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**AN INVESTIGATION INTO  
THE UTILISATION OF EDUCATIONAL MEDIA  
BY PRIMARY SCIENCE TEACHERS IN MANKWE DISTRICT  
IN THE NORTH WEST PROVINCE**

**BY**

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## **DEDICATION**

To my two sons, Jimmy and Arthur, without whom I would not have had an inspiration or motivation to go on.

To my husband, Jimmy, because of whom I have become what I am today.

To Anne, my sister, whose presence gave me courage and to Jean whose love and generosity has benefited us all.

And to my dearest mother, Lillian Ann Mukwaya, who because of her sacrifice and determination moulded me to become confident and taught me to believe in myself.

God bless you all.

## **DECLARATION**

I declare that

**AN INVESTIGATION INTO THE UTILISATION OF EDUCATIONAL MEDIA  
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THE NORTH WEST PROVINCE**

is

my own work and that all the sources that I have used or quoted  
have been indicated and acknowledged by means of complete  
references.

**RITA NDAGIRE KIZITO**

## TABLE OF CONTENTS

	CHAPTER ONE: INTRODUCTION	page
1.1	Media Utilisation In Science Teaching in rural areas	1
1.2	Delineation of Research area	2
	1.2.1 The teacher as the main object of study	4
	1.2.2 Who is the primary Science teacher ?	4
	1.2.3 Why Primary Science ?	5
1.3	Background to the Problem	6
	1.3.1 Problem Source	6
	1.3.2 What are media? Educational media, Mediated learning experience, Teaching and learning with media and Educational Technology.	8
	1.3.2.1 Educational Media	8
	1.3.2.2 Using Media	9
	1.3.2.3 Media Didactics and Educational Technology	10
	1.3.2.4 Teaching/learning with media and educational technology	10
	1.3.2.5 Modern Educational Technology	13
	1.3.2.6 Feuerstein's Mediated Learning Experience	16
	(a) What is Mediated Learning Experience?	16
	(b) Application of Feuerstein's theory to teaching curricular content (e.g Science)	17
	1.3.3 Media Selection	20
	1.3.4. Media Evaluation	21
	1.3.5 Media Integration into the phases of the lesson	21
	1.3.6 Multi-media	23
	1.3.7 The role of the teacher	24

	1.3.8 Pragmatic Concerns	25
	1.3.8.1 Technology and the educational Environment	25
	1.3.8.2 Quality versus quantity	26
	1.3.9 Research	26
	1.3.10 The research trend for this study	26
	1.3.11 Definition of terms	27
	a) Educational media	27
	b) Media Utilisation	27
	c) Primary School	28
	d) Primary School Curriculum	29
	e) Mankwe District	29
1.4	Science Teaching and the Problem	29
	1.4.1 Attitudes towards Science	29
	1.4.2 An integrated approach to teaching Primary Science	30
	1.4.3 Constructivist approach within media use	31
	1.4.4 The teacher and the Primary Science Curriculum	32
	1.4.5 The Research problem	33
	1.4.6 The approach used and the hypothesis	34
1.5.	A theoretical framework for the investigation	35
	1.5.1 Phenomenology: A qualitative from of inquiry	35
	1.5.2 Phenomenology as related to this study	37
1.6.	Aims of this study	37
1.7.	Theory and Practice	38
	CHAPTER TWO: REVIEW OF RELATED LITERATURE	
2.1.	Categorising media related studies	40
2.2.	Descriptive and Comparative studies	40
2.3.	Media Selection Studies	41

2.4	Correlational and Experimental Studies	43
2.5	Decline of Media use	44
2.6	Proponents of Media use	45
2.7	A study of the availability and use of media in secondary schools in Nigeria, Okwodishu (1993)	46
2.8	A study to evaluate curriculum materials designed to improve the teaching of Science in primary schools in South Africa, Ntho, (1994-1995)	47
2.9	Inadequacies of Media Research	48
2.10	Support for Media Use	49
2.11	Towards Interactive Investigations	50
2.12	Modern Investigations in Media Utilisation	51
2.13	Assumptions and Recommendations from the literature Review of relevance to this investigation	53
	2.13.1 Assumptions	53
	2.13.2 Recommendations	55
2.14	Implications for future research	56
2.15	The History of Science	56
2.16	School Science Teaching	58
	2.16.1 What is Science ?	58
	2.16.2 The branches of Science	59
	2.16.3 What does Science teaching Involve ?	60
	2.16.4 Primary Science Teaching	62
2.17	Media Use in the teaching of Science	64
	2.17.1 Importance of Science	64
	2.17.2 What needs to be done	65
	2.17.3 The role of media use in Science education	66

	<b>CHAPTER THREE: METHODOLOGICAL STRATEGY</b>	
3.1	Illuminative Evaluation	68
3.2	What is qualitative research ?	69
3.3	The Methodology of Constructivist inquiry	69
3.4	The research Design	72
	3.4.1 Focusing on the study	73
	3.4.2 Gaining access to the setting	74
	3.4.3 Unit of Analysis and Time periods	74
	3.4.4 Sampling	75
	3.4.4.1 Key factors in the sampling process	76
	3.4.4.2 Criteria for constructing a sample	77
	3.4.4.3 Implementation of the sampling process	78
	3.4.5 The problem of " selecting what to observe "	78
	3.4.6 Interviewing instrumentation	79
	3.4.7 Ethical issues and matters of confidentiality	79
	3.4.8 Data, Design and Analysis approaches	80
	3.4.9 Issues of reliability, Validity and Triangulation	80
	3.4.9.1 Reliability	80
	3.4.9.2 Validity	81
	3.4.9.3 Triangulation	82
	3.4.10 The cost of the research	83
	<b>CHAPTER FOUR :COLLECTION AND ANALYSIS OF DATA</b>	
4.1	Introduction	84
4.2	Autobiographical sketch of the researcher	85
4.3	The survey	87
	4.3.1 Collection of data	87
	4.3.2 Results and their analysis	88

	Table 1: Table showing availability of media, media sufficiency, media in good condition and the most frequently used media.	89
4.4	Observation strategy	90
	4.4.1 Data Collection and analysis	92
	4.4.1.1 General Impression of schools	92
	4.4.1.2 Classroom Settings	94
	4.4.1.3 Teacher and method of instruction	96
	4.4.1.4 Media Selection and Integration	99
	4.4.1.5 Learner interactions	101
	4.4.1.6 Media Integration	102
	4.4.1.7 Overall impression of the lessons	104
	4.4.2 Main points from the analysis of Observation Data	105
	4.4.3 Limitations of the Observation Method	105
4.5	In-depth Interviewing	106
	Table 2: Interview Guide	108
	4.5.1 Data Collection and Analysis	108
	4.5.1.1 Opinions and Views concerning media utilisation	109
	4.5.1.2 Problems associated with media utilisation	110
	4.5.1.3 Recommendations towards improving Media Utilisation in Science teaching	115
	4.5.2 Other issues of concern	119
	4.5.2.1 The whole group mode versus small group mode	119
	4.5.2.2 Child-centred teaching versus Teacher-centred teaching	120
	4.5.2.3 The Question of Improvisation	121
	4.5.3 Main Points from the Analysis of Interview Data	122
	4.5.4 Limitations of the Interview method	124
	4.5.4.1 Selection of the respondents	124

	4.5.4.2 Reactivity of the respondents	125
	4.5.4.3 Triangulation of respondents	125
	CHAPTER FIVE :FINAL REFLECTIONS AND CONCLUSIONS	
5.1	Reflections	126
	5.1.1 Patterns and Linkages	126
	5.1.2 Teacher's views and actual Practices	127
	5.1.3 Motivation	128
5.2	Evaluation findings	129
	5.2.1 Re-consideration of Questions	129
	5.2.1.1 Who is the Primary Science teacher in the Mankwe Region?	129
	5.2.1.2 What types of Media are available? and in what type of facilities does the teaching occur ?	130
	5.2.1.3 To what extent are these teachers utilising media ? What type of teaching strategies are they using ?	130
	5.2.1.4 What are attitudes towards media utilisation ? What are the problems related to media use ?	130
	5.2.1.5 Is their sufficient evidence to support media utilisation as a means of improving learning ?	131
	5.2.1.6 Is it possible to use this information, to make recommendations towards the identification of sound principles for successful integration of media utilisation to Primary Schools in South Africa ?	131
	5.2.1.7 When, in terms of the social and political climate is the study taking place ?	132
	5.2.2 Evaluation of Qualitative Research Framework	132
	5.2.2.1 General views	132
	5.2.2.2 Problems encountered during the research process	133

	(1) Problems related to the physical limitations of Collection of Data	133
	(2) Problems of selection of respondents and triangulation of data	133
	(3) Discrepancy between attitudes and practice	134
	5.2.3 Recommendations for further research	135
5.3.	Conclusion	136
	REFERENCES	138
	APPENDICES	

## **ABSTRACT**

This study was an attempt to explore and describe media utilisation from a Primary Science teacher's perspective, within a qualitative theoretical and methodological framework.

A brief survey revealed what media was available in the schools, and observation and interview methods were used to give meaning to the media utilisation practice in schools.

It was hoped that the results would assist in the construction of guidelines required to improve media use, and consequently science teaching in the rural primary schools.

The inquiry revealed that apart from improving educational facilities, re-motivation of the science teachers was an essential ingredient in the search for ways of improving media use in Primary Science instruction.

## **KEY TERMS**

Educational media, Media utilisation, Primary Science teaching, Rural Schools, Educational facilities, Teaching strategies, Research in media-related studies, Qualitative inquiry using observations and interviews.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 MEDIA UTILISATION IN SCIENCE TEACHING IN RURAL AREAS

The educational scenario in rural South African schools is not very different from that found in other developing countries. It is characterized by the usual problems of continually increasing enrollments, shortages of trained, experienced and qualified teachers, curricula irrelevant to the general needs of the population and inadequate funds.

In addition to this, the rapid social, economic and political changes in the region have created the need for a **balanced education**, in which every individual will be assisted in acquiring the range of skills required to enable him or her to function effectively in the current dynamic and technological era. According to Raper and Stringer (1987:10),

Science is an ideal vehicle for acquiring skills, fostering attitudes and developing an understanding of a range of concepts relevant to everyday experiences.

According to Raper and Stringer (1987:17),

developing Science teaching at the Primary level could play a major role in consolidating other teaching areas.

The problem is that Science is a practically oriented subject, often requiring various forms of media, that is

persons or objects that are deliberately used to put across (communicate) learning content in a didactic (teaching-learning) situation (Freysen et al 1989:3).

Moreover, some avid supporters of media believe that, through the use of media,

both the efficiency of learning and positive attitudes towards learning may be enhanced ( Kemp & Smellie 1989:3).

But ,

- (a) Is there sufficient evidence to support the notion that media utilisation can significantly improve learning?
- (b) To what extent are Primary teachers in the rural areas utilizing media?
- (c) What are their attitudes and views concerning media utilisation ?
- (d) Is it possible to use this information to make recommendations that will contribute to the identification of sound principles for the successful integration of media utilisation in the Primary Science instructional process, specifically in a South African context?

These are some of the questions this study attempted to answer by investigating media utilisation by a specific group of Primary Science teachers in rural South Africa (Mankwe district).

## **1.2 DELINEATION OF THE RESEARCH AREA**

There is a substantial body of literature pertaining to the utilization of instructional media at various levels of education. Leading authorities include Yarger and Mintzi (1979), Teather and Collingwood (1978), Lennon and Maurer (1994), and Ntho (1995), just to mention a few. However, the investigations having a theme similar to the study have been surveys,

quantitative in nature, designed to determine frequencies of availability and use of various forms of media. Some examples include Lehman (1994), who explores the use of technology in the teaching of Science and Mathematics in elementary schools in Pennsylvania, USA, and Green (1993), who examines the level of use of recommended resources required to teach Science in Port Harcourt, Nigeria. A study of particular interest, which was carried out on similar lines of investigation to this study, is that by Okwodishu (1993). It is an exploratory venture into attitudes towards media use in Nigerian schools. It has been difficult to identify a study which has been undertaken from the point of view of specifically Primary school Science teachers, a perspective which particularly lends itself to a qualitative form of inquiry, an approach which

permits the evaluator to study selected issues in depth and detail (Patton, 1990:13).

Any investigation into media utilization will have the problem of delineation of the main area(s) of research. This is because media utilization is an integral component of any teaching activity. Even traditional instructional methods, often referred to as forms of **unmediated instruction**, depend on some type of media, (considering that the blackboard, textbook, and even the teacher can all be categorized as forms of media). Instead of isolating media from the instructional process,

media and materials should be used as an integral part of the overall lesson plan (Smith & Nagel 1972:21).

On the other hand, a thorough understanding of any complex system

depends on a systematic analysis of its relevant components, whereby, the constituent variables and factors, relevant to the understanding of the phenomenon or event are isolated (Mouton & Marais 1990:103).

This investigation has been an attempt to explore and describe media utilisation from the Primary Science teacher's perspective ,within a qualitative theoretical and methodological framework.

### **1.2.1 The teacher as the main object of study**

Although the modern approach to teaching proposes that

learning, for the learner should be central to the teaching-learning system (Du Plooy 1990:171), the teacher continues to be the main resource (Unwin & McAleese 1988:168).

This is strikingly illustrated by the amount of funds allocated to staff salaries in any educational institution; salaries outweigh all other major expenditures by far. At the Primary level of education, the dependence of the pupils on the teacher for instructional guidance cannot be overemphasized. He or she is responsible for planning and delivering instruction, and will undoubtedly be responsible for selecting (or even producing) the media for classroom use. The attitudes, feelings, past experiences and initial training of the teacher will have a tremendous effect on the teaching-learning process. It is imperative that his or her situation regarding media utilisation be investigated .

### **1.2.2 Who is the Primary Science Teacher ?**

Cohmbs & Ahmed , in Unwin & McAleese (1988) , portray the primary teacher in developing nations quite negatively. He or she is depicted as having no professional training, little motivation in terms of salary and promotion, no access to in-service training or educational materials, and generally as having a low status.

- (a) Is this the plight of the Primary Science teacher in the Mankwe region ?
- (b) If so, could these conditions be generalized to other rural primary schools in South Africa ?

These factors could have some effect on media utilisation in particular and on classroom instruction in general.

### 1.2.3 Why Primary Science ?

The urgent need for scientists and technologists in the South African economy is often equated with the need for a science and technology-sensitive formal education system. In particular,

Black schools are not as effective and there is a genuine unpreparedness of students in this sector (Bawa 1991:17).

This need requires some kind of analysis and audit. This audit must begin somewhere.

While a lot has been done to try to effect changes in Science teaching at the secondary and tertiary levels, there is an urgent need to redress the problem at primary level as well, especially if one regards this level as the base (foundation) of all instruction, and if one accepts the fact that the initial guidance received by the learners at this stage would inevitably have an impact on any form of future training received by the learner. Many of the **learning handicaps plaguing the black student** such as the lack of mathematical and manipulative skills, can easily be traced back to a deficiency in the initial Science and Mathematics instruction system. There is an urgent need to improve Science and Mathematics teaching at the elementary level.

Zetlyn (1992:6) says that

    this training can be made more effective by using appropriate media.

By conducting an inquiry into media utilisation by the Primary Science teacher, it is hoped that this endeavour would in a small way contribute to the long-term goal of educational inquiry, that of determining ways of improving the teaching-learning process. This need is further accentuated by the fact that

    appropriate teaching is vital for Third world development  
    (Zeitlyn 1992:7)

### **1.3 BACKGROUND TO THE PROBLEM**

#### **1.3.1 Problem sources**

The society we live in is characterized by various forms of technological sophistication.

    Teachers and learners will continually have changing roles and new activities as a result of these changes (Wilkinson 1973:39).

These recent advances have resulted in the need to make Science an integral part of the curriculum. Unfortunately, this change cannot be effected, because of

    the major source of scientific and technical manpower at all levels  
    (Melmed & Lesgold 1987:104).

In addition to this, South Africa is at the beginning of a new political era and one of the major areas of change is the school curriculum . The question is,

Is it possible to reconcile the justified ideals and expectations of the new education system with what is practically possible? (McGregor & McGregor 1992:2).

The answer to this can only be obtained if there is some general endeavour at the national and local levels to find a solution.

A few attempts have been made to deal with the lack of adequately trained personnel. Examples include the Science Teacher Upgrading Project which is being run jointly by the University of the North West and the In-service Training College at Mmabatho. The problems identified are similar to problems elsewhere in the country, namely

- (a) A failure by the practicing teacher trainees to implement the new ideas received from the training because of a deficiency of educational facilities and media in their actual school situation. Mashimbye (1995:81) had this to say about observations of Science teacher trainees:

The observations ,.... particularly on Science teaching, indicated that there is a need for visible changes in the school and college learning and Science teaching environments.

- (b) Furthermore, the unavailability of media reduces the teacher's confidence in media utilisation and, inevitably, in Science teaching as well.

(c) Lastly, according to Gray (1995:178)

there are inadequate or non-existent support facilities and in-service opportunities.

Gray (1995) , noted thiswhile running pre-workshops offered to rural and urban Science teachers before an evaluation of new Science training program packages in schools, that some teachers in the rural schools travelled more than 100 km to attend the workshops. For all the rural teachers it was the first time they had attended such a workshop.

### **1.3.2 What are media ?**

**[Educational media, Mediated learning experience, Teaching and learning with media and Educational technology]**

The terms **educational media, teaching and learning with media and educational technology** are used frequently in this investigation. Feuerstein's Mediated Learning Experience theory (MLE), with his unique approach to mediation as an interactive process, is an approach which could be used in media-related research. (This approach is fully explained in section 1.3.2.6.) An explication is given below in order to bring these terms into line with the theme of the research investigation.

#### **1.3.2.1 Educational media**

In the past reference was made to **teaching aids** as objects used to assist the teachers to deliver instruction effectively. This term has now been replaced by a broader and more inclusive term, **educational media** .

Media are,

persons or objects that are used deliberately to put across (communicate) learning content in a didactic (teaching-learning) situation. ( Freysen et al 1989:3).

Media can be the teacher, (human) or an instrument ( non-human). Educational media are used to carry messages for an educational purpose, such as changing behaviour, facilitating intellectual development or providing any other form of educational experience. The term **educational** when applied to media differentiates them from other forms of media, such as mass media. An educational media package will generally consist of the hardware (equipment) and the software (structured programs), which can be used to convey messages for effective learning and teaching. A simple example would be that of a tape recorder (hardware), on which standard procedures (software) are recorded to give instructions on how to practice a basic skill. It is important to note that the human form of media usually forms a basic component of any educational media package.

*(Please note that the model used by Freysen et al to define media is a model based on a systems approach. The danger in this type of assumption is that it presents only one "ideal " point of view concerning media, which may not necessarily be the only possible view).*

### 1.3.2.2 Using media

The use of media in itself is quite problematic. Because the study of the use of media in instruction was developed at a period when technology was also emerging, there is always a tendency to associate the term 'media' with technological facets. It is a fallacy to suppose that sophisticated electronic media can be used to solve all educational problems. Yeaman (1994), in his post-modernistic debate on the deconstruction of modern educational technology, challenges the prevailing belief that science and technology will improve the human condition. He warns us that

Education delivered by television and computers is not accompanied by a wish to look deeper for truth but a faith in utility (Yeaman 1994:15).

Contrary to modern belief, the use of techno-science (science that uses technology) and modern electronic gadgets in the technological curriculum does not serve

to provoke original insight, but rather the absorption of standardized facts (Yeaman 1994:16).

Yeaman's postmodernistic way of thinking questions the direction of educational progress. He is in agreement with endeavours carried out to improve the world morally, socially and economically, but questions

the possibility of doing so only with science and technology. The biggest human problems will not be repaired by technological fixes (Yeaman 1994:16).

This deconstruction of modern technology is necessary if one is to explore and investigate the media utilization process. In seeking for strategies to improve education one must also look at the side effects of these strategies. Educators must be constantly aware that it is critical to embrace science and technology without eroding the human conscience and way of thinking.

### *1.3.2.3 Teaching /learning with media and educational technology*

Media should form an integral part of the teaching-learning process. However, some form of delineation is justified when one wishes to ascertain whether this integral part is working efficiently and effectively. The actual question is whether there are some aspects of media utilisation related to teaching that

can be reconstructed or modified in order to improve the total teaching-learning process. When one wants to find out what instruments (educational media) would be used in a didactic situation, and why, how and when these forms of media should be used, then one has entered the field of Media Didactics. **Media Didactics**, according to Freydenberger et al (1989:4) is

the Science that studies the use of media in a didactic situation.

Basically this constitutes planning, preparing, carefully selecting and integrating media in a didactic situation.

When dealing with the process of teaching and learning with media, the point of departure should not be the medium but rather the needs of the learners, for example their learning styles, their cultural, social and psychological differences. The subject or topic of instruction would also play a vital role. The desired behavioural change within the same subject would require different approaches to media utilization. For instance, when teaching Mathematics, the mode of instruction will differ depending on whether media are used to cement recently taught principles, to process data or to allow creativity and expansion. However, there are still critical questions we need to ask about media. For whom were the media really developed? Whose interpretation of reality do they represent? Whose culture do they represent? Does the myth of media work to dis-empower teachers rather than to empower them?

This teaching/ learning with media process is a subset of a wider concept, **educational technology**, which is a complex integrated process, involving people, procedures and devices. Educational technology can be regarded as a form of technology dealing with planning, designing and evaluating didactic activities.

#### 1.3.2.4 Educational technology and media

*(Some of the sources used for this section, for instance **Komoski** and **Ofiesh**, both printed in 1967, seem outdated. The reason for selecting these articles is that they'll address a problem that is still crucial. The ideas of Ofiesh, particularly, seem to echo very closely the sentiments of the researcher, hence the apparent overreliance on his works.)*

Although it is generally accepted that educational technology is capable of expanding the delivery of instructional programs to learners of varying ages and grade levels, transcending economic and social barriers,

little is known or agreed upon concerning the role and impact of various technologies in our schools (Riccobono in Okwodishu 1993:32).

Another critical observation by Komoski (1967) is that education lacks an indigenous technology of its own, and this has made it particularly difficult to make effective use of various technologies, such as interactive video and computers, for educational purposes.

Educators have not yet succeeded in working with and developing further what is already known about human learning, so as to establish a scientifically based technology, empirically validated through student performance) on which one can base media-related investigations, according to Ofiesh (1967) . There is no definite theory on how knowledge is transmitted or how skills are developed when learning occurs, at the present moment.

What technology has provided is a channel through which investigations can be carried out. Of notable interest, is the **systems approach** of investigations

within which all factors bearing on a particular objective are integrated and examined. (Ofiesh ,1967: no page no) refers to it as

systems engineering for education ... This process. involves systematically bringing together all the relevant factors bearing on the primary objectives of learning, in order to understand the learning phenomenon clearly.

These would include improving instructional practices, facilities, equipment, program curricula and personnel.

The educational technologist is concerned with finding ways of how best to structure environments for effective learning. In terms of media utilization, (Ofiesh 1967: no page number) suggests that

the question is no longer whether instructional materials can be effective, but how materials we are preparing can be made more effective .

In essence this would apply to old media, new media, and even the teacher ( the chief mediator of instruction ).

#### *1.3.2.5 Modern educational technology*

Thirty years after those statements were made, the same arguments still hold. The issue is not whether the media are new or old, but whether the instruction or teaching administered brings out a desirable form of learning (and what this would be is also debatable).

The problem is that educational technology is built on a model in which there is a linear flow of information from the source to the destination.

The Shannon-Weaver process of communication, when applied to humans, seems so mechanistic and abstract. The empirical-analytical view of education implies a causal relationship between teaching and learning. Schramm's model tries to widen the scope of interaction between those transmitting knowledge and those receiving it by introducing the concept of overlapping fields. In spite of all of this, the simplistic yet seemingly complex view of human communication objectifies people.

Not only are students transformed into components, but the readers of educational technology textbooks are also transformed into components (Yeaman 1994:17).

The argument still holds good that human beings can never be equated to machines.

The strategies used for teaching and learning are of vital importance. The appropriate teaching-learning systems design will be that which succeeds in matching the relevant materials to learner characteristics and learning objectives. The design should also be able to incorporate and integrate the relevant matter (content), adopt the correct sequencing for the best presentation to the students, and provide clear criteria for measuring the learning outcomes.

One should realize that although identification of components within a system and understanding of relationships between components are important in analyzing how the system works, for human communication, these processes will not always lead to improved functioning of the system. This is primarily because the human condition is not static, but dynamic and constantly evolving. Moreover, human and educational communications always occur within the confines of a particular sociopolitical context. An example is the

situation of blacks in South Africa today, for whom the issues of empowerment and democracy are going to influence the way educational communication transpires.

