shughuli zifanywazo katika eneo lako wakati wa kiangazi.

Somo la 2 **Msimu wa Masika**

Msimu huu ni wa mvua. Joto huwa la juu. Msimu huu pia umegawanyika katika vipindi viwili. Kipindi kirefu cha mvua huathiri nchi nzima. Kipindi kifupi cha mvua huathiri maeneo ya pwani, ya visiwa na yale ya Ziwa Victoria. Kipindi hiki huitwa Vuli. Tofauti hii hutokana na kuvuma kwa pepo za uelekeo tofauti kwa kila msimu ujao.

Dalili za msimu wa masika

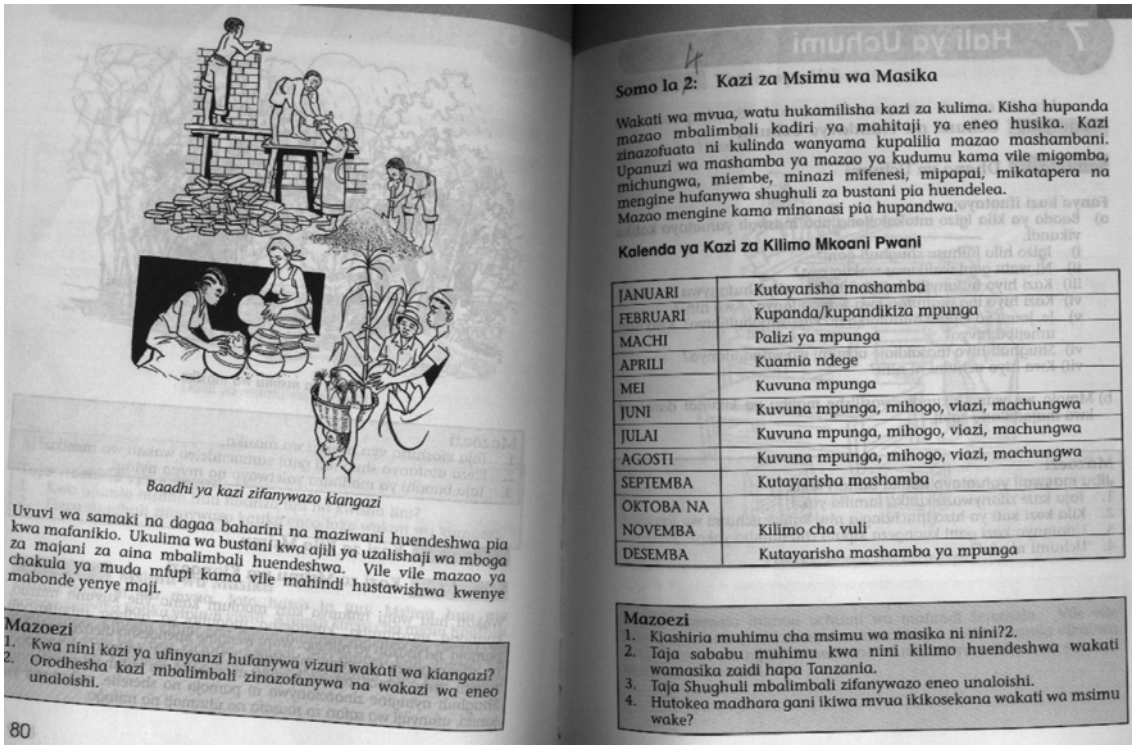
Mazoezi
1. Taja viashiria vya msimu wa masika.
2. Eleza utafanya shughuli gani zamaendeleo wakati wa masika?
3. Taja baadhi ya madhara yaletwayo na mvua nyingi.

Mada ya 3 **Kazi za Kila Msimu**

Somo la 1 **Kazi za Msimu wa Kiangazi**

Wakati huu watu hufanya kazi maalum kama vile kuvuna mazao, kuandaa mashamba, kuendesha magulio ya bidhaa mbalimbali pamoja na mazao ya mifugo. Watu wengine huendesha ujenzi, uwindaji na utengenezaji wa vifaa mbalimbali vya sanaa. Mifano ni vinyago, mipini, vinu, mbuzi, miche, kusuka na mikeka na kufinyanga vyungu. Shughuli nyingine zinazofanywa ni pamoja na sherehe, mikutano ya jando, ufanyaji wa safari za masafa na uhamaji na mifugo.

(Source: T.I.E., 2005a:78-79)



Baadhi ya kazi zifanywazo kiangazi

Uvuvi wa samaki na dagaa baharini na maziwani huendeshwa pia kwa mafanikio. Ukulima wa bustani kwa ajili ya uzalishaji wa mboga za majani za aina mbalimbali huendeshwa. Vile vile mazao ya chakula ya muda mfupi kama vile mahindi hustawishwa kwenye mabonde yenye maji.