If the function of educational technology is not only to produce people with the skills necessary to survive in an increasingly technological society, but is also geared to the

cultivation of human beings, through an encouragement of a deep self-understanding along with an understanding of and participation in the world (Yeaman 1994:20),

then this system is commendable. However, we are living in a world where education is continuously regarded as a commodity that has to be packaged and sold, and learners are becoming objects to be processed. Accurate and fast conveyance of information is considered to be superior to any other form of communication. Reddy in Yeaman (1994:18) emphatically points out that we should be careful about this information explosion because,

Information is useless to people who are unable to read and cyborgs (processed beings), who are unable to analyze, synthesize and criticize what they read.

What is desired is a dynamic approach to investigating the media utilisation process in which each instructional/teaching problem will have its own solution, an approach which allows for the diversity in the way different teachers give instruction and the way students assimilate information, an approach which allows a variety of analyses and interpretations. Modern educational technology is driven towards

a moral condition in which technology is used more to educate and less to subjugate the people and the earth, Nichols in Yeaman (1994:20).

It is beyond the scope of this study to provide a comprehensive exposition of educational technology. What this study attempts to do is to focus on media utilisation (instrumentation) as an element of the broader educational technology construct.

#### *1.3.2.6 Feuerstein's Mediated Learning Experience*

##### **(a) What is Mediated Learning Experience ?**

Feuerstein's views focus on mediation as an interactive process rather on the media. His underlying belief is that cognitive development is critically affected by the mediated learning experience (MLE) the child receives. He believes that low attainment in individuals can be attributed to lack of mediation.

MLE refers to the way in which a mediating agent ( a parent, caregiver) transforms stimuli from the environment for the growing organism (child). By this mediating process, a child acquires behaviour patterns and learning sets that make it easier for him or her to become modified by direct exposure to stimuli ( Harth 1982:2).

Goldberg (1991) and Savell et al (1986) both emphasize the role of an intervening adult as a teacher, or one who offers a purposeful direction (mediated learning). The other component of Feuerstein's approach with direct relevance to this research is his curriculum for remediating cognitive deficits, the Instrumental enrichment. In this he uses specific materials ( pencils, paper and exercises), to modify the cognitive functioning of an individual, allowing him or her to learn to organize, interpret, analyze and

perform any other operations that promote effective learning. Although the program was originally designed for retarded children, it has since been used for normal children as well.

The striking features of Feuerstein's approach is focus on the individuals involved in the learning process, the teacher and the student rather than on the media. Secondly, it is remarkable that the instruments (media) he uses are quite basic forms of media (pencil, paper and exercises). Both Harth (1982) and Blagg (1990) discuss the three main criteria for Feuerstein's approach. These are :

- (1) intentionality, a process of orienting the learner to specific tasks
- (2) meaning, the way in which the mediator endows the learning experience
- (3) transcendence, which involves teaching strategies that transcend the immediate task

**(b) Application of Feuerstein/s theory to teaching curricular content (e.g. Science)**

Feuerstein, after a number of years of research was able to identify specific problems and was able to select teaching materials to overcome these problems. The instruments used in Feuerstein's enrichment and remedial program are not designed for a specific curricular skill or content area, but are content-free.

Within this design, it is emphasized that

it is not so much the content of the activities that is important, but rather the way in which they are used by the teachers (Blagg 1990:22).

However, although it is contended that

researchers and practitioners share the view that improving cognitive skills is the key to affecting all areas of academic achievement (Silverman & Waksman 1988:134),

Feuerstein himself is somewhat skeptical about using curricular content in order to enhance cognitive performance (Harth 1982). He outlines two reasons for his skepticism. The first is the nature of the learners. For his particular investigation, disabled individuals who by their nature are action rather than content oriented, cannot be forced into discussing the content or subject of discussion.. The second is the nature of the content.

Curricular content has its own structure and sequence that do not always coincide with that needed to produce cognitive change (Harth 1982:6).

However, I believe that science would lend itself well to this particular type of approach because science teaching should not just involve assimilation of facts but should be geared to

transforming a learner's passive and dependent cognitive style into the characteristic of an autonomous and independent thinker' (Feuerstein in Harth 1982:5).

The main argument of the critics of Feuerstein's theory is that

finding that a cognitive deficiency is ameliorated by MLE does not mean that the deficiency was caused by lack of MLE (Frisby & Braden 1992:291).

In relation to this investigation, the power of Feuerstein's Mediated Learning Experience lies in its recognition of the human influence in communication, that is the student and the learner. The instruments (media) used are secondary to the interaction itself. The theory has its limitations in terms of the time available to run such an involved program, maintaining continuity and the intense and demanding preparation of teachers that is required. However, according to Pendlebury (1985), the rewards in terms of the students' improved motivation towards learning and the effects this has on the teacher performance levels make the approach a worthwhile venture. The message conveyed here, especially by Hillard (1992), is that it is necessary to establish and develop mediation (teaching) strategies that would allow the learner to improve approaches to learning in a meaningful, long-lasting way.

According to this theory the act of teaching itself is a mediated experience. Without the mediator, the guiding individual, the learner undergoes a direct learning experience (unmediated), in which he or she is directly exposed to the environment. If the experienced and active human being responsible for guiding the learner is the mediator, and the objects used during this experience are the tools or instruments, what then are the media? Is it justifiable to assume that mediation is an interventional interactive process which does not require the use of any form of media? Or can we plausibly say that these tools that are used can be referred to as forms of media ?

Educational communication requires forms of platforms, channels or tools through which or by which the interaction between the teacher and learner can be enhanced. These structures are referred to as forms of media in this investigation.

### **1.3.3 Media selection**

The main purpose of using media should be to facilitate learning. Clark in Fortner (1985:122) contends that

media are mere vehicles that deliver instruction.

Selection of media requires adequate planning to ensure effective use. One of the main problems in media selection is the lack of clearly formulated media selection guidelines. Furthermore, a number of teachers have no access to information on media attributes or processes of integrating media in different didactic situations. A few teachers are threatened by media, fearing that media will replace them. Others are not well-informed about the operation of certain equipment, especially electronic and computerized equipment, and would

prefer to rely on traditional pedagogy than to incorporate mediated instruction ( Descy, 1992:16).

At times they resort to using less complex forms of media. This does not, however, imply that simplicity of use of media can replace suitability and relevance to the achievement of the learning objective. There are complex forms of media which at times hinder the learning process, because the learner is at times forced to concentrate on the media itself instead of the actual desired learning objective. Finally, in a number of rural schools, media are simply not available because of the lack of financial resources.

Identification of media selection strategies, whereby media possessing those attributes necessary to ensure that effective learning takes place are identified, is essential. Selection should be based on the desired learning objectives and learner characteristics. The test for the successful use of

media is on how well those media assist the learner to achieve the desired learning objectives. This success depends on

the suitability of the various media, the way in which they complement one another and the planned use of media to realize stated objectives ( Freysen et al 1989:65).

#### **1.3.4 Media evaluation**

The major limitation of the media evaluation process is similar to that of media selection, that is, the lack of a perfect formula for evaluation. The assumptions about the ways in which media are effective have not been adequately tested by measuring the extent to which a student gains in performance or modification of behaviour. It could be argued that this lack of a fundamental evaluative procedure is the reason why many instructional devices have seemingly failed to live up to their overstated performances when adopted by schools. A typical example here in South Africa was the introduction of television and video teaching in the early 1980s. After introduction, there was no visible evaluative procedure and hence there was no visible positive effect on teaching with this type of technology. The result was that the whole project was abandoned.

#### **1.3.5 Media integration into the lesson**

Media integration should be carried out in accordance with the objectives and content throughout the entire lesson. All the variables associated with the instruction, that is, the learner, the teacher, the learning content and the media, should be interlinked, in order to obtain the most effective and efficient

learning for each individual is the opinion of Ofiesh (1967). Freysen et al (1989) identify three lesson phases , the introductory phase ,the development phase and the final phase .

According to Freysen et al, during the introductory phase, which involves arousing interest, media are used to motivate, attract and hold attention. (Examples would be real objects, videos and models.) This can only be done if the media are properly integrated and suitable. The best media should be selected for the development phase, the phase in which it is essential for a meaningful learning experience to take place. (Realia and textbooks are suitable for this phase.) In the final phase, media can be tested to determine whether the learner has acquired the knowledge necessary to lead him or her into deeper and further application .

During all these stages, media integration should be evaluated in terms of learning objectives. One medium could be used for all phases, or a different medium could be selected for each phase. Proper integration is a prerequisite for determining the success of the teaching/ learning activity. This approach to analyzing media integration is by no means perfect or final. In fact one could argue that it is too structured and too limiting to both the teacher and the learner. A more desirable approach would one in which both the teacher and the learner would be allowed to explore, search for and define their own strategies of media utilization. The problem is that, unfortunately, in the real school situation there are many factors which inhibit this form of approach. There are constraints of time, regulations and a fixed focus on finishing and following a clearly marked syllabus and time-table. These always seem to revert the teaching/ learning process to a more structured format.

The entire lesson should be investigated holistically but sometimes it is necessary to break up the lesson into segments in order to enhance the analytical process. This is because the integration requires that one should

be able to assess the overall effect of using forms of media in the whole lesson, as well as identify those types of media most suited to the achievement of specific learning experiences or behavioural modifications.

### **1.3.6 Multi-media**

The meaningful integration into the lesson can therefore be analyzed in terms of its impact on different segments of the lesson or on the entire lesson. This integration can lead to more effective learning and teaching, provided that the media selection and adaptation to the lesson are appropriate, systematic and also able to allow individual expression and adaptation for both the teacher and the learner. The fact that material concerning some aspects of knowledge is 'packaged' is just an indication that the society we live in is still largely dominated by static educational systems. In schools, the evaluation procedures still prescribe that curricula have to be followed precisely otherwise learners would not be deemed competent to graduate from educational institutions.

Multi-media strategies are only useful if they complement each other, and if their combined use results in successful and meaningful learning. The greatest strength of multi-media strategies is their multi-sensory applicability (their potential to stimulate different senses). Unwin (1967: no page no.) warns that

multi-media should not be used for its own sake, nor for the simultaneous battering of all possible senses, but primarily for communication and motivation.

The qualities of a good multi-media strategy include convenience of use for both the learner and the teacher, and the ability to motivate, capture the

learner's attention and maintain the interest of the learner. A good system is able to actively involve the learner in achieving the learning objective.

O' Connor and Brie (1994), in their findings on a study investigating multi-media use (a computer combined with a video disc player), reported that this technology was able to change the classroom environment in positive ways.

As time passed, we frequently observed more Socratic dialogue between the teachers and students. Students began to think critically, examine their assumptions, and put forth alternative hypotheses (O'Connor & Brie 1994:28).

Multi-media allow or make room for individualization, where each learner proceeds at his or her own pace, enabling the teacher to give attention to those students who need it.

The greatest disadvantage of multi-media is their relatively high cost, especially in developing countries. Another problem is the communication gap between material developers and potential users. Teachers have insufficient knowledge on how most media work, and hence tend to develop a type of pessimism regarding media use.

### **1.3.7 The role of the teacher**

The teacher is the most expensive and most valuable resource available for achieving the aims and objectives of education . The teacher should, therefore , be suitably trained and well-equipped. It is imperative that he or she has an understanding of the learning process in relation to the subjects being taught. Educational technology could pave the way for exposing teachers to

strategies enabling them to use relevant approaches of organizing instruction to meet the learner's needs, and to ... and to be in command of those strategies enabling them to make selections of materials and devices appropriate to each instructional problem (Ofiesh 1967: no page no,)

The teacher requires exposure to teaching and learning systems, to place the range of technologies in perspective .(Parker 1967: no page no.)

In order to overcome technophobia and to dispel teacher fears, the teacher must learn to interact with new and old media, and must be encouraged to use instructional technology as a tool for teaching and learning.

### **1.3.8 Pragmatic concerns**

#### *1.3.8.1 Technology and the educational environment*

These concerns have somewhat dictated the direction of this study. The first major concern is the rapid advance of technology in an educational environment where the student population is increasing rapidly, the teaching population is insufficient in numbers and anachronistic in skills, and the educational facilities are deficient. There is an increase in the volume and complexity of information to be communicated, assimilated and applied. Then there is the issue of an educational system adopting teaching curricula and methods which are incompatible with the new technological era. This contributes to feelings of inadequacy among teachers, making them hostile toward any form of modern educational media. Moreover, right now, technology is far ahead of our ability or even desire to use it.

### *1.3.8.2 Quality versus quantity*

The second concern is that of **Quality versus Quantity** of education. The free primary education system which the South African government intends to introduce will in effect result in increased student rolls in schools, while modern learner-centred approaches to learning suggest individualization. The new age education system demands and is inclined towards better equipped classrooms with, preferably, affordable multi-media systems. The challenge, then, is to attain the highest quality education in an expanding mass education system geared to individually prescribed learning.

### **1.3.9 Research**

Extensive experimentation in areas central to a relevant education in this part of the world still needs to be carried out. The field of Primary Science teaching and learning within a South African context requires further exploration before any objective decisions can be made. On a global scale, experiences that produce better and effective learning need to be investigated further and evaluated. So far, a number of pedagogical hypotheses have been sufficiently tested. The available learning systems need, however, to be validated and tested for accuracy and effectiveness in real classroom situations before meaningful adaptation in actual teaching and learning environments can take place.

### **1.3.10 The research trend for this study**

It is unrealistic to expect increased resources to be allocated to media utilisation in schools in the present financial climate. Methods of making the most effective and efficient use of resources must be developed. Approaches

must be devised whereby the old and the new resources are integrated into a relevant-learning oriented system.

Tickton (1979:23) says that

creative application of the little known about the learning theory can be used to produce an effective form of education.

Hopefully, the essential ingredients required to forge a means of developing several appropriate media utilisation systems will be identified, systematically analyzed and then integrated and applied to Primary Science teaching. The need to identify more effective approaches in the search for solutions pertinent to educational problems is no less urgent in South Africa than elsewhere in the developing world.

This process, however, requires soliciting accurate information on what is actually transpiring in the schools today. This study aspires to be a worthwhile beginning rather than a final statement.

#### **1.3.11 Definition of terms**

It is important to define explicitly, as far as possible, the key terms used in this research report so that the reader can get a clear picture of the field the writer hopes to cover. An attempt will be made to arrive at a systematic definition of the following terms:

##### **(a) Educational media**

In this investigation the word **media** was used to refer only to the non-human forms of media (presentational devices whose main purpose is to facilitate

learning). The term **educational** here was used to distinguish this type of media from other forms of media, such as mass media. The educational media being investigated include the chalkboard, flipcharts, cloth or felt boards, the overhead projector (OHP), slides, models, audio-cassettes, radio, television (TV), video, computers, posters, displays, real objects and any other form of media that will be used in the classroom.

### **(b) Media utilisation**

Observations will encompass media in general as utilized by both the teacher and the students during the lesson format, even though the title would seem to imply that the study is focused on media utilized by teachers only. It is assumed that it is the responsibility of the teacher to plan, select and integrate any form of media used in the lesson, particularly those used by the students.

### **(c) Primary school**

These schools cater for the 7-13 age range of pupils, although in the rural areas a higher age average is expected, since policies of age restrictions are not rigidly adhered to.

The schools in this region (the former Bophuthatswana) were categorized as follows:

Grades 1 - 2 : Preprimary School

**Standards 1 - 4 : Primary School**

Standards 5 - 7 : Middle School

Standards 8 - 10 : High School

#### **(d) Primary Science Curriculum**

The Science Curriculum begins at the Standard Two level and extends to Standard Four.

The main topics covered are :

Living things

Materials in nature

Energy

Forces and their application

#### **(e) Mankwe district**

This is one of the 26 districts in the newly demarcated North Western Province in South Africa. There are seventy primary schools in this region, of which a list is provided (Appendix A). There is one special primary school in the region, (the Holy Family Primary School), which was not included in the investigation, because during the period in which the research was conducted it was offering a science curriculum different from that of other schools.

### **1.4 SCIENCE TEACHING AND THE PROBLEM**

#### **1.4.1 Attitudes towards Science**

The generally accepted view is that Science subjects are difficult subjects. Children are given the impression at an early stage, according to Guerra (1988:23),

that sciences are tough, nearly incomprehensible, and they tend to believe it.

Science seems to be too complicated for early childhood students, especially if it is presented as the explanations of the universe as understood and accepted by scientists (Yager, Blunch & Nelson, 1993:125).

It is inconceivable to expect young children to interpret Science as mature scientists do. Science concepts are often presented as barriers and hurdles which have to be overcome. This is rather unfortunate, considering that Science is supposed to be an explorative subject. The aim of primary Science teaching should be

to encourage and stimulate curiosity, ... to allow students to explore and understand the environment, appreciate problems and develop a framework for solutions at an early stage (Stringer & Stringer 1987:1).

Primary Science education needs to be redefined in the direction of an approach to learning in which the learner has the freedom to construct his or her own meanings.

#### **1.4.2 An Integrated approach to teaching Primary Science**

An integrated Science approach, which consists of

the investigation of one's environment, and .... extending the use of the laboratory and classrooms to the use of locally and available materials (Green 1993:431)

is the approach envisaged as the most desirable at the primary level of education. In addition to this,

Science in the primary school must be associated with doing  
( Hayes 1982:2).

Children should be allowed to explore, observe and satisfy that natural curious instinct, and that inner quest for discovery. Objects and materials within the immediate environment can be used for investigations and exploration. The ultimate aim should be to channel and lead the learners towards understanding basic scientific concepts while allowing room for individual growth and expression.

Science is an ideal vehicle for acquiring skills, fostering attitudes and developing an understanding of a range of concepts relevant to everyday experiences (Stringer & Stringer 1987:6).

This potential has been seriously underutilized by teachers in general. Media utilisation could enhance the realization of this potential.

In this study, the media utilisation model considered as ideal is one which would suit an integrated Science approach to teaching and learning. Within this model, pupils are taught to tackle some of the questions arising from their observations of the environment, and problems which affect their daily life.

#### **1.4.3 Constructivist approach within media use**

The correct media utilisation model can only be developed if proper constructions of the media utilisation reality are created in such a way that they are relevant to a specific situation, for example, in this case, the rural schools. This process would have to draw on contributions from skilled, experienced and dedicated researchers. This cannot be achieved without the help and assistance of the major stakeholders in the media utilisation process. In this particular case, these are the teachers and the learners.

In terms of this research study, the focus is on the teachers. The researcher, together with the teachers, has been engaged in a process of exploration and discovery of the media utilisation reality so as to acquire some form of understanding of this reality. The process requires continuous testing and revision until an acceptable form of construction is arrived at. The process would be strengthened if there were more researchers participating in building up joint constructions.

Similarly, a constructivist approach to media use is very desirable. In this type of approach, the teachers would possess the freedom to explore and assess what they are utilizing, and eventually construct their own meaningful strategies of planning, selecting and using media to improve Primary Science teaching. Teachers should also be enabled to research on their own through an establishment of reflective teaching practice. By considering and reflecting on their own classroom practice they are able to develop an awareness of what is required to improve the existing practice. In addition to this, the learners are not just involved in using the media, but are actively involved in the production of media, collecting pictures and specimens, making wall charts, building models, conducting experiments, observing natural phenomena, collecting, analyzing and synthesizing data. In this way there is an assurance of the meaningful use of media to facilitate cognitive development.

#### **1.4.4 The teacher and the Primary Science curriculum**

The themes in the Primary Science curriculum in this region can easily be taught with the integrated approach. This includes themes such as : *Living things, Materials and nature, Energy and Forces and their applications.*

The teacher, if well-informed and well-motivated, can draw up from the vast wealth of human and material resources in order to encourage the students to

interact with their surroundings. (Human resources would include the teacher, the pupils themselves and personnel from health centres, factories and local craftsmen. Material resources include local surroundings, the laboratory or science corner, gardens, ponds, village markets, places of work and natural habitats.)

A well-trained teacher should have the ability to draw on the pupils' experiences, and permit the students' participation in demonstrations and illustrations in order to develop a healthy learning environment.

#### **1.4.5 The research problem**

Primary Science teachers in the rural schools are faced with a multitude of problems, the most prominent of which are overcrowding and lack of facilities and equipment. The use of media and any form of technology can reduce or minimize the pressure on these teachers. One must note, however, that

in Science, children's experiences of learning and discovery through doing things for themselves can never be replaced by artificial situations created by computers and other forms of technology ( Strack 1988:164).

However, technology can bring to the classroom situations which would otherwise be impossible to create.

Hardly any investigative Science takes place in rural schools today, primarily because very few schools have access to the variety of devices required to improve Science instruction, and those available are not supplied with clearly formulated strategies for their use. Furthermore, teachers have not been trained to recognize opportunities which they could exploit to improve learning. (Strack 1988:164) expresses the following opinion:

More information is needed about the technology that both transcends subject boundaries and provides an opportunity for children to carry out those activities that are associated with good Science education.

Encouraging teachers to use educational media is one of the ways that can be used to improve Science instruction, since

the use of educational media promotes learning  
(Freysen et al 1989:15)

if selected in compliance with the learner's needs. The use of media in didactic situations is not a new concept, but the search for practical theories behind media selection and integration is not a widely researched field, particularly in the black South African schools. An analysis of media utilisation can be of considerable value in establishing a frame of reference for media use in education, in assembling clearly formulated procedures for media selection, and eventually, in contributing to the development of the most appropriate teaching models designed to improve Science teaching and learning.

This study is an initiatory attempt to analyze media utilisation in the context of the perceptions of those responsible for delivering instruction, the Primary Science teachers in the Mankwe district.

#### **1.4.6 The approach used and the hypothesis**

A qualitative approach seemed particularly well-suited to a study aimed at investigating media utilization from the teachers' point of view. This seemed to comply with the functions of qualitative researchers, as stated by Bogden and Biklen (1992:32), which are

to set up strategies and procedures to enable them to consider experiences from the informants' perspectives.

The primary hypothesis of this study was that primary science teachers were not using educational media extensively enough when teaching Science. The sub-hypothesis of the study was that problems the teachers experienced with media utilization could be associated with

- (a) the teachers' lack of exposure to media due to unavailability
- (b) inadequate knowledge of teaching and learning strategies
- (c) the lack of in-service facilities and media centres, and the lack of confidence in teaching Science

Although the inquiry from the teachers' perspectives called for qualitative research, a brief quantitative survey was carried out to establish a general media availability and utilisation pattern in the primary schools.

## **1.5 A THEORETICAL FRAMEWORK FOR THE INVESTIGATION**

### **1.5.1 Phenomenology: a qualitative form of inquiry**

The study was concerned with exploring and describing a phenomenon (media utilisation), as viewed by the teacher. A perspective that would focus on a particular phenomenon and that would allow the researcher

to try and understand subjects from their point of view (Bogdan & Biklen 1992:34) was required.

A phenomenological inquiry appeared to provide such a perspective. According to the two philosophical 'fathers of phenomenology', Edmund Husserl and Alfred Schutz,

Phenomenology is the study of how people describe things and experience them through their senses (Patton 1990:69).

The central issue, then, is the act of experiencing the phenomenon, understanding it as a result of the experience, and then finally being able to interpret and give meaning to the experience. What people experience constitutes their reality.

From this explication of phenomenology Patton (1990) identified two implications of a phenomenological perspective which are often a source of some degree of confusion, namely:

- (1) a focus on the subject matter, what people experience and how they interpret the world in which one can use interviews without experiencing the phenomenon itself (Patton 1990:70) ....
- (2) a methodological implication, with a mandate to actually experience the phenomenon being investigated (in which case participant observation would be necessary ) ( Patton 1990:70).

A phenomenological perspective can mean either or both.

The other unique characteristic which is used to distinguish a phenomenological inquiry is

the assumption that there is an essence or essences of shared experience(Patton 1990:70).

The phenomenologist is constantly engaged in the process of analyzing the experience, so as to identify basic elements which are common to all those who are sharing the experience or phenomenon.

**WHAT** are his or her attitudes towards media utilisation, what are the problems and obstacles, and what contributions could be made to improve media use ?

- (3) **WHERE** is the media utilisation process taking place: the physical surroundings, the learning environment, the types of schools (rural/urban)?
- (4) **HOW** is the media utilisation process taking place, in terms of available resources and the type of teaching models used while teaching ?
- (5) **WHEN** is the media utilisation taking place, in terms of the political era and the social climate ?

All these were designed to try to give meaning to the media utilization practice in the rural schools. It was hoped that from the answers to these questions, one would be able to purposefully construct some form of guideline required to improve media use and ultimately Science teaching.

## **1.7 THEORY AND PRACTICE**

Delving excessively into the abstract world of theory can sometimes serve to dissociate theory from the world of practice. Complete allegiance to one epistemological perspective is sometimes neither possible nor plausible. It is the practical side to qualitative methods that simply involves asking people open-ended questions and observing matters in real-world settings in order to solve problems that is both attractive and very applicable to this study.

The qualitative method of research uses all the approaches one requires to analyze and describe experiences (for example, media use).

It enables the researcher to understand the subjects' world , and how and with what criteria they judge it (Bodge & Biklen 1992:219).

Qualitative research skills play an important part in helping people to live in a world more compatible with their hopes by providing tangible information on what it is like now (Bogden & Biklen 1992:217).

The focus of this investigation was on the teacher and media utilisation. However, before continuing with the investigation, the opinions of other researchers concerning media utilisation are briefly reviewed.

## **CHAPTER TWO**

### **REVIEW OF RELATED LITERATURE**

#### **2.1 CATEGORISING MEDIA-RELATED STUDIES**

The bulk of media-related studies are descriptive or comparative in nature. A few of them are experimental and there are a number of reviews on media utilisation research. Although the studies are varied in their approaches and aims, a common problem expressed is the choice of an appropriate methodology for analysing media utilisation.

#### **2.2 DESCRIPTIVE AND COMPARATIVE STUDIES**

In general, descriptive studies are those carried out with the aim of describing or documenting characteristics of the media utilisation process. Comparative studies focus on making either a comparison between the use of one type of medium in different institutions, or a comparison between the use of different types of media within the same institution. Both descriptive and comparative studies have

the end result of describing a natural phenomenon (Yarger & Mintzi 1979:20),

and have contributed to our knowledge of how materials are used in the classroom. One such study by Hawley and Yarger (1979) was designed to document the number, group mode, type, characteristics and the time in which materials were used in American elementary and middle schools. Another descriptive study by Yarger and Harrootunian (1979) assessed the materials used and the roles played by elementary school teachers during a reading instruction.

A comparative study by Teather and Collingwood (1978) compared the use of media at two universities in order to identify differences in media use between teachers of different disciplines. According to the findings, the blackboard was the most frequently used form of medium.

In contrast, a more recent comparative study by Lennon and Maurer (1994) analysed four basic technologies (blackboard, projector, flipcharts and whiteboards) in terms of work space, editing/erasability and visibility. The overhead projector was ranked the most superior while the blackboard was the most frequently used. The researchers recommended developing a system that would

incorporate the advantages while avoiding the disadvantage of each media (or technology) (Lennon & Maurer 1994:5).

A study by Jamieson et al (1993) compared the effectiveness of instructional television and radio with that of a teacher. The main drawback of this research was the lack of detail about the learning process. This made cross-media comparisons difficult to evaluate and led to conclusions of **no significant difference** between media use and non-media use. However, one significant inference from this research was the identification of some variables which consistently made a difference to student performance, for example **teacher verbal ability**.

### **2.3 MEDIA SELECTION STUDIES**

Levie and Dickie (in Wilkinson 1973) were the pioneers of using media attributes as a means of selecting media. Wilkinson (1973), in his comprehensive report on media utilisation, sought among other things for the media attributes that would facilitate learning, for a particular type of learner and for a specific task. Teather and Collingwood (1978) contend that media selections depend on what media are provided or available, and emphasise that

the discipline taught is an important determinant of patterns of media use (Teather & Collingwood 1978:156).

Impressive studies dealing with media selection are those of Romiszowski (1986) and Knirk and Gustafson (1986). Romiszowski developed a media selection system whose components were processes, information and materials. He further continued to formulate a media selection model. According to Romiszowski (1986:57),

the instructional method dictates /limits media selection.

Factors influencing media selection mentioned in the study were lesson objectives, student and teacher characteristics and economic restraints. He managed to come up with media and behavioural classifications, concluding that the choice of media was influenced by issues such as affordability, ease of production and practicability (or applicability to the teaching situation).

In their study Knirk and Gustafson (1986) also outlined procedures for selecting presentation methods and media, but were more emphatic on the processes of field testing and revision of procedures before actual utilisation within the relevant teaching models. Again, factors influencing media selection were mentioned, namely the environmental setting, the participants (students and teachers), and the instructional technology applied. Freyden et al (1989) also emphasised the environmental influence, stating that a well-designed teaching venue could really make a teacher's task easier.

In conclusion, it appears that successful media use depends on the suitability of the various forms of media, the way they complement each other, and the planned use of media to realise objectives (Freyden et al 1989:65).

## 2.4 CORRELATIONAL AND EXPERIMENTAL STUDIES

In the literature publication on media by Yarger & Mintzi (1979), Cornbleth correlated curriculum material characteristics with pupil involvement, using a classification system known as the Annehurst Curriculum Classification system (ACCS) to match students and materials. The intention of this research design was to manipulate, in a controlled manner, those variables thought to cause changes in the curriculum materials (the independent variables), and then assess the effect of these manipulations on some measure of pupil involvement (the dependent variable or criterion). Another group of researchers, Berneman et al, in the same Yarger and Mintzi (1979) publication, carried out experiments intended to test the validity and reliability of the same instrument, the Annehurst Classification System (ACCS). They carried out a series of experiments using two dependent variables, achievement (how well a given task could be accomplished) and interest (a measure of student involvement with the task), on a specific task. The aim was to determine how this would affect the correlation between the curriculum materials and the students' involvement, or the effectiveness of matching students and curriculum materials. The results did not show any significant correlation, raising doubts about the validity and reliability of the classification system.

In another experimental study, Lee (1970), compared the textbook and other media using operational analysis. In essence he had to operationalise those observable and measurable aspects of each form of media, noting how they affected the total learning process. He endeavoured to find the best means of integrating media in the total context of learning conditions, and to identify ways of making instruction less expensive, more effective and more rewarding to the learner. He discovered, from his research, that the textbook was

a necessary, but not a sufficient instrument for learning ( Lee 1970:116).

The textbook is a good source of information, excellent for fast retrieval of information, and is also a relatively inexpensive means of data storage. In many instances, the textbook falls short of concentrating the learner on the learning task, specifically in the elementary stages of education.

## **2.5 DECLINE OF MEDIA USE**

Nelson et al (1987) drew attention to the decline of the use of audio-visual media in favour of textbooks ( back to basics ), combined with an inclination towards video and computer use in instruction. Reasons given for the decline, which could prove worthwhile to this study, included outdatedness, lack of equipment, poor quality of materials and unavailability of centres for media support.

The fact that in most Black schools there is no equipment to start with renders any comment on a decline in audio-visual media invalid, for the simple reason that teachers in the rural areas have never had the opportunity of using this type of media. A vivid example of the decline of audio-visual aids in the schools in this country can be seen if one visits the middle and high schools in the former Bophuthatswana. During the early 1980s there was a campaign to introduce video and television training in the schools. Literally every school was supplied with a television and video machine. Those schools in areas without electricity were given solar operated televisions. Very few schools have managed to retain these machines. The remnants of the solar-operated television sets can be seen in some schools. Apart from neglect and improper maintenance, incidences of theft and vandalism during the riot period have also contributed to the destruction of these major items of audio-visual equipment. The other deterrent factor is the lack of a properly co-ordinated central media centre in each of the regions or districts.

The type of media preferred was, according to Nelson et al (1987), the kind that could be updated quickly, easily duplicated, easily prepared and conveniently stored in the home and classroom. In terms of an urban environment, this would suggest

multi-media with computerised instruction. In terms of the rural areas, this suggests a drive back to the textbook and the chalkboard. This is further encouraged by the type of assessment or examination system prevailing in the schools today. It encourages rote memorisation and a shift backwards to un-innovative methods of teaching and learning. Moore and Hunt (1990), in their study, associated the teachers' reluctance to use media with teachers' fears of innovations and a generally uncomfortable attitude towards any new teaching or learning techniques.

## **2.6 PROPONENTS OF MULTIMEDIA USE**

Several researchers are totally convinced of the benefits of multimedia. As early as 1965, Barrileaux (in Wilkinson 1973:33) indicated that

the use of a wide variety of materials leads not only to increased skills in the use of the materials, but also to increased achievement in academic areas.

Freysen et al (1989) were of the opinion that a multimedia approach in which the best media for each learning activity were selected was superior in effectiveness to a single media system.

It should, nevertheless, be borne in mind that there is no single superior device, rather

each type of media will contribute to a specific situation ( Smith & Nagel 1972:14).

Moreover,

researchers have learnt that only specific, relatively unique features of a medium make a difference to instruction' (O'Connor & Brie 1994:27).

The use of multimedia (especially the combination of computer-assisted instruction and interactive video) can make learning easier and allow students to perform at higher levels.

The educational needs of the students can be effectively fulfilled by using the benefits provided by multimedia (Malhorta & Erickson 1994:38).

## **2.7 OKWADISHU'S 1993 STUDY OF THE AVAILABILITY AND USE OF MEDIA IN SECONDARY SCHOOLS IN NIGERIA**

The study, whose aim was to identify what items of educational media were available in selected schools and the extent of their use, was of particular interest because of the similarity between its research theme and that of this study. Three dimensions, which, to a lesser or greater extent run parallel to those of this investigation, can be noted. The first one is the environmental setting: both studies were conducted in rural regions in developing countries, where resources are scarce, student populations are increasing at alarming rates, and the number of qualified teachers is relatively low. In both studies, the schools are assumed to be poorly equipped and the levels of media low. The third dimension was the fact that Okwodishu (1993:33) regarded media utilisation as an integral component of the instructional process, a position also adopted in this investigation.

The approaches of both studies are different, with the Nigerian study using a more quantitative approach, while this study adopted a more qualitative approach. Nonetheless, the problems identified in the Nigerian study can easily be transposed into a South African context. Specifically, these are economic problems, where the schools have very small budgets, and purchasing educational media is not a priority. There are also political problems, in that the government, in an attempt to appease the public, erected more schools than it could afford to maintain. The third problem relates to the quality of teacher training and lack of upgrading and in-service facilities for these teachers. In essence what this suggests is the fact that findings

and recommendations in the Nigerian study could easily be transferred to a South African context.

## **2.8 NTHO'S STUDY (1994-1995) TO EVALUATE CURRICULUM MATERIALS DESIGNED TO IMPROVE THE TEACHING OF SCIENCE IN PRIMARY SCHOOLS IN SOUTH AFRICA**

This was a recent evaluation study which involved the evaluation of a system of syllabus-related educational materials, designed for Primary Science teaching, and presented in a non-threatening adventurous and comical format. The name of the system is **Spider's Place**

and the material is contained on comics, as well as video and audio-cassettes (Ntho in Conference Abstracts 1995:92).

The evaluation was carried out on a much grander scale than this research, involving eight in-service organisations and advisers from the USA and UK. Apart from the fact that this research does not involve readily prepared curriculum materials, the research trend and approach are very similar. The data collection methods used were extensive, including questionnaires, interviews and observations, and the schools were selected from different parts of the country, in contrast to this research, which was more localised in nature.

The evaluation findings of this research and its limitations have a remarkable bearing on the developments of this study. The strongest link is obviously the fact that both investigations were carried out in the same country, and within the same period (1994 - 1995).

Of significant value are the findings that -

(a) The material introduced teachers to new ways of teaching Science, encouraged student independence, presented Science from the point of view of the learner, and was found to be valuable in those schools with no other Science teaching resources.

(b) Regarding utilisation, teachers tended to concentrate on print, from the multi-media package. What was a bit disturbing was the lack of pedagogical content knowledge of the teachers and the dominance of teacher-centred approaches, leaving many of the goals and possibilities of the material unexploited.

(c) There was a need for interactive teacher orientation in the use of the materials. The researcher felt that teachers did not

fully grasp scientific concepts, approaches to science teaching and the goals of the innovation (Ntho, in Conference Abstracts 1995:93).

Limitations on the research and the amount of data collection was a certain amount of instability within some schools, the number of researchers available, and the fact that observations were conducted in only those schools with in-service and pre-service teacher education facilities.

## **2.9 INADEQUACIES OF MEDIA RESEARCH**

Clearly one can state, in terms of the reports from a number of researchers, that a substantial volume of media-related research has been inadequate, and therefore of insubstantial value to theory and practice. The failures in research are mainly due to inappropriate methodologies.

Studies were set up to demonstrate prior convictions rather than examine carefully drawn hypotheses (Wilkinson 1973:5).

Moldtsadt, in Moore et al (1986), reported that media supporters built their cases on **soft data**. As a result, the findings have indicated that there is no significant difference

in utilising or not utilising media, and consequently media does not have a substantial impact on learning (Moore et al 1986:186).

Several other researchers have expressed similar views concerning media research. Campeau in Moore et al (1986:167) states that

earlier media research has failed to provide reliable information on media use value.

Moldstadt, in the same literature study by Moore et al, indicated that comparative studies have been deemed incapable of determining the value of media usage. This, according to Lee (1970 :5) is mainly because

research has not yet clarified the unique capabilities of media.

According to Moore et al (1986) ,the lack of research clearly supporting the use of technology in instruction is mainly because there are no clear taxonomies , nor properly designed statistical techniques suitable for comparing media instruction with media to traditional instruction.Many studies have been done, as implied by Clarke and Augent in Moore et al (1986),which have concentrated on singular attributes and neglecting the environment.

## **2.10 SUPPORT FOR MEDIA USE**

The bleak picture on media use has not deterred the avid supporters of media utilisation. ( Wilkinson 1973:29) firmly believes that

media has a significant impact on learner achievement and self-image, if carefully selected and systematically integrated into an instructional program.

Even Moldstadt, in Wilkinson (1973), agrees with the concept of increased learning as a result of proper media integration.

Based on findings of media supporters, media utilisation is credited with a number of advantages. Media are said to be able to

unfold reality, and bring the learner into direct contact with reality (Yule 1992:6).

Scramm and Curtis (1976) take cognisance of the ability of media to reach a lot of people, and portray media as a

commercial vehicle for communication (Curtis 1976:7).

The impact of mass media (television, radio, film and the press) on education cannot be under-estimated. Gagne (1986) acknowledges the ability of media to make the instructional task easier, while Jamison et al (1984) referred to media as being time saving. Petkovitch and Tennyson (1984), in Moore et al (1986), ascertain that the power of media lies in their ability to do what the teacher finds difficult or impossible to do.

## **2.11 TOWARDS INTERACTIVE INVESTIGATIONS**

As Wilkinson (1973) correctly suggested, there is a need for researchers to shift from studying media effects to a study of interactions. Lee (1970:7) says that

opportunities for interaction between the learner and technology have not been sufficiently explored.

Lewe and Dickie (1973), in Moore et al (1986), warned, however, that media attributes when combined with the role of the learner were formidable as research investigating the nature of media. There were of the opinion that it would be more worthwhile to embark on cross studies where the multiple effects of one media would be correlated with the multiple learning differences of the students.

Campeau, in Moore et al (1986), who is one of the firm critics of media-related research, proposed taking the direction of inquiry in which media research characteristics would be viewed together with subject matter and task characteristics. She also advised that multivariate designs be used to show effects and interactions among variables for the purpose of improving mediated instruction and learning. The implication of these opinions is a move towards more interactive investigations.

## **2.12 MODERN INVESTIGATIONS IN MEDIA UTILISATION**

In modern investigations in media utilisation the focus of attention is on computer-assisted instruction. One example is a study by Riber (1990) in which the effects of animated presentations and practice were studied in a computer-based science lesson for primary children. Another future theme of investigation is interactive multi-media systems. An example is the study by Malhorta and Erickson (1994), who analyse interactive multi-media systems in terms of increased capacity to store data. The general presentational format of the media in these studies is individualised, consisting of a one-to-one interaction between the learner and the media, and allowing the learner to continue at his or her own pace.

Of notable interest is the report on a collaborative project in California, between a university (California State University), a number of schools in the Kern High School

district and IBM EduQuest, which was designed to empower high school Mathematics and Science teachers to improve their curricula via the use of technology, as described by O'Connor and Brie (1994). The project which ran for three years was evaluated by reputable Science and Mathematics educationists.

The funds in the project were used to provide a selected number of high school teachers with computer networks, software, multi-media workstations and intensive staff development .

Below is the final statement of the authors concerning the project:

The overall result of technology is that it changed the classroom environment in very positive ways ( O'Connor & Brie 1994:27).

These included less lecturing and more learner involvement with the learning task (science and mathematics), improved feedback, more problem solving, more hypothesis-generating and testing, more performance based assessment, increased student creativity, increased student motivation and increased teacher productivity.

However, the success of such a project depended on two major issues. Namely, that the teachers involved felt a personal need for computers in their classrooms, and had some knowledge of potential computer applications. Secondly, these teachers were willing to change their traditional organisational and instructional styles in order to try to solve curriculum-related educational problems. There was an awareness that the multi-media used were not introduced to replace the teacher, but to make the work of the teacher easier. There was also consultation and evaluation of competent educationists, who were able to analyse the whole media utilisation process in terms of how a particular type of technology could positively change what was going on in the classroom.

## **2.13 ASSUMPTIONS AND RECOMMENDATIONS FROM THE LITERATURE REVIEW OF RELEVANCE TO THIS INVESTIGATION**

It is impossible to represent comprehensively all the views, assumptions and recommendations from the various studies reviewed. It is, however, important to take note of a few assumptions and recommendations which are considered to be of relevance to this investigation.

### **2.13.1 Assumptions**

Smith and Nagel (1972) formulated several assumptions which may be worth noting, namely that:

- (a) The use of media is not a substitute for the teacher, and the use of audio-visual media is not designed to supplant the textbook.
- (b) Media use is not necessarily labour-saving, but has great rewards for learning. There is sufficient evidence to support the fact that greater learning takes place if media are well-integrated within the whole instructional program.
- (c) Media can be used to reduce the time spent on a learning task.

In general media usage is preferred over traditional instruction by students. Jamison et al (1973) noted that the use of instructional television was particularly suited to science subjects and that children favour using television for instruction, the reason being that television and video have the ability to bring things alive, to link learning to reality. Learners are able to see and hear events as they occur. These are visual formats that are always capable of gaining and holding attention. In most cases the use of video and television is also considered a welcomed change from the normal routine of static visuals.

One must, however be careful to ensure that instructional television and video are only used for those particular stages within a lesson for which they are best suited. For instance, television and video can show complex motion and events which would otherwise be difficult to explain using static visuals, such as a rocket launch, experiments in space and the birth of a child. Television can also be used to link learners to events as soon as they happen. Satellites now enable us to view important world events as they occur. Television is not a form of media that should be used continuously, because although it allows the learner to concentrate on the material, it does not allow for questioning and feedback. The teacher should still be able to provide those outlets. Continuous and uninterrupted television and video instruction can also become very boring and demotivating. While in some studies it was stated that

the teacher was far more superior to all visual media in gaining and sustaining attention (Wilkinson 1973:6).

Freysen et al (1989:116) argue that

the visual formats of media have the advantage of being able to transcend language barriers.

This is to some extent true, because whatever language we use, the visual display has a way of being able to project, to a great extent, the same message. The interpretation of that message would be influenced by the cultural, social and psychological inclinations of the learners. Each medium can be effective with children of different abilities at different ages, according to Bates (1981) in Moore et al (1986).

### **2.13.2 Recommendations**

Media can be effectively and efficiently used if teachers have received specific training in media utilisation.

- (a) Opportunities should, therefore, be available for training and upgrading teachers in media-related studies and skills.
- (b) An inquiry should be made into how the Department of Education is assisting schools with the provision of educational media, and with the organisation of workshops and seminars on local media production and utilisation.
- (c) The teachers should have access to some form of media centre.
- (d) Access to television and radio broadcasts should also be investigated.

When investigating media use, it is crucial that one pays attention to media selection and integration within the entire lesson.

Materials should be relevant to the purpose for which they are created, and to the students' level of understanding ( Newble & Canon 1991:128).

The teachers should have in mind clearly stated objectives, because these will assist in the selection of media.

Knowing the objectives forces one to create a learning environment in which the objectives can be achieved (Heinich et al 1989:37).

Additional factors which influence media utilisation would require special attention. These include the environmental setting and the instructional methods.

## **2.14 IMPLICATIONS FOR FUTURE RESEARCH**

There is still a need to identify the peculiar values and limitations of media.

According to Lee (1970), operational analysis is one of the means that could be used to further explore the general goals of instruction and media utilisation.

Following the discussion on media research, Campaueu (in Moore et al 1986) quite correctly suggested that replications of earlier research were needed, in order to confirm findings and provide a follow-up to these findings. This would eventually assist in determining under what conditions, for which students and for which learning task specific types of media would be utilised to bring about the desired learning.

## **2.15 THE HISTORY OF SCIENCE**

Science and technology have existed for a number of years, even in Africa. From the earliest times, people have been curious about the world around them. For centuries, people were able to erect structures, plough the land, and make simple useful artefacts for daily use, for example meat grinders or storage barns, using basic scientific principles.

African science educators have pointed out that science and technology have existed for centuries in Africa' (Ngananu 1992, from Doidge, in Conference abstracts, 1995:111).

The study of seasons, methods of hunting, herbs for use as medicines was among man's

first attempts to understand and control nature (World Book Encyclopaedia 1992:142) and the beginning of the study of Science.

Throughout the period of the ancient civilisations - China, Greece, Rome and the Middle East - scientific and mathematical principles were used mainly for practical matters. Each group of people made their own contribution. The Chinese, Babylonians and Indians are known for contributions in mathematics and medicine, the Greeks stressed the development of theories, and the Romans were more advanced in the field of architecture and engineering.

The sixteenth and seventeenth centuries witnessed an upsurge of increasing experimentation in mathematics and science. A number of famous scientists, Copernicus, Galileo and Newton, just to mention a few, were engaged in disproving and establishing theories which are still the core of scientific principles today. From this period onwards, there was an inclination towards original fields of scientific development.

A few examples of people who contributed to the great scientific advances of the era are given below :

- (a) Charles Darwin's theory of evolution for the biological sciences (1859)
- (b) Dmitri Mendeleev's systematic representation of chemical studies (Chemistry) (1869)
- (c) Michael Faraday and Joseph Henry in the production of the electric current (1831)
- (d) James Maxwell, with his famous electromagnetic theory
- (e) John Dalton with the beginning of the atomic theory
- (f) Auguste Comte with sociological studies
- (g) Gregor Mendel, with his contributions to the law of heredity

The past century has seen the influence of scientific knowledge and applications develop at an alarming rate. The development of atomic and nuclear physics has accelerated medical and space exploration, and unfortunately military and weapon technology as well. The development of the transistor has revolutionised the

electronic and communication industry. High-powered transistor radios, television and most recently, computers, are all products of the scientific-electronic age.

## **2.16 SCHOOL SCIENCE TEACHING**

As the field of science and its effects on society expand, so does the need for scientific study...

School science teaching has been steadily changing also in the wake of these societal changes. A century ago it was a small minority that volunteered to study science at school, now the majority do so compulsorily (Bradley 1995 :103).

Science today has been made part of the primary curriculum in schools. This transformation is necessary to ensure that the next generation is adequately prepared to deal with the rapidly changing technological world, and to participate and contribute to the economic developments of the different countries.

As the objectives for teaching science have changed and diversified, so has the content and approach to science teaching changed (Bradley 1995:103).

The representation of science as facts and theories is being replaced by a more practical approach to teaching science.

### **2.16.1 What is Science?**

The world of science covers a very broad spectrum.

Science covers the broad field of knowledge that deals with observed facts and the relationships among these facts (World Book Encyclopaedia 1992:18).

Scientific study involves using systematic methods to observe nature, collect and analyse data, experiment and then establish valid conclusions about whatever is being studied. The study of science is embedded in theories and principles. Theories and principles can only be accepted after testing and verification.

Scientific progress depends on new ideas expanding and replacing old ones (World Book Encyclopaedia 1992:138).

### **2.16.2 The branches of Science**

Science consists of four main branches, namely :

- (1) **Mathematics and logic:** these are the essential tools with which scientific principles are expressed and tested.

Mathematics is the language of science and logic provides the basis of all scientific reasoning (World Book Encyclopaedia 1992:140).

- (2) **The Physical Sciences** deal with the study of the properties and structure of non-living matter. The main branches are Physics, which deals with matter and energy and Chemistry which deals with the study of the chemical structure of materials and how they react with each other. Astronomy (study of the stars), geology (study of the earth's structure) and meteorology (study of the atmosphere and weather) are other branches of Science.
- (3) **The Life Sciences or Biological Sciences** deal with the study of living organisms. Botany (plant study), and Zoology (animal study) are sub-branches of Biology. Other branches include Anatomy (study of the structure of living things) and Physiology (study of the normal functions of living things). Biochemistry, Genetics, Ecology and many others are considered to be part of the life sciences.
- (4) **The Social Sciences** deal with individuals and groups within human society. Branches of the Social Sciences include anthropology (study of the origin and

development of human cultures), economics (examining how people produce goods and services), psychology (dealing with mental and behavioural processes), political sciences (the study of forms of government) and sociology (study of interrelationships within society).