Mazoezi

1. Kwa nini kazi ya ufinyanzi hufanywa vizuri wakati wa kiangazi?
2. Orodhesha kazi mbalimbali zinazofanywa na wakazi wa eneo unaloishi.

80

Somo la 4: Kazi za Msimu wa Masika

Wakati wa mvua, watu hukamilisha kazi za kulima. Kisha hupanda mazao mbalimbali kadiri ya mahitaji ya eneo husika. Kazi zinazofuata ni kulinda wanyama kupalilia mazao mashambani. Upanuzi wa mashamba ya mazao ya kudumu kama vile migomba, michungwa, miembe, minazi mifenesi, mipapai, mikatapera na mengine hufanywa shughuli za bustani pia huendelea. Mazao mengine kama minanasi pia hupandwa.

Kalenda ya Kazi za Kilimo Mkoani Pwani

JANUARI	Kutayarisha mashamba
FEBRUARI	Kupanda/kupandikiza mpunga
MACHI	Palizi ya mpunga
APRILI	Kuamia ndege
MEI	Kuvuna mpunga
JUNI	Kuvuna mpunga, mihogo, viazi, machungwa
JULAI	Kuvuna mpunga, mihogo, viazi, machungwa
AGOSTI	Kuvuna mpunga, mihogo, viazi, machungwa
SEPTEMBA	Kutayarisha mashamba
OKTOBA NA NOVEMBA	Kilimo cha vuli
DESEMBA	Kutayarisha mashamba ya mpunga

Mazoezi

1. Kiashiria muhimu cha msimu wa masika ni nini?2.
2. Taja sababu muhimu kwa nini kilimo huendeshwa wakati wamasika zaidi hapa Tanzania.
3. Taja Shughuli mbalimbali zifanywazo eneo unaloishi.
4. Hutokea madhara gani ikiwa mvua ikikosekana wakati wa msimu wake?

(Source: T.I.E., 2005a:80-81)

Appendix 2. Interview and observation schedules

Interview Schedule for School committee Member's/Parent or Child Custodian's Profile

Age:

Gender:

Ethnic group:

1. Same as the local majority or different?

Experience:

1. How long have you been living here?
2. How long have you been a member of the school committee?
3. Why were you chosen to be on the school committee?
4. Other experience of working /life?
5. Any environmental experience /education/courses/informal teaching from elders/extension workers?

Qualifications:

Formal:
Short courses/informal recognition in the village:

Own Activities and Interests:

1. What is the role/s of the school committee?
2. What do you like dislike/about being on the school committee?
   Enjoy doing/experiencing?
   Dislike doing/experiencing?
3. What do you think about the relationship between the village community and the school?
4. What do you think about the relationship between the village community and the District Education Department?
5. What do you think about parents/villagers' present involvement in children's education? Is it enough? Too much? Too little?
6. If you think it is too much or too little, in what ways would you change it?

Attitudes to teaching methods

1. What teaching methods do you like to see the teachers using?
2. Should they use of the methods below?

	Ever	Occasionally	Regularly/Usually
Teaching the whole class as a group			
Teaching in a small group			
Teaching individually			
Teaching through question and answer technique			
Giving positive feedback			
Relating to everyday life situations			

Using available local materials			
Using the outdoors			
Doing experiments			
Using a science kit			
Using the community knowledge			
Puzzles			
Dramas			
Stories			
Students Drawing			
Asking students to do surveys/research			
Making teaching materials her/himself			
Giving Homework			
Tests			
Other ways of teaching, mention:			

3. Would you like to make any other comments on the teaching methods issue?
4. In an ideal world what teaching methods would you prefer the teacher to use?
5. Does anyone else in the community teach anything to the village children?
6. If yes, who, how and what?

Content of student's education

1. Do students learn anything in school about the local natural environment and people? If so what?
   Please list:
2. Is it appropriate to teach things about the local environment to the children? If yes why? And What?
   If no, why not?
3. What would make it easier for children from this sub-village to attend school more regularly?
4. What would make it easier for children from here to learn /succeed at school?
5. What do you think the priority for education should be? (what should the aim of educating a person be?)

Interview Schedule for COBET Student Profile

1. Age: 2. Gender: 3. Ethnic group:

1. Same as the local majority or different?

4. Home language:

5. School Experience:

1. How long have you been living here?
2. How far do you travel to school?
3. How long have you been in school/COBET class?
4. Why did you miss out on school when you were seven?
5. Any environmental experience/education/courses/informal teaching from elders/extension workers?