Within the school system, the branch of Science considered to fall under the Science curriculum is Physical Science.

### **2.16.3 What does Science teaching involve ?**

The teaching of science involves the transferral of the **scientific method** and scientific facts and principles to the students. Students are taught basic techniques of scientific research, that is observation of nature, classifying of data, conducting experiments, drawing conclusions and forming hypotheses that can be used to explain existing facts and occurrences. According to Bradley (1995:103),

we have gradually developed from observing nature, classifying observations and speculating, to deliberately designing experiments to test hypotheses and develop abstract concepts, and to applying new knowledge to design artefacts and processes that improve our existence.

Until recently, the teaching of science centred on introducing the abstract concepts, with the hope that science students would be armed with the core knowledge, which they could then use, together with scientific methods, to investigate, verify and develop principles necessary for scientific progress. Some have argued that the teaching of Science with an emphasis on abstract concepts has only succeeded in

driving away students from science, and have left the majority of the population scientifically illiterate, disempowered, and even anti-science (Bradley 1995:103).

The recent trend is to move away from abstract concepts, towards a more relevant science curriculum.

Perhaps the failure to introduce science in a meaningful way to students has been due to the lack of information concerning the learning process, rather than to the abstract concepts themselves. Perhaps the fact that students and educators alike regard scientific concepts as being abstract is an indication that they have, failed to assign proper meaning to these concepts. Gallagher (1991), in his study of textbooks and classroom practice, concluded that the teachers' failure to characterise scientific knowledge as tentative and scientific work as creative was the reason why teachers always seemed to emphasise factual concepts in teaching science.

It would be rather sad if the basis and the core of scientific study were not accentuated during science teaching. What is required today is a new way of teaching, and a new approach to learning abstract concepts. One such approach, referred to as the **learning cycle**, is described by Ward and Heron (1980). It involves three stages: gathering of information, hypothesising (conceptual invention) and application (conceptual expansion), which if one looks very closely, are already dimensions of scientific inquiry.

If this approach is amalgamated into a science-technology-environment-society (STEP) approach to delivering Science instruction in the classroom, it would lead to students having more positive attitudes towards science, less anxiety about science, and better perceptions of themselves as problem solvers (Doidge 1995:112)

The Science-technology-environment-society (STEP) approach to teaching science is an which emphasises the teaching and learning of science grounded in technological, environmental; and societal issues. Syllabi topics are built on issues concerning real-life problems in the fields of Science, technology, the environment and society in general.

Students investigate real-life problems, and learn how to inquire into personal, environmental and social problems, rather than focusing on inquiry into pure science (Doidge 1995:111).

Students learn to apply scientific inquiry skills, which include identifying problems, gathering information from the local environment, organising, analysing and synthesising information, making decisions and taking action. A variety of student-centred teaching-learning methods are used, for example, group discussions, role play, public enquiry projects, practical investigations, case studies, reports and community experiences.

In South Africa, a number of Science-based curriculum organisations are in the process of undertaking science curriculum development along these lines. An example is the centre for Research And Development in Mathematics, Science and Technology Education, (RADMASTE) in its (MRSC) or More Relevant Science Curriculum Project, at the University of Witswatersrand, Johannesburg.

#### **2.16.4 Primary Science teaching**

In many countries, Science has been added to the Primary education curriculum. Teachers now know

the importance of cognitive theory in structuring appropriate experiences in science (Miller 1989:11).

Young children are introduced to skills that will help them develop into competent scientists, skills such as observing, classifying, predicting and inferring.

Much of Piagetian research in cognition has underlined the importance of teaching Science between the ages of six and eleven from a concrete, demonstrable foundation (Miller, 1989:11).

The question has now become whether the primary science curriculum should concentrate on the content of science, or on the processes by which scientific knowledge is gathered and synthesised. Gilbert, in Conference Abstracts (1995:75), says the following:

A realistic answer is that it should strike a balance between the two, because science education is described as having three purposes, learning science, learning about science and doing science.

A number of educators do advocate a shift to a more constructivist approach to teaching Science, in which students are allowed to explore and discover and encouraged to make their own deductions and constructions. For example Stringer (1987:1) says that

the aim of teaching science is to encourage and stimulate curiosity

and Hayes (1982:2) contends that

science in the primary school must be associated with doing.

This will work effectively provided that the students are working within a reasonably well-structured environment.

Other reports which contain arguments on the same lines include a report on the progress of the **Science through discovery** programme of a Texas Independent School district by Kyle (1989). Results of a study on the programme indicated that students improved their attitudes towards science, as well as their decision-making skills because of the programme. Another investigation by Morella (1990) which involved an experiment in which a model encouraging a creative, constructivist approach to teaching science concepts in order to improve complex engineering

systems produced positive results supporting the model's utility. A report by Hofstein et al (1990) which compared participants and non-participants in extra-curricular science activities concluded that students exposed to extracurricular science activities had a more positive approach towards science. In his report Rennet (1987) addresses the need for a revolution in elementary school science and advocates a hands-on discovery approach to teaching science.

These and many other reports advocate the introduction of an authentic science curriculum in primary schools which is activity-based and oriented towards problem solving. This type of curriculum will without doubt require the use of educational media.

## **2.17 MEDIA USE IN THE TEACHING OF SCIENCE**

### **2.17.1 Importance of Science**

Science has an important influence on our lives. It provides the basis of modern technology which shapes our lives as we live them today. Almost every sphere of our lives today is directly influenced by some form of technological development; take for example the spheres of communication, transport, banking, entertainment and domestic chores like cooking, cleaning and washing . Aeroplanes, cars, computers, satellites and television are just a few of the modern scientific and technological inventions. Research in the fields of nuclear physics, medicine and agricultural science is continuously adding to the scientific and technological innovations. Nuclear power, the discovery of antibiotics to cure diseases, organ transplants, and better crop and animal production are all results of scientific research.

We must not forget that accompanying these achievements have also been some disastrous effects. For instance, environmental pollution from industrial wastes, mass production of weapons ( nuclear and chemical ).It is of vital importance that

children at an early stage be exposed to some of these aspects, and there is no better way of doing this than through the use of educational media.

### **2.17.2 What needs to be done**

Primary science teaching needs to be restructured so that it is activity-based. Ramsden, in her study (1992), was of the opinion that pupils' interest and enthusiasm for school science could be increased through a combination of using everyday interests and also employing a wide range of learning activities. Among the activities that could easily be integrated into the science classroom are insect collecting, laboratory procedures and safety, recycling, electricity, forces, transportation, shelter, water supply, food supply and entertainment.

If science instruction is to be reformulated and restructured according to a science-technological-environment-society (STEP) approach, then inevitably this would require the use of equipment and media to foster this type of development. There should be a national will to enhance the quality of science education and this requires dedicated and committed teachers willing to devote their time to this endeavour. There should be an endeavour towards **hands-on** science participation but this would require government support.

All these changes and reforms require materials. Macvicar (1990) warned that if attention was not given to a mechanical delivery of science instruction, (instruction in which abstract information was imposed on to the students without their experiencing any meaningful interpretation of this information), the economic climate of the country would be affected. She suggested measures including mobilising private and federal resources to facilitate and strengthen the school environment. Tobias (1992), in his paper on Mathematics and Science Curricula for African-American students, suggested that there was need for appropriate materials, teaching reinforcements, constant practice and repetition of experiences by both students and teachers.

### 2.17.3 The role of media use in Science education

If creative scientists are to be produced, then they must have something with which to create: they need material media.

The most common use of media is as a catalyst, as a means of initially sparking interest in a topic ( Rogers & Dunwoody 1984:341).

In order to encourage young children to be creative and to develop problem-solving skills, they need to be motivated and allowed to participate in activities which encourage this creativity. One of the ways in which this can be done is by incorporating play into science activities. Make believe play with objects, actions or situations is the type of play that seems to be most effective in developing problem-solving skills and creativity.

Playful learning also tends to increase creativity and general cognitive achievement, and it improves aptitude scores (Severeigde & Pizzini 1984: 60).

Moreover, all the new methods of teaching science require the use of media. This is because science is a practical subject which is grounded in doing. Science education is unique in that it emphasises first-hand experiences.

Rather than study facts about things, we study things themselves (Sigda 1983:27).

Elementary science education can be improved through teacher workshops, teacher-developed materials on local themes and support services. None of these aspects mentioned above can be achieved without some form of media use.

Science teachers could make more and better use of instructional media if they are

appropriately selected and utilised. The media chosen must be suitable for the concept being taught, for the type of students and for the overall teaching style of the teacher. Sigda (1983:28 ) lists some situations unique to science in which instructional media can be effective. The following are a few examples:

- (a) presenting information about inaccessible places ( e.g. space)
- (b) reliving history ( volcanic eruptions)
- (c) reducing and enlarging size ( when observing microscopic objects or looking at massive solar objects)
- (d) acquainting students with unknown phenomena
- (e) introducing students to living organisms which may not be readily available

Media will have greater impact on students when the teachers have received specific training in the utilisation of media. Media will be more effectively used when there is an integrated media centre.

Media are tools of teaching and learning. These tools must be available when and where they are needed to meet the needs of the teachers and students who must use them (Wilkinson 1978:39).

Science education is vital for the economic growth of any nation. Economic vitality depends on the ability of the country to upgrade the technology of industry,

an impossible task without adequately trained people. It is imperative that all students have a basic knowledge of science. The use of instructional media in science classrooms is essential if science teachers are to get the most out of their students (Sigda 1983:29).

## CHAPTER THREE

### METHODOLOGICAL STRATEGY

#### 3.1 ILLUMINATIVE EVALUATION

For the empirical investigation, the methods of the **illuminative evaluation** approach of Parlett and Hamilton (Patton 1990:119) seemed appropriate.

The objective is to examine media utilisation, not in isolation but in the wider contexts in which it functions. Its main concern is with description and interpretation rather than with measurement and prediction.

According to Parlett and Hamilton, (Patton 1990:119):

The aims of illuminative evaluation are to study the (**innovative program**); how it operates, how it is influenced by the various school situations in which it is applied, what those directly involved regard as its advantages and disadvantages ... . It aims to discover and document what it is like to be participating in the scheme, whether as a teacher or pupil, and, in addition, to discern and discuss the **innovation's** most significant features, recurring, concomitant, and critical processes.

In operationalising the study, however, the descriptions used to examine the central action (innovation) using the illuminative evaluation approach seemed to imply that the action was a structure, rather than a practice (like media utilisation).

It therefore seemed necessary to develop or adopt a broader methodological foundation within the qualitative research framework, in which the illuminative evaluation principles would be retained but construed to fit in with the required analysis of the media utilisation practice.

### **3.2 WHAT IS QUALITATIVE RESEARCH ?**

In this study, the definition of qualitative research given by Smalling (1992:174) is used. He states that qualitative research

can be characterised on the basis of four aspects : the nature or preconception of the object of study, the method of data collection, the method of data analysis and the research design.

- (a) First, the object of study is the world as defined, experienced or constituted by those being investigated.
- (b) Secondly, the method of data collection is not strictly regimented but open and flexible.
- (c) Thirdly, the data collection method is not empirical (numerical-mathematical) but descriptive.
- (d) Fourthly, the qualitative research design implies an interactive, cyclic relation between data collection and data analysis, alternating with each other.

Guba and Lincoln's (1989) methodology of constructivist inquiry appears to function on the same basic fundamental aspects, and was found to be appropriate for this investigation.

### **3.3 THE METHODOLOGY OF CONSTRUCTIVIST INQUIRY**

Constructivist inquiry is based on representations of constructions of the people being investigated. The assumption is that the contexts in which a phenomenon is being investigated

give life and are given life by the constructions that are held by the people in them (Guba & Lincoln 1989:175).

This form of inquiry has a set of conditions which have to be met before it can be given the name **constructivist**. These conditions have been found to be sufficient in their capacity to examine and describe the media utilisation process.

The first requirement is that the study should be conducted in a natural setting. As Guba and Lincoln (1989:175) say,

it is essential that the study be carried out in the same time/context frame that the inquirer seems to understand....otherwise, the findings would not be relevant.

This study satisfied this condition, as the investigations were carried out in the actual school setting.

Secondly, the constructivists are required not to assume that they know what they are investigating, therefore there is no need to prepare rigid instruments for carrying out the inquiry. They

enter the frame as learners, not claiming to know predominately what is salient (Guba & Lincoln 1989:175).

An adaptable instrument, which is unstructured, and is able to enter into the inquiry and discern distinctive views of the respondents and concentrate on them is required required. The human instrument is the best instrument of choice for the constructivist.

Objections that humans are subjective, biased or unreliable are irrelevant, for there is no other choice (Guba & Lincoln 1989:175).

Thirdly, the methods that are most compatible with the human instrument are qualitative methods, those that involve using the senses - methods such as interviews and observations. However, the constructivist is not restricted to qualitative methods. Quantitative methods can be used to gather information from a

broad spectrum of individuals once the need and utility of that information has been established ( Guba & Lincoln 1989:176).

Finally,

the human instrument must have the privilege of drawing on his or her tacit knowledge (Guba & Lincoln 1989:177),

without which the inquiry would collapse. The constructivist inquirer uses this tacit knowledge to sense what it is that has to be examined, and to understand the situation at the beginning of the inquiry. It is assumed that an explication of the constructions of what is already known and understood about the situation or phenomenon would have been provided before the onset of the inquiry.

The methodology of constructivist inquiry allows the investigator to use his or her tacit knowledge to

probe into the unknown and make joint and valid constructions of the phenomenon after grounding the research instrument in the academic views of the respondents (Guba & Lincoln 1989:164).

These four specifications were regarded as the entry conditions or basic requirements for a constructivist inquiry. Stated differently, this type of qualitative inquiry is naturalistic, inductive and holistic (Patton 1990). It is naturalistic

in that the researcher does not manipulate the research setting (Patton 1990:39), and inductive ,...because the researcher attempts to

understand the situation without imposing pre-existing expectations on the phenomenon (Patton 1990:44).

Holism is the assumption that the whole is greater than the sum of the parts. This approach aims at gathering data on several aspects of the situation in order to construct a complete picture of the situation.

### **3.4 THE RESEARCH DESIGN**

The ultimate purpose of this study was to identify ways of improving the media utilisation process within the rural primary school setting by primary school teachers. This study can thus be categorised as a formative evaluative study. The purpose of such studies, according to Patton (1990:156), is

to improve human intervention within a specific set of activities at a specific time to a specific group of people.

Formative evaluations rely heavily on process evaluations in which the focus is on how something happens. In this case, the study was aimed at elucidating and understanding the dynamics of the media utilisation process, hence the reliance on a qualitative form of inquiry. However,

a process evaluation requires sensitivity to both qualitative and quantitative changes in the program (Patton 1990:95),

therefore a brief qualitative survey was conducted to paint a general picture of media utilisation within the area. This was followed by a deeper qualitative examination of the experiences and perceptions of the teachers concerning media utilisation.

The triangulation strategy of Denzin (1978) was incorporated into the research design. Triangulation, according to Patton (1990:187), is

the combination of methodologies in the study of the same phenomenon or programs.

Denzin identifies four basic types of triangulation. Data triangulation, which involves using a variety of data sources, researcher triangulation or the use of different researchers. There is also theory triangulation or the use of multiple perspectives to interpret a single set of data, and methodological triangulation, which is the use of multiple methods to study a single problem or program.

Data triangulation, which includes interviews, observations, recordings and photographs, was the main form of triangulation strategy used in this investigation. It is generally accepted that

the inclusion of multiple sources of data collection in a research project is likely to increase the reliability of the observations (Mouton & Marais 1990:91).

As Patton (1990) correctly states, triangulation is ideal but expensive. The amount of triangulation that is practically possible is limited by financial, time and political constraints. Some methodological issues which surfaced in the design were the following :

#### **3.4.1 Focusing on the study**

The problem here was to move from an extensive list of potential questions to a focused list of only essential and necessary questions. The review of the relevant literature helped considerably to establish a focus in that it made it possible to consider how others had approached similar concerns. However, one felt this also

worked to bias the researcher's thinking and curtail the inductive analysis. In the end, the researcher felt that the substantial literature reviewed before data collection in a way inhibited the process of focusing on the study. However, the literature review continued throughout the study,

permitting a creative interplay among the processes of data collection, literature review and researcher introspection (Patton 1990:163).

### **3.4.2 Gaining Access to the setting**

Gaining access to the setting did not prove difficult in terms of obtaining permission from the relevant people, these being the Circuit Education Officer in the Mankwe region, the Inspector of Primary Schools and the principals of all the schools visited.

A letter was written to the Chief Inspector, requesting permission to conduct the study and stating the reasons for the study ( Appendix B). The Circuit Education Officer in return supplied a letter which had to be produced on arrival at each school ( Appendix C).

Within each school, securing the co-operation of the principals and science teachers was not too difficult. At times it was necessary to fully discuss the aims of the research with some principals, who needed convincing that the researcher was not a representative of the Reconstruction and Development (RDP) forum, and with those who were apprehensive about the use to which the findings would be put. In some schools the teachers were not comfortable with being recorded or observed.

### **3.4.3 Unit of analysis and time periods**

The Primary Science teachers comprised the unit of analysis. The primary focus of the data collection was on what was happening to these teachers, regarding media

utilisation in the classroom setting. The aim was to examine the media utilisation process holistically, taking into consideration aspects like the physical setting, teaching methods and learner and teacher interactions during the lesson. The individual variation of attitudes and views concerning media utilisation was also an important issue.

The time during which research could be conducted was also important. No research was carried out during November because examinations were in progress then. The enthusiasm of both the teachers and the students (and even the researcher) was far greater at the beginning of the year (January, February and March) than towards the end (September, October).

#### **3.4.4 Sampling**

There are seventy primary schools in the region, with an average of at least one Science teacher at each school. Some schools had one while others had two teachers offering science. It is important to note that even these teachers are not strictly Science teachers. In most cases they are teachers who are responsible for teaching a class where one of the subjects taught happens to be Science.

Initially, the researcher tried to ensure that at least one teacher from each school was included in the brief preliminary survey. It was not practicable to reach each school physically, with the result that the brief survey sheet had to reach the remote schools through the circuit office. The researcher tried to reach as many schools as possible. The purpose of this brief survey was to arrive at criteria for constructing a sample which could then be used for an intensive qualitative investigation, even though the size of the population was not significantly large.

Qualitative inquiry uses **purposeful sampling**, sampling which depends on selecting

information-rich cases from which one can learn a great deal about issues of central importance to the purpose of the research (Patton 1990:169).

The most ideal situation would have been to conduct observations and interviews at all schools. Unfortunately this was not financially viable or physically possible for the researcher who, although firmly committed to the research, had work obligations to fulfil as well. For this study, **maximum variation sampling**, which could provide the broadest scope of information within a **random sampling procedure** in which each school had an equal opportunity of being selected, seemed to be the best sampling mode of choice.

#### *3.4.4.1 Key factors in the sampling process*

The method of sampling seemed appropriate because of the physical limitations of the researcher. The intention was to choose a representative sample in which there was sufficient representation for the teachers. In other words, it was essential that the sample would in all relevant respects, be a true image of reflection of the population), or the group of people being investigated. Fortunately, because of the qualitative nature of the research, the main issue was not how many teachers were inclined to particular attitudes and practices of media utilisation. Generalisations having a bearing on the actual population would have to be made using the study from the sample, but these generalisations would not be statistical inferences. The main objective of the research was to try to explore and understand the ethos of the media usage in the rural areas. In order to ensure that any inference from the sample would have bearing on the whole population, and to maximise variation in a small sample, there was a need to identify criteria for constructing the sample.

#### 3.4.4.2 *Criteria for constructing the sample*

The researcher attempted to select a representative sample in order to carry out investigations in different contexts so as to examine the significance of four key factors important to the study. These were:

- (a) Location (subrural /rural)
- (b) Type of school (community/state)
- (c) Teacher's qualification
- (d) Teacher's experience of teaching

Determination of whether the school was rural or subrural was based on the basis of distance from the nearest semi-urban township in the region, Mogwase. A school within a radius of 30 km from the township was considered to be subrural. Later on in the research process it was clear that this distinction was not a very reliable one because there were schools far from Mogwase, but closer to some other mini shopping centre, which seemed to have the same amenities as those near Mogwase. The availability of resources was significantly different, however, in Community schools and Governments schools. The community schools are owned by the community although the teachers are paid by the government and the Circuit office is responsible for their administration. The government schools were built and staffed by the government. There was a very great difference between community and government schools in terms of resources available. Government schools were far better equipped than the community schools. This was, therefore, considered to be a significant factor in terms of the media utilisation investigation, and the researcher had to ensure that there was fair representation of each type of school in the research.

The last two factors considered to be significant for the media utilisation experience were the teaching experience of the teachers, the number of years spent teaching the subject and the professional qualifications of the teachers.

#### *3.4.4.3 Implementation of the sampling process*

The sampling process itself was not a rigid, strictly regimented process. The first criterion that had to be dealt with within the sampling process was the choice of the schools according to location. Originally, the intention was to select 30 schools within distances varying from 2 km to over 30 km from the township, Mogwase. Later on, as the research proceeded, schools within a radius of 20 km were the only ones considered, because of two limiting factors, the expense involved in trying to reach the remote schools, and the conditions of the roads in the rural areas .

The observations and the interviews were not conducted at the same time. The number of interviews was relatively lower than the number of observations, mainly because of the time involved. Teachers were selected randomly, depending on who was available and willing to participate in the investigation. The aim of using a maximum variation sampling strategy, within the normal random sampling strategy, was not to enable the researcher to generalise the findings to all people from all groups, but to

look for information that elucidates variations and significant common patterns within the variation (Patton 1990:172).

#### **3.4.5 The problem of “ selecting what to observe “**

This was one of the most demanding activities of the entire research. It required practice and repetition on the part of the researcher before an acceptable observational guide could be constructed. In the early stages of the research, the problem was that in an attempt to obtain a holistic view of the situation, the researcher tried to collect so much detailed data that it was difficult to observe and make the field notes simultaneously. At times it seemed that the study was an investigation of media rather than media utilisation by the teachers.

However, after a few trials it was possible for the researcher to attain an observational focus by identifying sensitising concepts which could be used

as a way of organising the complexity of the reality

(Patton 1990:218).

The sensitising concepts used were the type of media being used, media integration (how media were being integrated into the lesson), methods of instruction and the classroom setting.

#### **3.4.6 Interviewing instrumentation**

A common characteristic of the qualitative approach to interviewing is that the persons being interviewed respond in their own words to express their own personal perspectives. This evaluation employed a combination of two interviewing techniques, the interview guide approach and the standard open-ended approach. The technique most prevalently used was the interview guide approach. This allowed for flexibility while providing a framework for developing, sequencing and selecting which items needed to be pursued in greater depth Patton (1990). The flexibility in sequencing results in different responses and reduces the comparability of the responses. In order to increase the comparability, a few standard open-ended questions were added to the interview guide.

#### **3.4.7 Ethical issues and the question of confidentiality**

This research did not contain a lot of sensitive data except for some socio-demographic information at the beginning of the inquiry which was used to give a characteristic description of the Primary Science teacher. In this instance, an assurance that the investigator would not identify the respondents in any manner had to be given. This

can also be regarded as the minimum requirement for establishing greater validity (Mouton & Marais 1990:92).

Even during the interviews, permission for recording the responses had to be obtained. There were people who refused to be taped. It was agreed that all the information given would be treated in the strictest confidence.

### **3.4.8 Data, design and analysis approaches**

The data collected in this study were essentially qualitative, with some quantitative material. The collection of data can be described as being open, flexible and not strictly regimented. No numerical-mathematical system was used to analyse the data. Instead, content analysis was the analytic approach employed. The design can best be described as a holistic-inductive type of naturalistic inquiry.

### **3.4.9 Issues of reliability, validity and triangulation**

Validity and reliability have roles to play as methodological principles in qualitative research. The distinction between internal and external reliability, and internal and external validity, is generally accepted.

#### **3.4.9.1 Reliability**

Reliability, according to Smalling in Meulenberg-Buskens (1993:7),

is the absence of random or unsystematic error.

Reliability can be a characteristic of research actions or research results. External reliability is said to be achieved if independent researchers are able to replicate the same results, using the same methods in the same research situation. Internal reliability is reliability within the research project. External reliability can be

increased by description and explication of the total research design. For this study, some of the factors contributing to increased internal reliability were,

- (a) the examination or debriefing by the professor (supervisor), to ensure that there was a rational argument taking place within the research
- (b) attempts to co-operate with those being researched by the researcher
- (c) mechanical recording of data, for example using photography and video taping

In qualitative research, where the observer is the most important instrument,

instrument reliability depends on the sensitivity, receptiveness, and role-taking capacity of the researcher (Smalling 1987:276).

The closest the researcher could get to role-taking was during the interviews, in which the researcher tried to identify with those being researched. This naturally required sensitivity and receptiveness on the part of the researcher.

#### 3.4.9.2 *Validity*

Validity refers to

the absence of systematic and unsystematic errors in the research (Meulenberg-Buskens 1993:8).

It is a methodological norm for research actions and results. Internal validity is used to refer to the fact that

the study has generated valid and accurate findings of the specific phenomenon being studied (Mouton & Marais 1990:50).

External validity refers to the generalisability of the findings to all similar cases. Internal validity is a precondition for external validity. Internal validity is of vital importance in research where a contextual interest is emphasised, for example in qualitative research. Meulenberg-Buskens (1993) defines three internal validity dimensions, which the researcher tried to adhere to. These are:

- (a) content validity, referring to the suitability of instruments, and the rightful claim of actions with regard to the phenomenon
- (b) conceptual validity, referring to the quality of conceptualisations and operationalisation used with regard to the phenomenon
- (c) logical validity, which refers to the link between the research design's line of argumentation with research conclusions

The validity criterion is important because validity implies reliability.

#### *3.4.9.3 Triangulation*

Triangulation is a general means of striving for both reliability and validity. The only form of visible triangulation within the research context was the use of the several methods of collecting data, observations, interviews, photographs and recordings.

Reactivity is the largest single threat to the validity of the research findings when human behaviour or characteristics are the source of data information (Mouton & Marais 1990:78).

Human beings will always be aware of the researcher. The researcher endeavoured to minimise the threats to validity by introducing some measure of structure in the data-collecting procedures, that is the observations and the interviews, in a way that would still allow the researcher-subject interaction to proceed in a natural and non-threatening manner. An added help was the fact that most of the Science teachers had attended an in-service course in which the researcher was one of the facilitators, therefore there was some degree of familiarity.

The other crucial concern was the effect the researcher's opinions, prejudices and biases would have on the data. The continuous collection and review of data ensured that the researcher had to continuously re-evaluate a joint construction, merging the contributions of the researcher and the researched. This joint construction, as defined by Guba & Lincoln (1989), was different from the investigator's and respondents' constructions but grounded in both

#### **3.4.10 The cost of the research**

The incurred costs were mainly the cost of fuel for travelling to different schools in the region. The costs escalated somewhat because most schools selected for the research had to be visited more than once. The preliminary visit would be to introduce oneself, and to make an appointment for the observation. After the observation, a third visit was required for the interview. In very few instances was the researcher able to conduct interviews immediately after the observations. The other major limiting factor was the time factor. The research was undertaken on a part time basis, and the observations and interviews were therefore conducted on a one-off basis.

## **CHAPTER FOUR**

### **COLLECTION AND ANALYSIS OF DATA**

#### **4.1 INTRODUCTION**

Although the study was essentially a qualitative study, an initial survey procedure seemed suitable for collecting information on the general availability of media in the schools, and gathering some socio-demographic information which would be used to construct a portrait of a typical primary science teacher in the rural regions. Otherwise, the qualitative framework of the study required that the media utilization process be investigated using an observation method, in order to find out how the media utilization process was being applied in the classrooms, and an interview method which would reveal the attitudes of the teachers concerning media. In short, a triangulation strategy in terms of which several methods were used to collect data was employed.

To some extent, this constructivist inquiry used the process known as the hermeneutic dialect,

which involved continuous interplay of data collection and analysis  
(Guba & Lincoln 1989:179) as the inquiry proceeded.

This involved the cycling and recycling of the views of the researcher and respondents until some kind of consensus was reached. It also involved consulting with people or respondents other than those researched, people such as fellow lecturers, those involved in preparing teachers, and experienced Science teachers who teach in Middle and High schools, as well as in pre-school. The objective here was to come to some form of agreement

or consensus regarding media utilisation in Science teaching in the Primary schools. The reality of the situation was constructed

on the basis of the researcher's interpretation of data with the help of the participants who provided the data for the study. Eichelberger in (Patton 1990:85).

A form of content analysis was then used. Primary patterns of data were identified and categorized to form constructs emerging from the analysis. Each method of data collection was analyzed independently.

#### **4.2 AUTOBIOGRAPHICAL SKETCH OF THE RESEARCHER**

The researcher is and has been a Science teacher for the past thirteen years and during that time she taught Science first at high schools in the former Bophuthatswana, after which she spent four years at St. Anne's High School, followed by a period at Tswelelopele High School. In 1992, she joined Mankwe Christian College, a teacher training College where she taught Physics. At the beginning of 1992, she was part of the Mathematics and Science Upgrading Project for Standard Ten (Matric) pupils. She was also involved in a project for upgrading teachers, run by the University of the North-West (formerly the University of Bophuthatswana).

The researcher's interest in primary science teaching was the result of watching and teaching Mathematics and Science students for over twelve years, realizing all the while that there was some deficiency in their background. The whole situation became even more visible when the researcher became involved with upgrading teachers in the region. By teaching and communicating with these teachers who are already teaching the Primary students, the researcher soon realized that there might be some problem within science teaching. Since science is a practical subject and

requires the constant use of materials and equipment, an investigation into media utilisation seemed an appropriate choice for a starting point for an inquiry.

The problem was then to select the best method of conducting the research. Coming from a scientific background, the researcher had ample experience with only one method, the survey method. But for this particular research a method which could be used to investigate and analyze the opinions of the teachers was essential. In the researcher's opinion, this was the best way of trying to find out exactly what these teachers felt, and how they viewed the whole science teaching aspect.

Prior to this investigation, the researcher had embarked on an investigation into the attitudes of first-year college students towards learning science. A survey type of research had been used and at the end of the research, one felt that the core of the whole problem, that is the actual opinions, attitudes and feelings of the students had not been dealt with sufficiently. This is the reason why, for this particular research, a qualitative approach seemed most appropriate.

Throughout the entire research, the mode or approach used was one of trying to probe, dig further and seek to find some form of understanding of the media utilisation concept, in terms of those who are being researched, that is the Primary Science teachers. The views of other people considered to be important to the investigation were included, for example, the views of lecturers who are involved in shaping and forming these teachers, the views of teachers from the lower and upper standards, and even the views of some student teachers.

The challenge of this research has mainly been in trying to improve the validity through triangulation methods. The difficulty lies in the fact that it has

not been physically possible to obtain a truly representative sample of respondents, and yet on the other hand, it was virtually impossible to interview each and every teacher in the region. Even the selection of 'samples' of teachers to represent the larger population falls short because of the fact that those selected are at times unwilling to participate in the research or sometimes not available for other reasons.

The researcher can therefore be described as primarily a natural scientist with a keen interest in trying to establish ways of improving science instruction, beginning at the primary level, and using media utilization as the focal point of the investigation. Other areas of research have included the inquiry into ways of improving the understanding of Science concepts in schools.

### **4.3 THE SURVEY**

#### **4.3.1 Data collection and analysis**

The survey was carried out in the initial phase of the study. Only one science teacher from each of the schools was used to provide this information. The instrument used was a three-page survey consisting of one page of the School Assessment (address, telephone number if available), distances from strategic points, the rolls and media budget. This was followed by a page of demo-graphical information. On the third page, the respondents were given a list of 18 types on instructional media and asked which types of media were available, which they had in sufficient quantities, which were in good condition, and which type they used most frequently while teaching (Appendix D (I) - (iii)).

### **4.3.2 The results and their analysis**

Sixty-six surveys were collected for a response rate of approximately 94 percent. One of the schools had some administrative problems. In the other two, the teachers assigned to teach science did not feel confident enough to be included in the study. Only four of the 66 respondents were male. The majority, 77 percent, had the Primary Certificate (PTC) as their highest qualification while the rest, 23 percent, had the Primary Diploma (PTD). The average age was 36. The average school roll was 507, with the rolls ranging from 279 to 801 students. The average number of students per class was 43, with class sizes varying from 30 to 79 per class. Most of the schools reported spending in the region of two thousand five hundred rands on purchasing media. It appeared that most of this was spent on stationery items.

As indicated in Table 1, all school reported having blackboards, radios, typewriters, print material and duplicating machines. None of the schools had television sets, video machines or any type of projector.(79%) had posters and charts,(75%) laboratory equipment,(50%)models and (45%) reported having realia as media types. Only one school (1%) had a photocopying machine.

Of the available media, the blackboards were reported as being in the best condition and the posters and charts as being in the worst.(50%) of the schools indicated that their blackboards and models were in good condition. No significant results were recorded on the others. The blackboard was reported as the most frequently used type of medium (47%), followed by print material (36%), posters and charts (18%), laboratory equipment (17%) and models (13%).This initial survey was very helpful because the researcher was able to carry out the observations and interviews with some form of orientation to the research setting.

**Table 1**

**Table showing availability of media, media sufficiency, media in good condition and the most frequently used media.  
( percentages are used and n = 66)**

Media type	Availability	Sufficiency	Media in good condition	Frequency of use
blackboards	100	50	70	47
whiteboards	3	-	-	-
overhead projector	-	-	-	-
slide projector	-	-	-	-
film projector	-	-	-	-
audio cassette players	-	-	-	-
television sets	-	-	-	-
video tape recorders	-	-	-	-
computers	2,9	2,9	-	-
radios	100	100	50	-
typewriters	100	-	60	-
duplicating machines	100	-	60	-
photocopying machines	1	-	-	-
laboratory equipment	75	-	44	17
print material (text books)	100	-	33	36

**Table 1 ( continued)**

Media type	Availability	Sufficiency	Media in good condition	Frequency of use
models	50	50	50	13
posters/ charts	79	-	-	18
realia	45	-	-	-

#### **4.4 OBSERVATION STRATEGY**

A lot of practice was required before some form of systematic observation could be carried out. The observation was carried out over a period of six months, (from August to March, excluding November and December). During these periods, the researcher spent periods ranging from thirty to forty minutes (the normal length of a primary lesson) in each of the schools. Observations were recorded by jotting down notes during observation sessions, keeping mental notes of some situations, and then later writing down comprehensive field notes. These were mostly descriptions of events that had taken place in class.

In the study, the original intention was to select ten schools from the ten specified regions. These regions had been specified or selected in terms of their distances from the township, Mogwase. A geographical distinction in which schools in the first region were within 15 km from the township, between 15 and 30 km from Mogwase in the second region, and further than 30 km in the third region, seemed to be a fair and valid selection criterion initially. The researcher was trying to at least to ensure that geographical variation was represented in each sample. Within each region, the samples

were selected serially, which meant that all data was collected from the first sample before moving on to the next one. What the researcher was attempting to do here was to cater for the differences in the schools which the result of the distances of the schools from any form of town or urban-like structures, which does affect the way schools function. This is true if one considers the fact that equipment, school materials, libraries and other facilities are easily accessed by schools within towns or cities where there are structures to provide these services or materials. The problem with this kind of selection was that some schools, though far from Mogwase, were actually near some other type of shopping complex. Moreover, there was no guarantee that the teachers selected for observations and interviews would actually participate in the investigation. Another consideration the researcher had in mind was that data should be collected from respondents continentally, in such a way that each respondent was different from the preceding one. Two criteria which were to be used here were whether the schools were government schools as opposed to community schools, and whether the schools had a small roll or a large roll.

After some trials, it was evident that the type of selection did not have such a significant effect on the data collected. Collecting the data randomly proved to be more practical and much easier to deal with. The observations took many forms before a pattern of observation could emerge. At first the researcher sought to write down everything that she had seen. However, the amount of information collected far exceeded the needs of the study and the reasons for which the study had been conducted. Initially, the researcher even tried to tabulate the frequencies of media use by the teacher and the students. The process became so involved that one lost the track of the central question, **how the media were being used**. In the end, an Observation Guide seemed the most appropriate instrument (Appendix E). The main themes of this guide were the general impression, classroom setting, the teacher and

methods of instruction, types of media selection and integration, and student interactions.

At all times, the researcher was fully aware that the documentation based on the observation included the researcher's individual response to the phenomenon and to the purposes of the observation, and tried to employ a non-judgmental attitude as much as possible.

#### **4.4.1 Data collection and analysis**

As previously indicated, there was an interplay between collection and analysis. Indeed, after the observations the researcher would analyze the results and then proceed to carry out further investigations. The observations of the first teaching situations had a great impact on the observations that followed later. Even the notes (Appendix F) show this influence. During the first observations, the note-taking was scanty and lacked direction. After that, there was an increase in clarity, detail and precision. As the researcher became more experienced, only those important factors or factors which could be differentiated from the ones previously recorded were documented. For reasons of clarity, however, each analysis was carried out according to the observational themes.

##### *4.4.1.1 General Impression of schools*

The following are quotes from the researcher's field notes on some of the general impressions of the schools:

I visited the school twice before securing an appointment with the teacher. The school was definitely a government school, the buildings were relatively new and meticulously clean. This school is right within the township. The school roll was high, 700 students. I was amazed to

discover that three quarters of its students were from a poor village on the outskirts of the township .

This school is rather dilapidated. The principal says it is because it is a community school. The buildings are old and not well maintained. There is no vegetation around except for a few trees which have recently been planted. A fence is needed to keep the goats out. This school is about 20 km from the township.

This school is deep in the village but I am quite impressed with its appearance. It is very clean and very organized even though there is no water and electricity. I am told the children donate 10 cents to buy candle wax which is used to polish the floors. The school roll is low, 279 students, and the principal is not happy about it. All the teaching equipment is kept in a store next to the principal's office. An elderly teacher, who seems to be in charge, gives me a school tour and a cup of tea.

A rather dilapidated school, with no funds. It is a community school. Everything is kept in the headmaster's office. The headmaster showed me what he called a fascinating model of a fish. It was well painted, a very impressive work of art.

Arrived at school after break time and asked the principal for permission to go into the classes. The difference between the principal's office and the rest of the school was quite remarkable. His office was spotless, with very good furniture. The classrooms were less impressive. The school was well fenced but the toilets needed some attention. They had the problem of goats coming into the school.

The school is in the village, Ledag. It looks very neat on the outside. There is a friendly atmosphere. It is a new school, but the school roll is high. A male teacher is in charge of Science teaching.

By now the researcher is no longer affected by the appearance of the schools. After some time, one tends to accept the fact that most of these schools need some paint work.

After visiting a number of schools, a general pattern seemed to emerge. Government schools tended to have better buildings and larger rolls. Community schools were dilapidated, with unpainted walls and very unhygienic sanitation. The community responsibility ended with the erection of the buildings. There were, however, exceptions to the rules, depending on the commitment of the principals. Regardless of the conditions of the buildings, in general most primary schools are kept clean.

#### *4.4.1.2 Classroom settings*

Most of the classroom settings are similar, with the traditional arrangement of the teacher's desk at the front, and the students' desks in neat rows, facing the teacher. A typical class would have a few charts on the wall as well. A few notable observations are reported below.

This is a very pleasant learning environment with attractive displays on the wall and a science corner with specimens and objects. The desk arrangement is traditional but during demonstrations, the students gather around the demonstration table to observe the experiment. Two students occupy each desk.

This is terrible, there are 79 students in a room with dimensions of approximately 10m x 8m. There are 3-4 students per desk and some of

them do not have chairs. Some desks are broken and even the researcher had to sit on an improvised chair. Not only are the walls unpainted, but they are also bare.

A horse-shoe arrangement of desks with the teacher demonstrating from the middle. The scenario is almost too perfect, as if rehearsed. The classroom has 27 charts. It is the only classroom I have seen with shelves of textbooks and reference books.

The classroom has good lighting and acoustics, no interference. There are displays all over the classroom, one cupboard in the corner, very pleasant learning environment. The classroom has a traditional arrangement. There is space left between the teachers' desk and those of the children to observe the experiment.

The classroom is not so bad. The two classes are joined together by a partition. One can sometimes hear what is going on in the next classroom.

The classroom is neat but rather bare. It is an orderly arrangement with a few items. For example, there is a wind vane in the class.

Adequate. There are enough chairs and desks but there are very few charts around.

Classroom setting is fine, safe, but rather crowded.

The class is bare, with just tables and desks, and very few charts. There is no Science corner.

The classroom consists of the usual desks and chairs in a straight row.

This classroom definitely requires some renovation. The riots must have left it in this state. Not even the chalkboard is intact. The classroom is too crowded.

This is a smaller class roll. It makes the class more manageable. The teacher has already arranged the classroom in group settings. Maybe it is because I told her I was coming.

Again, the distinction between government and community schools, and schools with committed principals and those without was evident. Government schools generally have better facilities. It is interesting to note here that the government actually supplies furniture to both state and community schools.

#### *4.4.1.3 Teachers and methods of instruction*

This is the theme in which there was very little variation in almost all the schools. The typical approach to teaching was found to be deductive, whereby the teachers started with general laws and statements and ended with particular cases of interest. The whole group mode was used most frequently. Methods of instruction used were the oral narrative, supplemented with the question and answer technique and sometimes accompanied by a practical demonstration. A few examples are quoted below.

A few of the methods used for this lesson were the oral-narrative, with a demonstration and some questions and answers. Two students helped with the demonstration. All books were put away during the demonstration.

The teacher started the lesson with a collection of items on his desk. He then demonstrated the experiment independently. At the end he

asked a few questions and then told the students to copy what was on the blackboard. The notes were a textbook rendition of the lesson.

There was only one exception where "the teacher used the inductive approach", he started from what the students already knew. He then divided them into groups, allowed them to experiment and later summarized the findings on the blackboard. This was the only impromptu lesson the researcher observed.

The teacher's methods were oral- narrative and whole group instruction.

The teacher is pleasant, very confident and rather strict. Children are made to stand in perfect lines. The researcher was asked to sit in front at a table covered with a tablecloth, she felt like a real visitor in the class. After some time, the children were too engrossed in the lesson to recognize that she was there. The methods of teaching were oral-narrative, and demonstrations with questions and answers. The mode of teaching was whole group. All books were put away and only referred to when the teacher said so. The teacher was very audible and clear. She stayed in front during the entire lesson; she was rather agitated. The lesson was very well planned. It was planned according to the text book.

The teacher was teaching inductively. He was very well prepared. But at times he did not appear to be very natural. There was too much effort. Maybe this was his normal way of teaching. He used the oral-narrative method and demonstration. He was very smart and was in control. He had planned the lesson objectives.

The fact that researcher had to make prior arrangements before visiting the teachers somewhat affected their manner of teaching. One got the distinct feeling that some of them went to too much trouble to prepare the lesson, with the result that their observational settings deviated from their normal teaching settings.

Generally, primary teachers dressed very well, and displayed a great degree of confidence while teaching. They tended, however, to be too bent on ensuring that there was a controlled classroom situation. This observation could be due to the fact that the researcher is a teacher trainer, who is normally involved in observing nervous student teachers teaching Physics at high schools, and therefore accustomed to a more liberal and less controlled teaching environment.

The majority of teachers tended to teach in a similar fashion, giving information to the whole group, (oral-narrative) and then asking questions or giving class work exercise, as the examples below indicate.

Teacher and methods of instruction; oral-narrative, large group, some demonstration.

Teacher and methods of instruction; the teacher uses a deductive method, oral-narrative. The teacher uses the teaching aid media by himself, there is no classroom involvement. The teacher is well dressed but the lesson plan is a bit sketchy.

Teacher and methods of instruction: two large groups, who are very difficult to control. Oral-narrative method, under very strict supervision. There is no other alternative.

Teacher and methods: oral-narrative, whole group.

Because of the large groups in the classrooms, there seemed to be very little choice. There were some teachers who tried to use other methods. For example,

- (1) narrative, a bit of group discussion
- (2) guided discovery, asks questions, lets pupils discuss the work in groups before coming up with answers

#### *4.4.1.4 Media selection and integration*

What was apparent here was that teachers were using the media which were available to them. From the survey, these included the blackboard, the text-book, some charts, one or two models and a few pieces of laboratory equipment. Several observations are quoted here.

The blackboard was very well used, with instructions on the left and work on the right. The apparatus consisted of beakers, plastic containers, salt, sugar and a filter, which were all appropriate for the lesson objective - to investigate the solution process. The summary of the work was copied into the students' notebooks at the end of the lesson..

Media used included the blackboard, which was not in very good shape. Apparently it had been partially destroyed in the riots prior to the elections. The apparatus selected to teach the influence of heat on the solubility of substances included a primus stove, empty bear cans, salt and water. The lesson was rather rushed, so the teacher told the students to refer to their textbooks, which from observation were not sufficient either.

In contrast, another teacher teaching the same lesson had taken the trouble to provide each group with two transparent containers, (empty jam jars), and some sugar. The students dissolved some sugar in cold water, and then dissolved it in hot water, which the teacher had boiled and distributed. The pupils wrote their observations in their classwork books and later the teacher summarized the results on the blackboard.

Media utilized : blackboard, text books and exercise books.

Media: chalkboard

Type of media: blackboard and a short trip outside to investigate water use.

Media : apparatus on teacher's table, chalkboard and pupil's exercise books.

Media, chalkboards, the environment outside, classwork books.

Media : chalkboard, a few plants in pots, a chart. The teacher says that if she leaves the charts hanging, the students destroy them. What a pity!

In general, most teachers seemed to be using the available media quite well, in terms of the learner characteristics and the lesson objectives. There were a few exceptions where the teacher's lack of media utilization knowledge was visible. Very few group and individualized activities took place. A few teachers were conversant with improvisation techniques, but the number of teacher demonstrations going on in the classrooms indicated that these were in the minority. Incidentally, learner-centred teaching seemed to be displayed more

by newly trained teachers, although there were a number of quite experienced teachers who also used the same approach to teaching.

Two schools, in particular, indicated that they had a set of computers. Unfortunately, the computer software had only been developed for language and mathematical use and the computers themselves were rather outdated (1986 models). Although all schools had indicated that they had radios, no lesson observed used radio broadcasts. Another salient feature was the lack of any form of teacher-prepared worksheets for the students. Charts were used very sparingly, and very few teachers used realia or models in their teaching.

#### *4.4.1.5 Learner interactions*

The researcher was interested in observing how the learners interacted with the teacher, the media and with each other. Learner involvement and concentration of the media and concentration of the learner on the learning task are vitally important, according to the researcher. A few reports are given.

In order to watch the teacher demonstration, all the pupils had to stand in straight lines and keep quiet. They did not participate in the demonstration. Their main interaction with the media was visual.

The teacher elevated the demonstration apparatus by putting everything on a chair which was then placed on his table. He told the researcher that the class was too large, and any attempt made to get the pupils near the demonstration would result in a chaotic lesson. The poor children at the back could see hardly anything.

The children are all seated in this nice horse-shoe arrangement, the one educators insist brings a feeling of oneness. The teacher is doing all the correct things, demonstrating, even using flip charts. I wonder why there does not seem to be any response from the students.

This teacher does not seem to have prepared the lesson very well. The pupils seem to be all over the place. On further scrutiny, however, all the students seemed to be involved, even the researcher could not resist the urge to join the lesson.

Students are very involved, they are interacting with each other and with the teacher as well. Students are fine and well-controlled, they are quite involved. The students are neat and quiet in class and well-controlled. There is limited interaction with each other and with the teachers.

The students are well-controlled and organized. There is minimal interaction with each other during the lesson. They are very serious yet quite involved.

In most cases it appeared that learner involvement was sacrificed for the sake of presenting a rigid, well-structured lesson. It seemed rather a high price to pay, considering that Science is often regarded as an activity-based subject.

#### *4.4.1.6 Media integration*

It is all very well to say that media integration analysis should check for suitability, ease of use, appropriateness and suitability for the teaching objectives. But in practice media integration analysis proved to be a complex process because of several problems.

The first problem was the lack of a suitable standard for measuring or comparing any of the media attributes. What seemed appropriate in one situation was not applicable in another. It is difficult, for instance, to compare a teacher with a small class, who has access to some form of media with another, who is faced with an overwhelmingly large class and has hardly any media. Both these teachers could in effect have used the available media to the best of their capabilities.

The second problem was the failure to identify the particular aspect of the media integration process that would be analyzed at each stage of the lesson, and the extent of this analysis. The researcher did not come up with a valid system for doing this throughout the investigation.

It was for these reasons that the researcher resorted to simply noting which types of media were integrated into various phases of the lesson, and what the general impression of the researcher was concerning this integration.