6. Own Activities and Interests

1. What do you like/dislike about being in school?
   Enjoy doing, experiencing?
   Dislike doing/experiencing?
2. When you first came to the school/COBET class what was new or strange to you?
3. Is there anything in school that reminds you of home?
   If so, what?
4. Are there things you are taught in school that you already know from home?
   If so what?
5. Does the teacher ever ask your class to give examples of thing in their lives to help explain the lesson? If so, can you remember a class where this happened?
6. Are you learning anything in school that you think will help you in your future life?
   If so, what?
7. What else would you like to learn that could help you in your ambitions for your future?

7. Attitudes to teaching methods

1. What do you like about your teacher's methods?
2. What do you dislike about your teacher's methods?
3. Which of the methods below do they use?

	Never	Occasionally	Regularly/Usually
Teaching the whole class as a group			
Teaching in a small group			
Teaching individually			
Teaching through question and answer technique			
Giving positive feedback			
Relating to everyday life situations			
Using available local materials			
Using the outdoors			
Doing experiments			
Using a science kit			
Using the community knowledge			
Puzzles			
Dramas			
Stories			
Students Drawing			
Asking students to do surveys/research			
Making teaching materials her/himself			
Giving Homework			
Giving tests			
Other ways of teaching mention:			

4. Would you like to make any other comments about the teaching methods issue?
5. Does anyone else in the community teach anything to the village children?
   If yes, who, how and what?
6. Are your parents/custodians involved in your education?
   If yes, how?
   e.g.,
   Help with homework
   Ask you about your school day
   Talk to teacher/s about your progress
   Buy supplementary books/equipment
   Reduce your home duties
   Encourage you verbally
   Other
7. Is it enough or would you like them to be less or more involved?
   In what ways would you change it?

8. Content of student's education

1. Do you learn anything in school about the local natural environment and people?
   If so what?
   Please list:
2. Do you want to know more about the local environment?
   If yes why? And what?
   If no, why not?

3. What would make it easier for children from this sub-village to attend school more regularly?
4. What would make it easier for children from here to learn/succeed at school?
5. What do you want do when you finish school? (Your aims for using your education).

9. Socio-economic status (SACMEQ indicators)

1. Does your home have any of the following items?

1	Daily newspaper	8	Car
2	A weekly or a monthly magazine	9	Motorcycle
3	Radio	10	Bicycle
4	TV set	11	Piped water
5	Video cassette recorder (VCR)	12	Electricity (mains, generator, solar)
6	Cassette player,	13	Table to write on
7	Telephone		

2. What is the education level of your most educated parent/guardian?
   Are they Female? Male?

Schedule for Teacher's Interview

1. **Age:**
2. **Gender:**
3. **Ethnic group:**

Same as the local majority or different?

4. **Experience:**

1. Teaching
2. Teaching here in this school for how long?
3. How did you come to be working here?
4. Other experience of working/life?
5. Any environmental experience/education?

5. **Qualifications:**

Formal
Short courses

6. **Own Interests**

1. What do you like about teaching?
2. What do you like about being a teacher?
3. Do people treat teachers differently to other villagers e.g., farmers, fishers?
4. What do you find difficult about teaching?
5. What could make your school day more enjoyable?
6. What could make teachers happier in their work?
7. What do you think about the local natural environment?

7. **Attitudes to teaching methods**

1. What teaching methods do you like?
2. Do you ever try to use any of the methods below?

	Never	Occasionally	Regularly/Usually
Teaching the whole class as a group			
Teaching in a small group			
Teaching individually			
Teaching through question and answer technique			
Giving positive feedback			
Relating to everyday life situations			
Using available local materials			
Using the outdoors			
Doing experiments			
Using a science kit			
Using the community knowledge			
Puzzles			
Dramas, songs creation			
Stories			
Students Drawings			
Asking students to do surveys/research			

Making teaching materials yourself			
Giving tests			
Giving Homework			
Other ways of teaching mention			

3. Would you like to make any other comments on the teaching methods issue?
4. In an ideal world what teaching methods would you prefer to use?

8. Attitude to curriculum content

1. Are (most of) the modules relevant to the student's lives/future occupations?
   If yes provide examples and say how they relate to the students life.
   If not give examples of irrelevant modules /parts of modules.
2. Do you think that there is anything/or knowledge or anyone one in the locality which/who could be used in teaching any subject/module?
   If yes what, whom and why might it/they be useful?
3. Is it appropriate to teach children about their local environment and people?
   If yes why?
   If no why not?
4. Do you think that parents/the school committee should be involved in the **content** of their children's schooling?
   If yes, how?
   If no, why not?
5. What do you think the priority for education should be? (what should the aim of educating a person be?)

Observation checklist for planning workshop, introductory lesson, student research, feedback lessons.