The following examples illustrate this:

Introduction: blackboard, quite well done.

Middle : teacher demonstration with the apparatus. No participation by the learners. Is the media integration suitable?

Beginning - introduction: a discussion with a few questions on the blackboard. Middle: chart and classroom exercises. End: note-taking. Media use is adequate.

Beginning: the teacher rushed everything; the experiment was too fast. Middle: still using the same media. End: rather rushed. The media integration was not well planned.

Beginning: the class takes a look at the environment outside. Middle: the teacher uses the chalkboard to explain End: exercise books. There was adequate planning, media choice was suitable.

The media integration was very well done.

Beginning: questions and discussions.

Middle: observations and questions again.

End: conclusions on the blackboard and in the pupil's books.

This part of the investigation was very subjective. Media comparison is extremely difficult unless there are standardized procedures for carrying it out.

#### *4.4.1.7 Overall Impression of the lessons*

On the whole, the lessons conducted were average or acceptable in the circumstances. The researcher's comments were quite frequently " **average**" or " **fair** ". There were, of course, lessons which were exceptional and those which were far below standard. Below are two quotes from the researcher's observations to illustrate this:

I (the researcher) am very impressed with the whole lesson. There has been very good use of media and improvisation .

A very interesting lesson.

On another note,

This lesson left something to be desired

I (the researcher) wish the teacher would ask the students to bring some seeds or something, to put a bit of sparkle into the teaching.

#### **4.4.2. Main Points from the Analysis of Observation Data**

The main features which emerged from this analysis were that the most prevalent forms of media in the primary schools were the traditional forms (blackboard, textbooks, charts and models). In general, teachers, were using the media available as well as they knew how to. Government schools were better equipped than community schools. It is interesting to note that when the researcher approached an employer from the education circuit office in the region, to inquire whether she was aware of such a distinction, she insisted that she was not aware of any such distinction between primary schools.

The main areas of concern were that a number of teachers were using a teacher-centred approach in the classrooms. Whole group teaching was used more than the small group mode, probably because of the large numbers. There was a lack of improvisation the use of realia and models in science teaching. Some of these concerns were investigated further during the interviews.

#### **4.4.3 Limitations of the observation method**

One limitation was the possibility that the participants were not behaving normally, because they knew that they were being observed. The fact that the researcher had to obtain permission from the principals prior to the actual observations meant that teachers were given a chance to prepare themselves for the observations.

The other concern was the possibility that the observer would affect the situation being observed. At one school the researcher was given a table covered with a white tablecloth right in front of the classroom. Fortunately, during the demonstration, the students all moved to the teacher's table, making the researcher's status less obvious. Even though it was at times

easy to discern those teachers using media for the first time, those observations had to be recorded as displayed.

Observations are also limited in that they only focus on external behaviour, and to some extent the observation guide restricted the activities that were to be observed. The researcher also attempted to use photographs to provide an inventory of the objects within the classroom settings. Unfortunately, the quality of photographs was not good enough for lithographic production.

The observation gave the researcher an idea of the basic issues that had to be covered during the interviews. Using the interviews was a way of trying to

use different data sources, to validate and cross-check findings (Patton 1990:244).

#### **4.5 IN-DEPTH INTERVIEWING METHOD**

The main purpose of qualitative interviewing is to provide a framework for the respondent to speak freely about those issues concerning the study that the researcher wishes to investigate. These issues will be derived from the research problem, the analysis of the observations and research hypotheses. These free narrations have to be guided if the data collected are to be in line with the research objectives. At the same time, they should not be too structured otherwise they will restrict and inhibit the qualitative nature of the inquiry.

The main aim of these interviews was to document the experiences of individual primary science teachers, and then to look for patterns that would help to arrive at an overview of their utilisation experience. The sampling

regions used for the observation method were used for the interview method as well. Initially, respondents with varying constructions were selected after which respondents were selected to clarify certain issues. The main factors which seemed to influence respondent views were the types of schools they were in (whether government or community), their experience in teaching science and their academic qualifications.

The principal method used for accomplishing reflective evaluations was to conduct follow-up interviews with a few selected participants. These selections were made on the basis of whether those particular respondents could make any significant additions to what the majority of respondents had to say. They were also selected when there was a need to clarify some points or when the researcher felt there was some pertinent question to ask. The initial interviews were conducted in October, followed by another set in February. The third and final interviews were conducted at the beginning of April. The reports are based on a condensation of the final interviews. All interviews were conducted face to face. Some were conducted at the places of work while others were conducted at the homes of the respondents. An average interview took 35 minutes; the range was from 30 minutes to an hour. Interviews were tape-recorded and transcribed for analysis.

An interview guide, in which issues to be covered were specified in an outline form with no restriction on sequence or wording, was used. However, to increase the comparability of the responses, three standardized open-ended questions were included. The interview guide used is illustrated in Table 2.

**TABLE 2: Interview Guide**

The interview focused on three central issues:

STANDARD OPEN-ENDED QUESTIONS
(1) What is your opinion concerning media utilization in the teaching of science ?
(2) What are the major problems related to the use of educational media in your school Specifically when teaching science ?
(3) What recommendations would be helpful in improving educational media utilization in science teaching ?
OUTLINE OF ISSUES TO BE COVERED IN NO SPECIFIC SEQUENCE
(1) Use of whole group mode rather than a small-group mode when teaching
(2) Use of teacher-centred approach to teaching rather than a learner-centred approach while teaching
(3) Lack of improvisation

*(During the actual interviews, the term 'teaching aids' was better understood than the term 'education media')*

#### **4.5.1 Data collection and analysis**

In the following discussion, individual responses were presented and analyzed. The whole purpose of this analysis was to organize these responses so that the overall patterns would emerge. The emphasis throughout the investigation was to let the participants speak for themselves. The main challenge was to organize all the responses in a coherent fashion which would integrate the different experiences without sacrificing their unique individuality.

#### *4.5.1.1 Opinions and views concerning media utilisation*

The opinions on media utilisation were generally positive rather than negative. Below are some of the responses indicating how a number of teachers felt about educational media:

The teaching aids help to explain difficult concepts.

They are very important, they make it easy for students to understand what you teach them.

Teaching aids are vital for the primary school. Children at this stage need to have everything introduced very clearly, and teaching aids can be used for this.

I find that when I use teaching aids children understand better; using a chart or bringing the real thing to class is better than just talking about it..

They are really gaining through using those charts. They get their whole information from there, even if they don't remember....

They help us to succeed in a lesson because pupils become involved..... so at the end the lesson becomes successful.

They are very important because they can bring reality into the classroom..

And as one of the respondents, the head of an education department, stated it,

Teaching aids are vital for the primary school. I am basing my opinion on Piaget's theory of development. According to Piaget, children at the primary level are at the concrete operational level of development which means that at this time they are still not able to think abstractly. It means that everything should be introduced at a concrete level... So for me a primary teacher should not go into class without a teaching aid.

But there were those who were of a different opinion:

Using these teaching aids makes teaching very expensive.

I think that teaching aids are a burden because some pupils are afraid of them... things like snakes, lizards.

#### *4.5.1.2 Problems associated with media utilization*

Questions about the problems associated with media utilization generated more reactions from the respondents than the other questions. There was an intensity in the responses which made it clear how significant the experiences were. The first critical problem associated with media use was that they were very expensive.

The problem lies with availability. Where can the schools get money from? From the forty rands the students pay, there is simply not enough money to buy teaching aids.

It is very difficult to use these aids because they are expensive. Imagine in some of these schools teachers even fight over chairs! How can we even think about media?

The problem is worse in these community schools. The student roll is very low. It is impossible to purchase any of this expensive equipment.

We don't have enough teaching aids.

We don't have electricity in our school, so something like the OHP (Overhead projector) cannot be used.

The problem is the availability of the teaching aids and having to make them yourself.

If they are not well prepared, then they are as useless as not having any. And another thing is that even if you are well prepared and then you have a large group, only the people in the front will be able to gain from the teaching aids ....he problem is also the periods....the time is too short for all the work.

We don't have many teaching aids .... so we just teach some of the subjects... theoretically. Some of the schools don't have the material so it is a problem if you have to dip into your own pocket to buy something for showing the children what you are talking about, so it is very difficult because things are so expensive... . There is also the question of laziness.

The implication from these responses is that teaching aids were expensive gadgets and schools did not have sufficient funds to purchase them. Some teachers were of another opinion.

To make these aids, and to collect different materials you need a lot of time. I do not have that time.

I know about all these things, maybe I just cannot make the time to prepare these aids.

When I am making the teaching aids, sometimes I find it inconvenient, because I have got to look for this and that..... I need a lot of time.

One teacher had the following to say:

I used to make aids, but I stopped because these students do not respect them. They misuse them and destroy them. The school has to replace the same teaching aids instead of buying new ones. Just last year 24 chairs were broken.

A number of participants attributed the problem of media utilization to the number of students in the schools, as is evident from the following:

It is impossible, the numbers are just too big.

Even in the early learning centres the teacher-pupil ratio is 1 to 20, there the ratio is 1 to 45

One teacher commented:

..... here we've got 127 pupils in standard 4.....Imagine..... You can't give individual help, there are too many and some of them are stubborn.

In some of the subjects the teacher-pupil ratio is too big.

There are many problems because we are overcrowded in class.

Another teacher was convinced that the whole problem was initiated in the training colleges.

In the training colleges lecturers always give the impression that teaching aids are unnecessary appendages. This impression is then passed on by teachers to the schools.

Another expressed a different view:

Teachers use these aids while they are training, once they start teaching they stop using them. They believe they are not necessary since they managed to go through school without any of these media.

One teacher commented sincerely:

I am not familiar with most of these new forms of media, so refrain from using them. The young teachers bring all these aids and I can see that the young ones are really fascinated.

You must know how to manipulate them. Because we are science teachers, we are going to teach badly because there are some experiments we cannot do. We are afraid, so it is better if maybe we get the chance of using them properly.

One respondent combined the two problems:

Like sometimes it is difficult to make your own teaching aids. ... then it is better if you have the apparatus ready. The problem we encounter is the size of the classroom...

The evidence, in total, indicates that respondents felt that cost of media, large student numbers and the time required to prepare the media were all part of media-related problems. A few of them identified unfamiliarity with media use and the lack of maintenance as problem areas as well.

One teacher in particular felt very strongly about the lack of organizations among black teachers.

The problem in these schools is that teachers are not organized They do not have subject committees, because if they have subject committees, it is for them to come together and say, look, here is a problem. We want this and then we can discuss and share problems.

Failure to use radio and television as instructional media was also reported.

There are a lot of interesting radio broadcasts, and we do have a radio, but the programs never coincide with my timetable, and there is no one to tape the programs for me.

The government intended to supply television sets to middle, as well as primary schools. Those that were supplied to the middle schools were stolen and badly maintained. It did not seem worthwhile to supply the primary schools with any television sets.

The other problem was that of the language medium:

The problem is the language, you know in Science you cannot use the mother tongue, it is very hard to use. They are not familiar with English...

Those are some of the problems that emerged from the analysis.

#### *4.5.1.3 Recommendations towards improving media utilization in Science teaching*

It was interesting to note that a majority of teachers seem to think that improvement of the media utilization practice was the responsibility of the government, those in charge of education and the principals, as the following comments demonstrate:

You people who are organizing the teaching of Science in schools are doing good work. You should come and speak to the principals.

It is only that you advise our principals to buy some materials for our children ....

I think they have to build laboratories, for instance for Science.

I think the RDP can help.

Participants suggested that the means of improving media utilization was the establishment of in-service training as expressed from the following quotes.

There should be a subject specialist assigned to the district who would be responsible for in-service training.

Several respondents were in favour of a broader approach to the training problem.

It seems that our primary education is neglected. If a Primary teacher's degree was introduced at the University of the North-West region, this would improve primary education.

Most people look down on primary teaching because even in the colleges of education, the low ability students are assigned to primary teaching. Primary teachers who upgrade should be motivated to remain in the primary schools.

One teacher, in particular, was convinced that the solution to improving media utilisation was connected to the assessment standard.

I think we need to revamp teacher training, revamp in-service training but also revamp methods of assessment.

It is often said that we can use evaluation to break down the door.

A few teachers suggested more parent and community involvement.

The community should co-operate in fund raising projects to collect funds for purchasing educational media. If the community can come together things would go smoothly. We need many things here and there ....cannot afford to buy anything..

Parents must be involved; they should come and see what conditions the schools are in.

We have a cultural problem: parents with children in multi-racial schools always attend parents' days. We held a parent's evening at our all black school and only a handful of parents turned up.

The government and the principals of schools were also criticized for not having done enough:

Principals must try hard to raise funds for media use.

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The government and the principals of schools were also criticized for not having done enough:

Principals must try hard to raise funds for media use.

Concerning the funds, the principal can call a parents' meeting. He must talk to the parents, he must make them understand.

The government must supply teaching aids; it must also address the problems of the community schools.

You see ma'am, if the government didn't say in 1995 grade one are not going to pay the school fund. ....Maybe after five years they will do something ..... when it comes to books, they are not supplying relevant books.

If the mobile laboratory costs about five hundred rand, the government should give us two hundred and fifty, maybe ....

I think at our school there is a problem with teaching aids because the government does not supply the teaching aids we need..

Some teachers felt that running workshops would help to improve the situation:

Maybe if there could be courses, for instance .... for performing or doing an experiment And if we could have workshops for teachers, where they could be taught to improvise. Maybe the teachers could be taught to make materials themselves from scraps.

I think we should have workshops.... maybe to show us how to use these things.

There was also the need to establish new buildings and facilities .

I think we should have buildings, especially for Science, like laboratories.....

The government needs to build more schools.

An interesting observation was that the teachers did not suggest that they too needed to put more effort into improving the media utilization process. Sound advice did emanate from other interested parties, such as those involved in teacher training. Advice concerned the need to get the teachers together in a form of organization where they could collectively discuss their problems and seek help on how to solve them. This help could include inviting other educators to share experiences concerning the use of media or teaching aids, or even approaching sponsors from the local business community to sponsor meetings of this nature or even offer help.

Other solutions included fund-raising, seeking finance from the government, and requesting the principals to assist in solving the problem. One person was of the opinion that any step in trying to reform the principals would involve approaching the inspectors of the region.

There was also the need to address issues such as overcrowding in the schools by erecting more school structures, and employing more teachers. There are some teachers who were of the opinion that the allocation of teaching grants in the region was not done fairly. There were those who also felt that it was up to the teachers to take the initiative themselves.

Another issue that arose was the need to introduce a primary science degree at the University of the North-West, in order to motivate primary science teachers and to counteract their feelings of inferiority when they compare themselves with high school teachers.

Another issue which was dealt with was the method of allocating relevant textbooks to the schools. It was felt that the education department should establish some channel whereby the teachers would be allowed to look at the books and make some contribution to the purchasing of relevant books that could be used.

#### **4.5.2 Other issues of concern**

##### *4.5.2.1 The whole group mode versus the small group mode*

Most of the teachers interviewed on this aspect acknowledged the use of the small group approach as being superior to the large group approach but were of the opinion that in the actual schools this was not practical or feasible,

I think the small group approach is better because .... as a teacher I can check whether I did reach my objectives. But with the large group you don't have the chance of doing this. .... I do not think it is practical because... even right now, I am coming from a class which is overcrowded, having to teach more than seventy pupils in a classroom.

I mean the best thing is to teach them in small groups ... to allow the teacher to observe each student doing their work You can divide them into groups. It can be achieved but not for large groups.

I think small groups is the ideal thing if the government can build more schools. ... But now the situation is difficult.

I divide the class according to their abilities. Other groups are going to be few, others are going to be many

One teacher felt that it depended on the type of teaching aid you were going to use,

If you have prepared a chart, you are going to place it in front of the chalkboard so that the whole class can see.

An older teacher had this to say about teaching methods:

There is no correct method of teaching. You should understand your child, and see to it that when you teach, you drive the point home ... The child must understand what is being said.

#### *4.5.2.2 Child-centred teaching versus teacher-centred teaching*

Contrary to what the researcher had expected to find, a number of teachers were familiar with the child centred-approach,

Teaching must be child-centred, it must be there..... effective teaching must come from small groups.

The teacher-centred approach is not good as such ... children start learning by cramming, not understanding things the way they are ... I have started a style of saying to them . If you need information written on a chart, please go and get and learn it.

A pre-school teacher had this to say:

When I am teaching these young ones, I see the nurse, the doctor, the scientist, and I try my level best to develop that in the child.

On further investigation, the teachers revealed that an up-grading project, the Primary Education Up-grading Project (PEUP), had been introduced in 1976 in this region. This project was introduced to encourage a learner-centred approach. Principals in the primary schools were trained as facilitators. Pilot schools were selected to test the project. The principals of these schools were responsible for spreading the new teaching methods to other schools, and for following up as well. Unfortunately, after some years, the project collapsed because of the lack of follow-up.

Initially the researcher had attempted to associate learner-centred approaches with newly trained teachers but this failed. This information also explained why there were some experienced teachers who were familiar with learner-centred approaches and media utilization also explained the existence of computers and overhead projectors in those formerly designated pilot schools for the project.

There was also mention of the development of teacher training in the region. Teachers in the primary schools today consisted of those who had the Primary Teacher's Certificate (PTC), the Primary Teacher's Diploma (PTD) or more recently had upgraded to the University Diploma in Primary Education (UDEP). Senior lecturers at the Education Department of Mankwe College clearly outlined the introduction of the upgrading project as the government's means of trying to erase the imbalance between primary and secondary teaching, and consequently trying to improve the quality of Primary education. A major problem that has recurred is the failure to maintain these new innovations.

#### *4.5.2.3 The question of improvisation*

The following four responses are from interviews concerning the issue of improvisation:

Improvisation is useful. But you find that in some schools there is no equipment ... there is nothing to make the improvisation apparatus with.

You can make your own ... but always we are having money problems.

We tend to think that only the imported or commercially manufactured teaching aids are good, even though sometimes they are not suited to our curriculum.

On the question of why teachers do not improvise, these were some of the answers:

Improvisation takes a lot of time, you have to collect the materials, and prepare them, and test them. Teachers do not have enough time to do this.

It is probably because teachers do not give themselves time to make them.

From these responses, one can only conclude that the primary science teachers were aware of the need and effects of improvisation in the teaching of science. There seemed to be some conflict between the perceptions and the actual practices of the respondents.

#### **4.5.3 Main points from the analysis of interview data**

The teachers appreciated and were aware of the advantages of education media in science teaching. The lack of funds was the major contributory

factor to the failure to use media. It could be argued that the terms “teaching aids” and “educational media” were associated with expensive equipment. Other problems included the number of students, the view that media preparation was time-consuming, inexperience with media use and low maintenance standards. The absence of a teacher support structure was mentioned. Failure to use radio broadcasts was due to their incompatibility with schools’ timetables. Television, (video machines) were simply unavailable. The lack of relevant textbooks in the schools was also mentioned.

Training was regarded as the major source of solutions to the media utilisation problem. Provision of degree courses in Primary Teaching and In-service training would assist in elevating the status of the primary teacher and improve media utilisation. Workshops were essential, or centres where teachers could receive new information were required. Relevant courses, in which trained teachers would assist the primary teachers in planning, developing and testing media use were required. The involvement of the education department and the community was also essential.

The implementation of special subjects in the schools was also mentioned. Subject teachers would then be assigned to these subjects and this specialization would bring about improved teaching and learning. There was the need to increase the number of periods allocated to science teaching so that there was ample time to perform experiments and have excursions.

There are still those that felt that it was not necessary to use media or teaching aids when teaching in Primary schools. One such teacher remarked that

These aids are not so important ... because as a teacher you can teach without them if you are well prepared.

The same teacher than contradicted herself saying that

you can use anything, or a student in the class can be a teaching aid.

Another rather extreme response to finding a solution to teaching/learning problems was, the one stated below:

The salvation of an African teacher lies in the return to corporal punishment. For a teacher to survive without problems, children must be lashed.

The majority of teachers had been exposed to the new learner-centred methods of teaching. What was required was a system to motivate them, either by inspection (follow-up), or by the mode of assessment. There was a need to encourage teachers to get pupils more involved, rather than just to talk and teach.

#### **4.5.4 Limitations of the interview method**

##### *4.5.4.1 Selection of the respondents*

This was done because it was not physically possible for the researcher to visit all the schools. Initially, the major criteria were the location, (urban or rural), the type of school (community or government). Assigning criteria to selecting the teachers proved to be a problem because of the limitation of the control the researcher had over the respondents. There was no guarantee that those selected would actually participate. There was also the problem of distances to be travelled. Some schools which had been selected were too far. In the end one can just assume that the selection was random in a sense that the researcher went to any of the schools which were within a

reasonable distance (that is 30 km), but controlled in the sense that on getting to the schools, she tried to interview, where possible, a variety of respondents.

#### *4.5.4.2 Reactivity of the respondents*

The fact that selected respondents reported on their own perspectives of the phenomenon rendered the reports very subjective. They could easily have been distorted by bias, anger, emotional state or even politics. The respondents could have said things to impress the researcher. The reactivity of the respondents to the researcher could not be completely eliminated. In this study, the observations provided a check of what was being reported in the interviews.

#### *4.5.4.3 Triangulation of respondents*

The researcher tried to include, within those interviews, a spectrum of other people involved in or linked to Primary teaching, but not necessarily teaching in the primary schools at this stage. These included the teacher trainers, a few principals, students, a preschool teacher and one or two lecturers at the training college in Mankwe. The reason for doing this was to provide a means of weighing the respondents' views to the views of those outside. The researcher would have liked to have included the Education circuit officer as well but he was rather preoccupied during the time the research was conducted.

## **CHAPTER FIVE**

### **FINAL REFLECTIONS AND CONCLUSIONS**

#### **5.1 REFLECTIONS**

##### **5.1.1 Patterns and linkages**

There are three main features of media utilisation that seem to be prominent throughout the entire discussion. The human resources (the teacher and the child), the non-human resources (mechanical devices and real objects), and the environment in which all these exist. In focusing on the teacher, the researcher was attempting to identify those elements that would lead to a meaningful interaction of these features in order to improve Primary science instruction.

What this research has revealed is that the availability of media, knowledge about media, and the knowledge of the advantages of using media will certainly influence the choice of media, but will not necessarily guarantee their use. Similarly, the awareness of the most appropriate teaching methods does not compel the teacher to use them. This does not rule out the fact that there are quite a number of primary science teachers in the rural regions who, because of their lack of exposure to media and to appropriate and relevant methods of teaching, fail to apply them.

Another expectation was that the schools nearer the townships would have greater accessibility to new and improved forms of media. This was true, in the sense that they are the schools most likely to receive the impact of any form of technological reforms. For example, the two schools chosen as pilot schools for the (PEUP) Primary Education Upgrading Project were schools

close to the township. However, there were a few deep in the rural areas who, because of adequately trained and dedicated teachers, were utilising the available media resourcefully and using suitable teaching methods as well.

It was clear from the study that there is a marked distinction in facilities and conditions between state (government) schools and community schools. There are still, however, community schools which have managed to develop and utilise their resources impressively. But these tended to be schools with relatively low student numbers. In the new dispensation and new government, it is hoped that most of these schools will be brought up to the same standard.

In short, a well-informed and adequately trained teacher, if placed in a **good environment** that is a school with proper facilities and media, would have a better chance of using media relevantly. What is even more surprising is that a teacher with the same characteristics, placed in a 'poor environment' if intrinsically motivated, can develop and use the available media to the best of his or her ability. The main key, therefore, to using information and knowledge resourcefully seems to be motivation. The challenge is to identify the factors that can be used to increase the teachers' motivation so that they can apply their knowledge and information to the best of their ability. This lack of motivation could also be used to explain the apparent conflict between the teacher's views on media utilisation and teaching methods and their actual media utilisation in the individual teaching situations.

### **5.1.2 Teacher's views and actual practices**

A comparison between observation data and interview data reveals some discrepancies. From the observational data, the results suggest that the

majority of teachers employ the teacher-centred strategy of teaching directed at the whole class, rather than at small groups and individuals. The absence of more recent forms of media in the classrooms can be attributed to unavailability and/or lack of funding, which confirms the assumption that there is an insufficiency of educational facilities mentioned at the beginning of the study.

The lack of improvisation and use of realia (natural resources), and the adoption of teacher-centred approaches to learning, would have been associated with a limited exposure to their use and inadequate knowledge of teaching strategies. However, the interviews indicated that a number of teachers had actually been exposed to new methods of teaching, either through recent training (for the newly qualified teachers), or through upgrading projects (the 1986 project and the more recent 1994 project). One cannot discount the fact that some teachers were excluded from both projects. At the same time, the argument that teachers are not exposed to new methods of teaching is not entirely justified. It could be argued that there is another factor influencing the conflict between the attitudes of teachers toward media and their actual utilisation of media. That factor could plausibly be teacher motivation.

### **5.1.3 Motivation**

The problem now becomes one of how to increase teacher motivation in order to reconcile views and practices. The logical steps would be firstly to improve the working conditions of the teacher by renovating the buildings, or building new ones and providing educational media. This step, although desirable, is very costly.

Secondly, another consideration would be to elevate the standards of teaching, either through reading projects and in-service training, or even by

elevating the Primary teaching standards to standards equal to those for secondary teaching. Unfortunately, the reality of the situation is that, unless these steps are taken in conjunction with a mechanism to elevate the social status of the teacher, the teacher's position will still be unequivocally associated with monetary status.

If the teacher is well-equipped and motivated, what would require attention would be an administrative mechanism to ensure that these strategies are sustained. This could be achieved through regular supervision, or even better, through an assessment system which would indirectly reinforce the use of these strategies.

Furthermore, if recognition and rewards could be given to those involved in developing and producing educational media, more educators would be encouraged to contribute to improving instruction, especially in the field of media utilisation.

## **5.2 EVALUATION FINDINGS**

The evaluation findings of the study pertain to a reconsideration of the questions asked at the beginning of the inquiry and a short evaluation of the appropriateness of the qualitative framework that was employed.

### **5.2.1 Reconsideration of questions**

#### *5.2.1.1 Who is the Primary Science Teacher in the Mankwe Region?*

The evaluation showed that on average he or she has a Primary Teacher's Certificate or even a Primary Teacher's Diploma, is reasonably qualified, relatively confident in teaching and familiar with media utilisation. What is

lacking in most cases is exposure to the media utilisation process and motivation to go beyond his or her circumstances.

*5.2.1.2 What types of media are available? And in what type of facilities does the teaching occur?*

In general, there are traditional forms of media available in the schools (blackboards, charts, models, textbooks). The facilities need improvement. Government (state) schools are much better off than community schools. Principals, heads of departments in the schools, and the teachers themselves must be encouraged not only to purchase the media, but also to teach the students to maintain these media. In some schools there are no media facilities. There are no textbooks or scientific equipment. Some schools do not even have enough desks.

*5.2.1.3 To what extent are these teachers utilising media? What type of teaching strategies are they using?*

They are utilising media, but there is still much room for improvement, especially in the area of improvisation and use of the available resources. The majority of teachers recognise the importance of using media when teaching, but are hampered by the problem of inadequate resources and lack the knowledge to improvise or to become innovative and creative in their different circumstances.

*5.2.1.4 What are the attitudes towards media utilisation? What are the problems related to media use?*

Most of the teachers regard media utilisation as being necessary. The main problems, as mentioned earlier, include lack of financial resources, large student numbers, and lack of in-service training. There are also feelings of

inferiority among Primary teachers in general, and an inability to use media because of the poor initial training of these teachers. In addition, subject committees, or forums where teachers can express their views, exchange ideas and discuss problems related to Science teaching are not found in this region, even though all these do exist.

*5.2.1.5 Is there sufficient evidence to support media utilisation as a means of improving learning?*

This question is still debatable. That media can facilitate learning, and concentrate the learning tasks, bringing into class what the teacher cannot do is true. More rigorous research is required before one can state with certainty that media can significantly improve learning.

The test for whether media use improves learning will depend on the teachers themselves. If media utilisation brings the learning process close to the pupils, if it encourages and stimulates independent investigation, and if it induces the active participation of the learner, then media utilisation can only work to improve the learning process.

*5.2.1.6 Is it possible to use this information, to make recommendations that would help to identify sound principles for the successful integration of media utilisation in primary schools in South Africa?*

Certainly, this research has revealed that there is a need to motivate and re-motivate primary science teachers in media use by providing equipment and facilities, retraining and elevating the social status of the Primary Science teacher. The education department and the community (parents) should also be involved.. As for integration, the best that can be done is to choose media that are relevant, and suitable for teaching the particular topic and for achieving the required lesson objectives.

The following can be done:

- (1) Provide the necessary facilities, where possible, raise funds, approach the government and community and business organisations,
- (2) Set up training structures for running in-service teaching or run workshops about media utilisation and teaching in general.
- (3) Devise a plan or strategy to maintain whatever is being taught.

*5.2.1.7 When, in terms of the social and political climate, did the study take place?*

This is a time of social and political change in South Africa, a time when many people are expecting some type of change and are beginning to be aware of social responsibilities they were not aware of before, particularly in the black communities. There was a great deal of enthusiasm and eagerness in the respondents' remarks.

## **5.2.2 Evaluation of qualitative research framework**

### *5.2.2.1 General views*

The approach employed in this study succeeded in capturing the essence of the Primary Science teacher's world instead of simply quantifying what media are available and how often they are used. The study attempted to give a total description of the media utilisation situation of the teacher. It also had an exploratory function in that it identified areas that could benefit from further research. One such area was experimental studies to find out which teacher-media-teaching strategy interactions would be suitable for teaching certain science concepts.

One important limitation of the study was the exclusion of learner's opinions and views concerning media use. The other limitations due to data collection methods have already been mentioned. These dealt with the selection of the respondents and the triangulation of the data .

Furthermore, the perceptions and interpretations of the researcher could have been biased by her own preconceptions. The personal biases could have been reduced by using more interviewers and observers. Video taping could have been used as an observational tool had it not been for the financial implications of using a video camera in the investigation.

#### *5.2.2.2 Problems encountered during the research process*

The problems encountered during the research were two-fold, those dealing with the physical limitations of collecting the data and those concerning the data collection and analysis.

##### *(1) Problems related to the physical limitations of the data collection*

The fact that the researcher was working alone without help from other observers or interviewers imposed a physical limitation on the number of schools the researcher could access. Those which were far were eliminated altogether because of the financial and time constraints. There were several occasions when the tapes were not clear after a recording session.

##### *(2) Problems concerned with the selection of respondents and the triangulation of data.*

The selection of respondents was a critical issue throughout the entire research process because of the failure of the researcher to come up with a concise and valid means of selecting the respondents. Initially the researcher

tried to establish criteria for selection, but this was later abandoned because of occurrences beyond the researcher's control, such as teachers from certain schools withdrawing from the process. At the same time, it was impossible for the researcher to avoid making choices. In the end those selected were selected on the basis of their relative distance from the college, and their reaction when asked to participate in the investigation.

The researcher tried to triangulate the methods of collecting data by using the observation and interviewing methods. Triangulation of the data itself was associated with the fact that other respondents, who were not necessarily teachers, were also interviewed and recorded. Triangulation of observers could have been attained had there been sufficient funds.

### *(3) Discrepancy between attitudes and practice*

This problem was found in certain cases, where the teacher's attitudes did not correlate with what they were practising. Unfortunately, the research design did not contain any mechanism for comparing each respondent's observation and interview. In some instances, the teachers observed from one school were not necessarily the ones interviewed from the same school. On the whole, the qualitative research approach seemed most appropriate in the context of this research process in that it was the only method which could allow the researcher to obtain and document data from the respondents exactly as it was given. The power of qualitative research lies in the fact that

qualitative researchers are more inclined to allow themselves to be led by meaningful sketches or by intuition' (Mouton & Marais, 1990:160).

### **5.2.3 Recommendation for further research**

There is a need to investigate the media utilisation process for small groups of people, to try to formulate systems of approach that will be specifically designed for the South African context of teaching and media utilisation.

There is a need to establish which media attributes it would be best to develop in order to improve science instruction in the primary schools. There are several possibilities, but a unifying framework is necessary to establish some form of guidance to the teachers. Suitable materials should be developed and tested on groups of people, especially in rural areas, where such a system could be designed to overcome the problems in the media utilisation process. Teachers and learners should participate in designing these materials so that they are relevant and appropriate for each instructional process.

More investigations are required to try to seek an explanation as to why there is a discrepancy between the teachers' attitudes concerning media utilisation and their actual practice. More research is needed to sensitise teachers and to make them aware that this is the period for questioning and reflective teaching. They have to be able to evaluate their own teaching approaches so as to help to identify problems and suggest ways of improving existing practice. Investigations and analysis are also required in the teaching colleges and in those institutions responsible for providing in-service guidance to teachers, in order to encourage a constructivist approach within media use. Within this type of approach, the teachers feel culturally responsive to the need for change so as to improve the entire media utilisation process. They develop a sense of ownership and can be encouraged to contribute to and participate meaningfully in a workable media utilisation exercise.

### 5.3 CONCLUSION

The problems of teaching science in the Mankwe region are similar to problems elsewhere. There are inadequate physical resources, a lack of knowledge concerning science teaching and a failure to relate theory to practice. ( Volpe 1995:92) says

that interest in science particularly at the primary level is lacking because of the wide gulf between one's studies and one's life.

It is extremely difficult to organise activities using media for science teaching when the resources are scarce. In addition to this, children in the rural areas have language problems. This usually encourages the teacher to do all the talking, thereby leaving the students in the class passive.

What is urgently needed in the schools today is training for the teachers, planning of workshops for them and supplying schools with materials and equipment. Regarding the basic recipe for using materials optimally, Ntho (1995) in Conference Abstracts, suggests that the components necessary to use media properly are :- a reasonable teacher-pupil ratio, physical space for experiments and demonstrations, science support equipment. Teachers do need encouragement in order to foster the correct type of learning in the primary schools.

The dynamic, almost compulsive involvement of a child or adult searching for answers provides a fuel for the vehicle of investigation (Carin & Sund 1970:6).

This vehicle can be further driven by the use of media. Once again, according to Moore et al (1986: 192), the aim should be

to improve rather than to prove media .

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## **APPENDICES**

APPENDIX A

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LIST OF PRIMARY SCHOOLS IN THE MANKWE DISTRICT

---

- |                       |                    |
|-----------------------|--------------------|
| 1. AGONKITSE          | 52. NTSATSI        |
| 2. BAKGATLA           | 53. NTSWETSHWEU    |
| 3. BAKGOFA            | 54. OFENTSE        |
| 4. BAKUBUNG           | 55. OKOMELANG      |
| 5. BAPHALANE          | 56. PHADI          |
| 6. BATLHALERWA        | 57. RAMALEBYA      |
| 7. BOJATING           | 58. RAMATSHABA     |
| 8. D.D.PILANE         | 59. RAMOKOKA       |
| 9. DINKWE             | 60. RAMONOTWANA    |
| 10. GOBANKWANG BOGOSI | 61. RANKAE         |
| 11. LEEMA             | 62. RATHEO         |
| 12. LESETHLENG        | 63. REAGILE        |
| 13. MABESKRAAL        | 64. SEFIKILE       |
| 14. MACHANA           | 65. SEGAKWANA      |
| 15. MADIMA            | 66. SEOLONG        |
| 16. MADUTLE           | 67. S.G.NTUANE     |
| 17. MAGONG            | 68. TLHAALAPITSE   |
| 18. MAKGOPHANENG      | 69. TSHWARA O DIRE |
| 19. MAKHOPHE          | 70. TSHOSE         |
| 20. MAKOSHONG         |                    |
| 21. MAKWELENG         |                    |
| 22. MAMODIMOKWANA     |                    |
| 23. MANTESERE         |                    |
| 24. NANTSHO           |                    |
| 25. MAOLOGANE         |                    |
| 26. MAPAPUTLE         |                    |
| 27. MATLAMETLO        |                    |
| 28. MATUANA           |                    |
| 29. MELOTONG          |                    |
| 30. MMAMITLWA         |                    |
| 31. MMOPYANE          |                    |
| 32. MODOMONG          |                    |
| 33. MODULE            |                    |
| 34. MOENG             |                    |
| 35. MOETLO            |                    |
| 36. MOGOBE            |                    |
| 37. MOGODITSAHANE     |                    |
| 38. MOKGALWANA        |                    |
| 39. MOKHINE           |                    |
| 40. MOLORWE           |                    |
| 41. MOLOTSI           |                    |
| 42. NONONONO          |                    |
| 43. MONTAMAISA        |                    |
| 44. MORONGWA          |                    |
| 45. MOTHLABE          |                    |
| 46. MOTSITSI          |                    |
| 47. MPEREBERE         |                    |
| 48. MPHUPHUTHE        |                    |
| 49. MPYANE            |                    |
| 50. NKOGLWE           |                    |
| 51. NTHEBE            |                    |

APPENDIX B  
-----

RITA KIZITO  
MANKWE CHRISTIAN COLLEGE  
PRIVATE BAG X1014  
MOGWASE  
0302

2 nd August 1994

THE CHIEF CIRCUIT EDUCATION OFFICER  
MANKWE DISTRICT  
NORTH WESTERN PROVINCE

Dear Sir,

REQUEST FOR PERMISSION TO CARRY OUT AN INVESTIGATION IN THE  
MANKWE REGION.  
-----

I am writing to request for permission to carry out an investigation involving primary school science teachers in the Mankwe region. The research is towards the completion of an M.Ed in Didactics degree with the University of South Africa.

The topic of the research project is ;  
" THE UTILISATION OF EDUCATIONAL MEDIA BY PRIMARY SCHOOL SCIENCE TEACHERS IN THE MANKWE REGION".

The aim of the research is to increase an awareness of the use of media in primary science teaching, and to identify problems concerning media utilisation.

The processes of the research will include participatory discussions with science teachers in various schools, classroom observations and filling in of questionnaires by the teachers.

It is hoped that the final report will form the basis of designing low cost instructional guides and media packages for the primary school science teachers. In addition, it could also form the basis for motivation towards the establishment of an educational media centre in the region.

The participants will remain anonymous and all the information given will be treated with the strictest confidentiality.

Thank you for your kind consideration,

Yours faithfully

RITA KIZITO  
-----



Nr. Tshup./Ref. No./Verw. Nr.

Botsa go/Enquiries/Navrae

A.J.MADISA

Nr. Mog/Tel. No. ... 55840/1...

Rita Kizito  
Mankwe Christian College  
Private Bag X1014  
MOGWASE  
0302

KANTORO YA/OFFICE OF THE/KANTOOR VAN  
MANKWE CIRCUIT OFFICE

PRIVATE BAG X1003

MOGWASE

0302

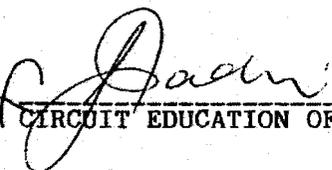
9 AUGUST 1994

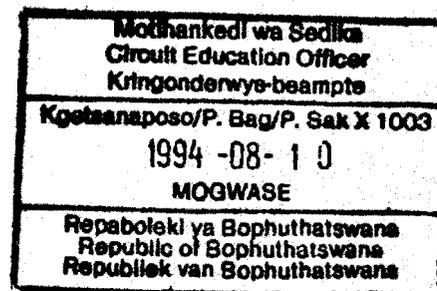
YOUR REQUEST FOR PERMISSION TO CARRY OUT AN INVESTIGATION IN OUR  
PRIMARY SCHOOLS

You are herewith granted permission for the above purpose as requested.

Schools have also been informed accordingly. However do make appointments with the principals concerned to avoid unexpected disruptive visits.

It is advisable that on arrival at each school you produce this letter for your clearance.

  
CIRCUIT EDUCATION OFFICER



APPENDIX D (1)

AN INVESTIGATION OF THE UTILISATION OF MEDIA BY PRIMARY  
SCIENCE TEACHERS IN THE MANKWE DISTRICT ; NORTH WEST REGION

School Assessment Sheet

The School \_\_\_\_\_ School no ..... Date .....

a) Name of the school .....

b) School address .....

.....Code.....

c) School telephone number.....

d) Distances from the school to ;

- nearest Middle school .....km
- nearest High School .....km
- nearest Teacher Training College .....km
- nearest town/shopping centre .....km
- circuit education Office .....km

e) Number of science teachers .....

f) School roll :

Standard	no. of classes	number of pupils per class	total
Grade 1			
Grade 2			
Std 1			
Std 2			
Std 3			
Std 4			

Total roll = .....

g) Approximate annual school budget .....rands

h) Estimate of money spent on media annually .....rands

APPENDIX D (ii)

Demographic Data

School no.....

Date.....

Age.....

Sex M..... F.....

Highest Academic Qualification.....

.....

.....

Experience in Teaching at a Primary School .....years

APPENDIX D (iii)

-----  
 INSTRUCTIONAL MEDIA  
 -----

Date .....

School no. ....

Media type | Circle appropriate number

- | 1- available  
 | 2- sufficient  
 | 3- in good condition  
 | 4- most frequently used

01 Printed material	1	2	3	4
02 Charts (commercial)	1	2	3	4
03 Overhead Projector	1	2	3	4
04 Slide projector	1	2	3	4
05 Film projector	1	2	3	4
06 Audio cassette player	1	2	3	4
07 Radio	1	2	3	4
08 Video machine	1	2	3	4
09 Television	1	2	3	4
10 Models(Commercial)	1	2	3	4
11 Laboratory equipment	1	2	3	4
12 Improvised equipment	1	2	3	4
13 Chalkboard	1	2	3	4
14 White board	1	2	3	4
15 Computers	1	2	3	4
16 Typewriter	1	2	3	4
17 Duplicating machine	1	2	3	4
18 Photocopying machine	1	2	3	4

-----  
 Observation Guide  
 -----

Date ..... Time : from..... to .....

Lesson Topic/Objectives.....  
 .....  
 .....  
 .....

## 1) General Impression

- 2) Classroom setting - ventilation, safety, interference  
 - displays, wall charts, models, interest tables  
 - furniture, space, working space  
 - arrangement (traditional, horseshoe, modular)

3) Teacher and methods of instruction  
 deductive/inductive  
 appearance/voice tone

methods

mode

- whole group
- small group
- individualised
- combination

- oral narrative
- question and answer
- demonstration
- experimental investigation
- discussion
- group work
- independent study

- 4) Type of media
- Blackboard
  - Textbook
  - manual/exercise books
  - wallcharts/ flip charts
  - science equipment
  - models

- 5) Student
- description
  - interactions with teacher, media, each other
  - involvement with lesson

- 6) Media Integration
- beginning, middle, end
  - suitability of media to achieve objectives
  - planned use of media
  - appropriateness of media for level of understanding
  - ease of use
  - cost effectiveness
  - affordable

## 7) Overall impression of lesson

**APPENDIX F**

**CLASSROOM OBSERVATIONS**

A total of 32 observations were carried out in 23 schools in the region. In some schools more than one observation was carried out.

#### 6 September Magong Primary School

Class size : 30

Arrived at school after break and went to introduce myself to the principal. The principal showed me around the school and allowed me to enter a Standard Four classroom. She introduced me to the teacher and said that I was welcome to observe quickly.

The teacher had already started the lesson, so there was writing on the blackboard. Apart from a few charts, the classroom is very empty. However, the school is very neat. I try to enter and to record what is going on but there is just too much activity, I am not sure what to record or what to leave out.

Summary: school is neat  
Teacher seems competent  
media used : blackboard throughout.

Class size : 57

This one is an elderly teacher. The classroom environment is not conducive to learning at all. There are desks scattered everywhere. Each student does not have a desk to him or herself. The lesson topic is :  
Effect of heat on the solubility of substances.

there is no chart, on the wall. The teacher is just using the blackboard. Some students have text books others do not. This does not seem to bother the teacher. However, the whole class seems to be listening intently to what is going on.

Researcher tried to tally the activities of the students in terms of media utilisation and those of the teacher, but it is very difficult to keep pace.

#### 6 September Mamodimankwa Primary School

Arrived in the school when it is almost coming to one o'clock. It is time to do the cleaning but the science teacher is willing to squeeze the researcher in for a look at the class.

Class size : 47

The classroom is very neat and well arranged . There are even shelves on the side walls with a few books. The teacher seems to be well organised. There is even a science corner where the students put their collections.

The teacher puts up a lesson very quickly.

The topic is filtration. It seems as if the students have already had the lesson before.

The researcher attempts to use the record sheet again, but it is proving to be quite difficult. The observation is not really well structured.

In the end the best thing is to concentrate on the teacher-pupil relationships which are quite interesting. The students are very participative in class.

The researcher must devise a better way of recording the results.

#### KEYS FOR OBSERVATION:

- 1) General Impression
- 2) Classroom setting
- 3) teacher and methods of instruction
- 4) type of media
- 5) student
- 6) Media integration
- 7) Overall impression of the lesson

**8 September : Mamitlwa Primary School**

- 1) : This school is rather dilapidated. the principal says it is because it is a community school. The buildings are old and not well maintained. there is no vegetation around except for a few trees which have recently been planted. A fence is needed to keep the the goats out.

class size : 71

Lesson topic : The use of water around us

2) classroom setting is adequate, considering the number of students, relatively clean.

Teacher methods: oral-narrative

3) Teacher methods: oral-narrative, whole group instruction

4) type of media : blackboard and a short trip outside to investigate water use

5) student: attentive and neat, rather passive..

6) Media integration:  
beginning- discussion and trip outside  
middle & end- teacher explains using blackboard

suitable, affordable

7) average lesson.

Class size : 52

Lesson topic : Filtration

2) Classroom setting: adequate

3) Teacher + methods : oral narrative, whole group.

4) Media: Blackboard and textbooks.

5) Students: attentive and disciplined

6) Media integration;  
Beginning: Blackboard presentation  
Middle: Writing in exercise books  
End: Summary on blackboard.  
suitable, affordable , planned use ?

7) Average lesson

## 21 September : Morongwa Primary School

Class size : 35

1) I visited this school twice before securing an appointment with the teacher. this school was definitely a government school. The buildings were relatively new and meticulously clean. his school is right within the township. The school was high, 700 students. I was amazed to discover that three quarters of its students were from a poor village, on the outskirts of the township.

Class was rather too well arranged, very pleasant teacher, very welcoming.

Topic: Purification of substances.

Had no notion that the teacher had prepared the topic because no apparatus. Explained that they had no apparatus.

2) a) good lighting, acoustics , no interference

b) displays all over the classroom, one cupboard in the corner, very pleasant learning environment.  
traditional arrangement, but space left between the teachers' desk and children, to observe the experiment.

3) teacher pleasant, very confident, rather strict, Children

made to stand in perfect lines.

Made to sit in front with a table and a white cloth, felt like a visitor in the class. After some time the children were too engrossed to recognise that I was there.

Mode: whole group

Methods: oral, narrative and demonstrations, questions and answers. All books are put away, only referred to when teacher says so. very audible very clear.

Stayed in front during the entire lesson, rather agitated, lesson very well-planned according to the text book.

4) Type of media : blackboard, science equipment: water, containers, salt, filter.

Blackboard was very well used with instructions on the left and work on the right. All students given to copy because they do not have textbooks.

Class very controlled, giggling, dressed very smartly. Had to get up in a straight line and listen to the teacher. Did not participate at all. Only interaction with media is mainly visual, no doing at all.

6) Introduction- blackboard- quite well done.

Middle - teacher demonstration	participation from
students all around	learners not there
see and watch but not	
touch	

suitable ?

7) Researcher comment:

Groupwork could be introduced, individualization, teacher needs help with improvisation and to involve learners. Rote memorization as a method of teaching still rampant.

Media utilisation: good in the circumstances, also discovered that the school has a set of computers but only developed for language use. Very old models (1976) cannot be adopted to use modern software.

Development of teaching aids/media: relevant to learners. General impression : environment very clean, no activity table. Teacher feels that strict discipline is the best approach.

Government school, buildings very clean and surroundings clean and organised.

12 October : Matuana Primary School

1) School deep in the village, impressed with appearance. Very clean and organised. No water and electricity. Children donate 10c towards candle wax for polishing. School roll is low, principal not happy. Teaching equipment kept in store, next

to principal's office. Elderly lady in charge, hospitable tea. R2000, for science equipment.

Class size : 34

Lesson topic: Solubility

2) classroom setting: very clean and organised, impressed about cleanliness, horseshoe arrangement, almost too perfect. Books in shelves. students have lockers.

3) Teacher; Inductive, very well prepared, not very natural. Too much effort. Oral narrative method, + demonstration. Very smart, in charge and i control. Planned lesson objectives.

4) Apparatus: solubility materials, sand, salt, sugar, water bunsen burner, etc  
Blackboard with charts and exercise books

5) Students are very attentive, no interaction with each other ,only interaction with media is visual.

6) Media integration: Beginning Blackboard- good  
Middle-apparatus- good, but could be used more  
End: Small flip charts.

fair selection, planned use ?

7) A good lesson.

Class size : 41

Lesson topic: Water and air around us

2) Classroom setting : adequate and neat and well organized. Charts on the wall, evidence of pupils' work.