Date: **Overall Event:**

1. Physical setting /Place/Space

1. Draw sketch
2. Take photos
3. Describe what is seen:
4. Is it near the school or not?

2. Actors –the people

1. How many people?
2. Identities–who are they?
3. Characteristics
4. How did they come to be members of the group?

3. Activities–vignettes of. one/two activities

1. What are people doing?
2. Who is doing what?
3. How do the different acts relate to each other?
4. How routine, regular, patterned, irregular, repetitive are the behaviours observed?
5. What kinds of teaching-learning methods are being employed?

4. Objects–the artifacts and physical things that are there.

1. What learning Support Materials are present?
2. What signs of teacher preparation? E.g., Lesson plan visible?
3. What equipment have students got?
4. Anything from the local environment?

5. Events–the sets of activities that are taking place.

1. How are the individual events that take place connected?
2. What rules govern the social organisation of the event?
3. How do the participants and others label /describe the event?

6. Time –the sequence of acts, activities, and events.

1. When does the event take place?
2. Length of time taken for each act and
3. overall.

7. Goals–what are people trying to achieve.

1. Why are they doing these things?

8. The talk, words discussions.

1. Who is talking?
2. Who is listening?
3. Who is asking questions?
4. Who is answering?
5. What are they talking about? (Take some quotations)
6. What is being discussed?

7. Are there things that are discussed repeatedly/often in the event? (collect keywords)
8. What are they **not** talking about?

9. Feelings-what people feel and how they express this.

1. What is the mood? Happy? Etc…
2. How do people behave towards each other?
   E.g., Indicators of respect/hierarchy of respect shown?
   Are people cooperating? Who is helping whom?
3. When confusion/difficulty in understanding occurs, how is it resolved? Ask someone? Whom? (other student, teacher, community member,)Look in a book or instruction notes?
4. What non-verbal communication is taking place?
5. Any signs of recognition of something already known? E.g., nodding, inputting information related to what is being said?
6. Signs of teacher surprise at something new they have learnt from the community?
7. Any signs of trying to change own behaviour by anyone?

10. What is not happening?

1. What are they not talking about?
2. Who is not talking? Does not contribute verbally at all?
3. Who is not listening-talks a lot or is distracted by other things?
4. What LSM could they be using that they are not using?
5. What teaching-learning methods are not in use? E.g., using students prior knowledge

11. Photographs taken

1. Number in camera/series:
2. Of whom doing what?
3. Comments & queries on the photo for following up with participants?

12. Reactions of the observer to what has been observed (attitude, emotions, analysis)

1. Own Role taken–observer only, participant-observer, observer-participant?
2. Active learning?
3. Child centred?
4. Contextually connected? How? State examples that were used.
5. Participatory? Any signs of trying to change own behaviour?
6. Community involved as whom? Partners? Suppliers of knowledge?
7. Social learning and whether it is given space?
8. Zones of Proximal development Scaffolding?
9. Implicit, explicit, and null curricula.

SAY BIG THANKS

Appendix 3. Sample of an Analytical Memo

Analytical Memo 1: Learner Participation and Responses

Category	Summary of comments/opinion/issue arising	Data Source
Perceptions of what teaching methods are normally used	Not related to life. Not individual teaching. Q &A. Homework	Student interviews; (PSG, PSB). See Table 7, section 4.1.1: Responses regarding teaching methods used. (Table created from data).
Responses to group work methods	Enjoyed doing them. Social learning Storming in research group	Photo of engagement in group work in classroom. (OL1) (OL2), laughing, chatting. (OSRG1)
Perceptions of outdoor research activities	Enjoyed doing them Liked. Became less shy. Less afraid of old people.	Focus Group interview with two student research groups; (EG1, EG2). Photo of group doing research with adults in the community.
Perceptions of sources of knowledge	Think that the teacher knows a lot. Think that elders know a lot Think that both sources of knowledge are important.	Group interviews with research groups; (EG1, EG2). Group interviews with research groups. Group interviews with research groups.
Perceptions of what they can learn from learner –centred pedagogies	Researching from elders helps to build students confidence. 'Were afraid of some old person but now less so'.	Interview with research group;(EG1, EG2).
School as a source of environmental knowledge.	Learn nothing about local env. in school Learn not to light fires or cut trees.	Student interviews; (PSG, PSB). One boy; (SB2).
School as a source of knowledge relevant to their future careers	Yes No	(SPG, SPB).

Appendix 4. Feedback Booklet for research partners–cover

Zoezi la kulinganisha somo la MEMKWA yahusu misimu na mazingira ya pale pale katika shule ya Nyamakurukuru, Siasa, Utete

Tarehe 27.02 hadi 07.03.2007.

Picha 1 Vijana watafiti wanamhoji Mzee Mpalandabo kushusu vyakula vya porini katika misimu mbalimbali.