3) Teacher & methods of instruction : oral-narrative. large group, . some demonstration.

4) Media: blackboard, exercise books and charts.

5) Students, attentive, neat, strict control on their work. No interaction with each other, only concentrate on teacher.

6) media integration:  
Beginning-introduction- discussion, a few questions,  
blackboard  
Middle- chart and classroom exercises  
End- note taking  
adequate

7) simple well structured lesson.

## 12 October : Mokhine Primary School

1) Rather dilapidated school, no funds , it is a community school

Everything kept in the headmaster's office. Showed me a fascinating model of a fish, well painted work of art.

Class size : 79

Lesson topic : Solubility

2) Terrible classroom setting, 79 students in a room 10x8m. 3-4 students per desk. Desks insufficient and broken, bare walls and unpainted.

3) teacher methods of instruction: deductive, oral-narrative. Teacher uses teaching aid/media by himself, no classroom involvement. Teacher well-dressed with a scanty lesson plan.

4) Media: chalkboard ( sorry state), no text books students had to share. Stove with cans of beer to demonstrate solubility ! Blackboard used rarely - handwriting too small. Students too many and too far to make observations effectively.

5) Students on average quite clean. But the classes are too big. Only front students are really involved in teaching-learning process. Back students too far to observe anything. Interaction with each other normal.

6) Media integration:

Beginning- rushed all things on table, experiment too fast how one could observe solubility, a puzzle !

Middle- still using same media

End- rather rushed.

Not well planned

7) Overall Impression : very sad that students are made to work under such conditions. ver little learning taking place.

Class size: 127

Lesson topic: Water around us

2) Classroom too big , but female teacher has tried to decorate it as best as she can .

3) Teacher & methods of instruction; two large groups, who are very difficult to control. Oral-narrative, under very

strict supervision. No other alternative.

4) Media: Only blackboard, and students' classwork books.

5) students: listen as attentively as they possibly can but the number is too big.

6) media integration :beginning- blackboard  
middle + end : classwork books

tried !

7) lesson is quite good considering the circumstances.

### 13 October : Ofentse Primary School

Class size : 30

lesson topic : Filtration

1) Arrived at school after break , asked the principal for permission to go into classes. the difference between the principal's office and the rest of school quite remarkable. School well fenced but the school toilets need some attention. problem of goats coming inside the fence.

2) classroom setting : not so bad two classes joined by a partition, one can sometimes hear what is transpiring in the other classroom.

Teacher very co-operative, allowed me to get into class without prior arrangements, not formal at all. Shelf with books and an activity table. A few collections on the table obviously collected by the kids. Seeds, dead insects, etc. Chalkboard in very good shape. Very comfortable and friendly atmosphere, observer got involved immediately.

3) Teacher & methods: teacher very young and competent. Methods : oral-narrative but also inductive, teacher started with inductive approach, started from what students already know. Then divided them into groups , allowed them to experiment and later summarised the findings on the chalkboard. Also investigations carried out in small groups. Very audible

4) Media: filter paper, beakers, ( bottles) water, sand, chalkboard, student exercise books, wall charts visible from most angles. Environment inductive to learning. exercise books with reports not rigid notes.

5) Students: a lively bunch. enjoyed the lesson. Volunteering to help the teacher, ask questions. Observer absorbed into the whole situation. Teacher-student interactions quite lively. Activity based learning.

6) Media Integration :  
Beginning-equipment- asking questions  
Middle-partial demonstration by teacher then group  
experiments  
End- chalkboard summary and writing reports in class  
work books.

Well selected and used.

7) Very impressed with the whole lesson. Very good use  
of available media & improvisation.

## 12 January : Bakubung Primary School

1) School in the village Ledag. Looks very neat on the  
outside. Friendly atmosphere. New school, but roll is  
quite big. Male teacher in charge of science teaching.

Class size : 67

Topic: effect of heat on substances

2) Classroom setting: neat but rather bare, orderly  
arrangement with a few items, wind vane in class.

3) teacher & methods : Teachers started with a few items on  
the desk, demonstrated experiment independently and then  
asked a few questions. later he asked the students to copy  
from blackboard-notes rendition of textbook.  
Whole group instruction, oral-narrative.

4) Media : apparatus on teacher's table, chalkboard and  
pupils' exercise books.

5) Students: well controlled and organised. Minimal  
interaction with each other during lesson. Very serious  
yet quite involved.

6) Media Integration:  
beginning-narration-chalkboard  
middle- teacher demonstration  
end note taking  
suitable , planned , not innovative

7) Fair lesson

Class size : 47

Topic : Dissolution process

2) Classroom setting: adequate, well spaced out and neat  
furniture. Bare walls, no charts.

3) Teacher & methods : whole group, oral-narrative, question and answer.

4) Types of media : blackboard, textbook, exercise book.

5) Student: stable and well organised, rather passive.

6) Media integration :  
beginning: blackboard  
middle : textbook, exercise book  
end.: blackboard  
lacks creativity

7) rather s dull lesson.

### 12 January : Mphumheithe Primary School

Class size: 56

Topic : Purification of water

1) The school is not very new but the surroundings are moderately kept. The principal complains of not having a telephone, or any means of access to the education circuit office.

2) Classroom setting: adequate , enough chairs and desks but there are very few charts around.

3) Teacher & teaching methods : oral-narrative, whole group, question & answers.

4) Media: chalkboard, exercise books

5) Student : neat, well behaved, very little interaction with each other or with the teacher.

6) Media integration:  
beginning, middle & end  
Chalkboard, exercise books.

7) Average

### 12 January : Bakgofa Primary School

Class size: 36

Topic; Importance of water

1) Not very neat. A few charts hanging on the walls

2) Classroom setting; ventilation, safety adequate. Sufficient for the class.

3) Teacher & teaching methods; oral-narrative, whole group.

4) Media, chalkboard, the environment outside. class work books.

5) Students; neat and quiet in class, well controlled. Limited interaction with each other and the teachers.

6) Media integration.

Beginning; look at the environment outside

Middle; teacher uses chalkboard to explain

End ; Exercise books.

Adequate planning, suitable

7) A good lesson

24 January : Ofentse Primary School

Class size : 78

Topic : Solubility using water

- 1) The school although a bit dusty looks well. The acting principal is a very friendly lady with friendly staff.
- 2) Classroom setting : safe, old , well looked after pupils share desks but the arrangement does not look so bad. A bit overcrowded.
- 3) Teacher & methods : whole group, smaller groups, investigation. Each group is provided with two containers, and some sugar. students dissolve sugar in cold and warm water , teacher boiled and distributed. Pupils wrote their observations.
- 4) Type of media : chalkboard, text book, apparatus- jam jars and sugar.
- 5) Student : alert . attentive and involved in the lesson. interact with each other and with the teacher.
- 6) Media integration :  
beginning: talk, demonstration by teacher,  
middle: student investigation  
end: conclusion writing of results.

Well chosen media

- 7) A very interesting lesson.

Class size : 68

Topic ; The air around us.

- 2) Classroom setting: fine, safe , rather crowded.
- 3) Teacher & methods: oral-narrative, . This teacher did not prepare the lesson well. Students walking all over the place.
- 4) Media : water, in different containers, textbooks.
- 5) students: initially seemed disorganised, but apparently are involved in the classroom activity, trying to show that air occupies space.
- 6) media integration:  
suitable and very interesting  
beginning: chalkboard  
middle : jars, water

end; could not finish, time was up.

well selected

7) An interesting lesson.

### 12 January : Bakgatla Primary School

1) School is not a neat school. There is too much movement all over the school. Apparently the principal was not in.

Class size: 47

Topic: Revision for test

had made an appointment but the teacher said he could not change the schedule. Students were doing revision of the topics, asking questions. Quite lively discussions were taking place.

Class size : 52

Topic : Filtration

2) Classroom setting : Average, looks fine , no charts or models on display.

3) Teacher & teaching methods : whole group, oral-narrative.

4) Media : chalkboard.

5) Student: attentive, neat and quite organised.

6) teacher used blackboard through out.

7).....

### 6 February : Madima Primary School

1) School looks clean on the outside, the compound is neat and well kept.

Class size: 54

Topic: Soil

2) Classroom setting. bare class just tables and desks very few charts, no science corner.

3) Teacher & methods: oral -narrative, whole group, questions and answers.

- 4) Type of media: chart, chalkboard.
- 5) students: quiet, not allowed to move around.
- 6) Media integration: teacher used the chart to explain the topic on soil and then asked questions.
- 7) Left something to be desired.

Class size :46

Topic: Heat sources.

- 2) Classroom setting: usual desks and chairs in a straight row.
- 3) teacher & teaching methods: oral-narrative, whole group
- 4) Media: chalkboard, flipcharts, exercise books
- 5) students: not passive but not very active either. seem to be involved with the lesson.
- 6).....
- 7) fair

7 February : Machama Primary School

Class size : 43

Topic : Germination

- 1) By now the researcher is no longer affected by the schools. After some time, one tends to accept that most of them need some paint and work.
- 2) Classroom setting: well arranged , adequate furniture, no displays at all
- 3) teaching methods : narrative, a bit of group discussions
- 4) Media : chalkboard, textbooks, questions on sheets of paper to be discussed.
- 5) Students; Fine, well controlled , quite involved.
- 6) Media inegration: classroom activity blended in very well with the lesson, distribution of questions on sheets of paper quite effective.
- 7) A good lesson,

7 February : Mpyane primary School

1) The school surroundings are well kept. Buildings could do with some renovation.

Class size : 66

Topic: Germination of seeds

2) Classroom setting: this classroom definitely requires some renovation. The riots must have left it in this state. Even the chalkboard-only part of it remains. Too crowded.

3) Teacher & methods; oral narrative and a chart . Teacher talks throughout the entire lesson. Only allows pupils to ask questions at the end of the lesson.

4) Media: only chart, at least could have tried to use the real seeds.

5) Students: rather restless, maybe it is because of the surroundings. It seems to be making them rather restless.

6) Media integration : Chart & chalkboard all through the lesson.

7) I wish he could ask the students to bring some seeds or something, to put a bit of sparkle into the teaching !

Class size: 35

Topic: Growth and development in plants.

2) Classroom setting: this is a smaller class roll, makes the class more manageable. Teacher has already arranged classroom in group sittings. Maybe because I told her I was coming.

3) Teacher & teaching methods: guided discovery, asks questions, lets pupils discuss in groups before coming up with answers.

4) Media ; chalkboard, a few plants in pots. a chart. Says if she leaves the charts hanging, the students destroy them, what a pity !

5) Students: very involved and amount of interaction is healthy.

6) Media integration: was done very well.

Beginning: questions & discussions

Middle : observation and questioning again

End: conclusions on blackboard and in pupils' books.

7) impressive lesson.

**10 February : Ramatshaba Primary School**

1) The school surroundings look fine.

Class size : 45

During the appointment I made the teacher had to finish off something. By the time she came in the lesson was over. But she said she would just ask them questions to show me how well they had learnt. They seemed to know the answers to the questions by heart.

**10 February : Magong Primary School**

The school is too small. Only two blocks of building. There is too much dust around at the moment. A few trees have been recently planted.

Class size : 56

Topic: Requirements for the growth of plants.

2) classroom setting : adequate, desks and chairs arranged properly.

3) teacher & methods: the usual narrative, with questions and answers, Uses chalkboard a lot and quite effectively. Coloured chalk, nice big drawings .....

4) Media: chalkboard, text books, which are shared around the class.

5) students : very attentive and studious, seem to be taken in by what is going on

6) Media integration: done quite well.

Beginning: Chalkboard with diagram students have to study diagrams and answer questions.

Middle : classwork in books

End: summary on chalkboard.

7) Quite an interesting approach to teaching.

**23 February : D.Pilane Primary School**

1) Fine surroundings, a little grass.

Class size : 44

Topic:Growth and development of plants.

Classroom setting: lesson outside the classroom

3) teacher & methods : guided tour of what plants are around, quite a big bunch to control  
Questioning and proding students.

4) Media: the natural surroundings, inexpensive, available and easy to use

5) Students :noisy and happy bunch.

6) Integration; good, just carried on until the end of lesson

7) Wondered if there was some follow up on what was being taught.

### **23 February : Ramalebya primary School**

1) A well kept school , considering the circumstances. There is too much dust around.

Class size: 47

Topic; Germination of seeds.

2) Classroom setting; good, desks arranged in usual traditional format. Class a bit untidy after breaktime.

3) teacher & methods : real narrative, teacher says something, copies it on the blackboard and students copy it in their exercise books.

4) Media : Chalkboard  
Exercise books

5) Students: very busy writing notes

6) Media integration;.....

7) Teacher says the results are good. The notes help the students to remember what they are being taught. Maybe the examination system should change ?

### **23 February : Ramontwana Primary School**

1) The school has proper grounds and the compound is well maintained, no grass, no flowers.

Class size: 36

Topic: Requirements for germination

2) classroom setting: well arranged, neat  
a few pots in the classroom  
some charts as well

3) teacher & methods: oral-narrative, whole group discussions.

4) Media: blackboard,  
exercise book

5) students: attentive throughout the period

6) Media integration:  
beginning - questions, discussions  
middle- blackboard  
end- exercise books  
easy to use , available

7) A fair lesson

### 7 March : Tshwara-O-Dire primary School

This is the school with the best surroundings. It is right in a residential area in Mogwase, has a flower garden Very well kept.

Class size : 45

Topic: Seed germination

2) Classroom setting: very neat classrooms but rather bare teacher asked me where she could get charts

3) teacher & methods: questioning, teacher talking, groupwork and discussions, observation as well Teacher distributed seeds, asked pupils to observe and record the answers on the worksheet.

4) Media: seeds, blackboard, worksheets,  
exercise books

5) students: very involved, interacting with each other and with the teacher.

6) Media integration : done well, lesson is fluid and activity based.  
beginning- probing questions then instructions  
middle- discussions and observations/seeds & work sheets  
end summary on chalkboard.

7) Well-planned lesson.

### 7 March : Segakwana Primary School

1) School surroundings are fine.

Class size : 46

Topic: Soil

2) Classroom setting: adequate, traditional arrangement of desks and chairs. A few wall charts.

3) teacher & methods: whole group, oral-narrative  
The teacher introduced the topic, asked a few questions, and instructed the pupils to try and get the answers in the texbooks which were not enough to go around the class. Sharing is done only between pupils close to each other.

4) media : blackboard, text books & exercise books

5) students : well controlled, minimum interaction

6) integration of media: done  
beginning-blackboard  
middle- students consult textbook  
end- conclusion on blackboard.

7) a fair lesson.

**APPENDIX G**

**INTERVIEWS CONDUCTED**

**KEY: Q = RESEARCHER ( in bold letters)**  
R = respondent

TAPE 1:

RESPONDENT NO. 1 [000 - 266]

Teacher trained at Lehurutse Teacher Training College.  
Qualification : University Diploma in Primary Education  
Experience : 3 years

**Q: What are the problems you encounter when teaching Science ?**

R: The problems that we encounter in teaching Science in the schools..... you look at the way they arrange the scheme of work. It's directly from the syllabus . I will take a topic from how they schemed our .....Science. They started with water as a topic. they say ..... water has three states, what.....You find that they leave that, they get air and they get other topics, and they get to expansion and contraction of other gases, and water, included in the topic. There is no link, you see. Children have been dealing with air by the beginning of the year. In the middle of the year, they get to water again.

The books are not relevant at all. You find there are activities in the book, but the apparatus are not there. I have to make something like ..... experiment like blue copper sulphate, magnesium sulphate. They don't even know what type of apparatus is that.

**Q: Do you think that that the use of teaching aids is useful?**

R: It is useful because I used the chalkboard ever since I started , so I started to use a chart. It is easily used to them, they can take it from where I pin it and use it at their own spare time. They are really gaining through using those charts, they get the whole information there, even if they don't remember it they get to class where the chart is pinned, and they can easily use it. Unlike your chalkboard, you see.... You might think that they are writing in their notebooks, they are not so good at writing notes..... they cannot even read them, so if there are notes on the chart or whatever on the chart, they can easily go and read it and revise it and the things can be easily learned.

**Q: What about the problems ? ..... especially with the teaching aids in the school ?**

R: Problems ..... I don't know, we don't have enough teaching aids. In fact, we don't have teaching aids, we just use textbooks and the chalkboard . We don't have teaching aids at all.

**Q: What would you suggest should be done to improve the situation ?**

R: It is only that you people who are organising the teaching of Science in schools doing better work. You should come and speak to the principals. It only lies with the Principals, that they should buy some of the materials ..... Perhaps if there can be a laboratory, a small one or a mobile laboratory, it will be very much useful.

Q: ....What is happening in teacher training,..... we are encouraging people to improvise It is so well and good to say that the government is going to supply, but it is not, ..... there aren't sufficient funds, so what I am trying to find out is ..... What about improvisation? Why can't teachers improvise, at least? Is it so difficult? What do you think about improvisation?

R: I should think that it can also work. It is not so difficult as such but you look at the number of children in our classes, you look at everything, very strenuous, number of periods ..... people who are teaching science, maybe Science and Maths together, the burden of the subject is also strenuous.....You find that you are doing a language and the language has many parts..... you've got to take them for an outing, looking at trees, so you take them, ten minutes is gone and the period is also short. The time allocated to the period is very short. You start teaching outside, maybe, for excursion. You are not going to get a lot of time and maybe the period is over and the the other one is standing at the door.

Q: Do you have double periods here, or are they just single periods?

R: Most of them are single periods, we've got only double periods, maybe once a week, or twice a week, and then it doesn't come everyday..... the science period.

Q: Do you have anything like a Science Fund? Some funds put aside for buying equipment or whatever?

R: No

Q: The other thing ..... is the type of teaching, the other time I was here I just saw one class, in fact two of them. What I noticed was that there was hardly any groupwork. There was just one big group. So I was trying to find out, for yourself, What do you think about those two, the small group teaching and the large group?

R: I should think the small one can be very much easy to teach, because I am teaching three classes only ..... The first one, the students are very few and almost all of them are gaining all the things that I am saying. The ones that are packed in the class, just only two or three of them you see that they are gaining something from what you saying, so I should think that, group teaching, you see it is very difficult for us to teach in groups, the time allocated for the subject is very short, you start, our

children, the problem is the language, you know Science you cannot use mother tongue in Science, it is very hard to use, otherwise, they are not familiar with.....and so you've got to use English, at the same time they don't understand. You've got to stress each and everything that you are doing. Looking at the SCHEME of work they say at the end of this quarter you've got to have completed this, most of the time you are running for completing the syllabus, not looking at the work children are doing.

**Q: What about the learner-centred approach as compared to the student-centred approach ? Do you think in the schools the teacher-centred approach is being used ?**

R: Exactly

**Q: Do you really feel, is it bad, is it good, or what ?  
..... What are your opinions ?**

R: Sometimes it is good, in fact it is not good such, children start learning just by cramming, not understanding things the way they are ( the teacher-centred)..... I have started the style of saying to them. If you need any information written on that chart, please go and get it and learn it..... now they are going to do a little bit well.

**Q: Any other thing you would like to add to add on ?**

R: It is only that you have to advise our principals to buy some materials for our children, otherwise they are just going to do all this History, and other subjects, other than Science, they will find it difficult.

**Q: What about yourself, what do you think you can contribute to improve the situation ?.....**

R: I will devise some means.

**Q: Thank-you**

Teacher only been in service for three months. A matric student, no professional qualification, would like to take teaching as a career, cannot find a place (matriculated in 1987)

**Q: What are your opinions concerning media/teaching aids?**

R: I am not going to say as much. I think it is much better to use charts and other teaching materials for experiments so that it can remain in their memories, they can memorise whatever you are saying in writing tests or classwork because you have been doing an experiment before them, they have proved what you have been saying, not just theoretically, but practically. I think that is all.

**Q: What about problems ?**

R: ..... There are many problems because we are overcrowded in class,.. and then we don't have much time to do ..... we have got slow learners and then we've got those who can grasp easily, so because of time, we don't have a special time for those slow learners, the group of slow learners, to teach them at their pace.

**Q: How many periods do you have per day ?**

R: Sixty.....seven. Every subject is done every day.

**Q: What about recommendations to improve the situation ?**

R: I think we should have buildings, especially Science, like a laboratory, and when coming, maybe dealing with animals that live in water, some of us do not have aquariums and when we say fish, they always see them in a picture, they must the outline of a fish, and they must see when we say, the fish is swimming in this, they must see it, and .... all the stages of the fish, from the egg, to fertilization,, until the reproductive system, they must prove it, we must have a sort of aquarium at least for them to study that.

**Q: What about making your own ?**

R: You can make your own but, always we are having money problems,... financial problems, but let's hope, maybe..

**Q: What about textbooks, are you also finding the same problems with textbooks ?**

R: We are having textbooks, but the textbooks just have to guide us, how to teach them.

**Q: According to you, are the textbooks fine ?**

R: They are fine .

Q: What about the teachers, what do you think should be done help the teachers ? Okay, finance is one, but is there something else that can be done ?..... so that the teachers are aware of the the things they can use, not necessarily expensive things ..... do you think there is something that can be done to help them ?

R: The charts are more important and they can do a lot of work for the teacher on the behalf of the teacher , they move this and this,..... and they are going to experience and keep it in their memory unlike when I tell them, the male come to fertilize the egg and so on, ..... even some become very bored..... they don't participate.

Q: What about the methods of teaching ? ..... What type of methods are you using in your teaching ? Do you use teacher-centred ? small group ? large group ?

R: I can say we use large group.

Q: Why do you prefer using large group rather than small group ?

R: The first problem is the time, the other one is the place, you must take them somewhere..... than the other group, spend time with them, according to their pace.....

Q: The other thing I was trying to find out from ther teachers is improvisation, I'm really interested in hearing about it..... In many ways one can improvise,..... when I go around I see that teachers lack improvisation, even with small thing,..... bringing containers, empty coke bottles ..... at some schools you see that this is done, somebody has gone through that effort, okay they don't have equipment, that is clear to everyone, but they are trying at their level best.....

R: Some , we are trying on our own.

Q: I just want to find out, what is is that makes it very difficult for teachers,..... they find it very difficult .....

R: Specifically in Science,..... the way they pack the subjects. You are not only teaching Science, you are teaching other subjects like ..... three subjects to teach. You don't have enough time,..... Science needs a lot of time . You have got lots of planning to do. If this doesn't work, how am I going to make them understand this. So you don't have a lot of time to be prepared for them ..... this is why we say that Science is for people who are just spending most of their time in the laboratory ..... but the actual fact is , they are working hard. The problem is that you teach a language and Science as well. It is very much difficult. You cannot work the way

you can improvise..... unlike if you were teaching Maths and Science. That one is a real problem.

**Q: Have you attended any Science workshops ?**

**R: No.**

When I started teaching, I started teaching Afrikaans.  
When I arrived here this year ..... they gave me  
Science ..... I never attended any course.

Elderly teacher, doing the Upgrading course offered by the University of the North West In Service. Has been teaching since 1981.

**Q:** Tell me .... what you think about teaching aids/media. What your opinion about teaching aids ..... just anything.

**R:** Well..... the help us to succeed in a lesson because the pupils become involved.... so that at the end the lesson becomes successful. And then with the media, well, we have a problem ..... because when we buy them, we don't have storage ..... so theft is a problem.

**Q:** It is difficult to accumulate things because they will be stolen.

**R:** Yes, that's right.

**Q:** Problem ..... I just want to hear your problems concerning media utilisation/teaching aids. What are your problems here in school ?

**R:** The first problem is going to be electricity. We don't have electricity in our school, so maybe, the OHP cannot be used, we can't apply.

**Q:** But there is electricity in the village ..... or are they just putting it in ?

**R:** Some houses have electricity, but there is no electricity in the school. I don't know whether it is funds or what. When I arrived here it was already electrified. So I don't know whether it is community or maybe the school council, so that's where, I don't know what the problem is, to connect electricity because we don't even have a phone.

**Q:** Is that so ?

**R:** So sometimes, the occasions, like the last time we were expecting visitors from Brits, so because we don't have a phone, they even drove to our school to tell them that they were cancelling the match, so that is why I say we have a problem of the phone.

**Q:** Any other problem, what about during the actual teaching ?

**R:** The actual teaching. Personally I don't see any big problem with teaching because of my service. I don't think I have any problem ..... the problem is only History, because there are no textbooks, and then ..... the matter in the syllabus, the teacher is going to look for information, so we don't have any ..... textbooks, especially Std. 4.

**Q:** What about Science, do you have textbooks in Science ?

R: No, in Science we have textbooks.

Q: And each student has got a book ?

R: No, some of the students are having textbooks, some don't.

Q: Where do they buy from ?

R: They buy them from the bookshop in Mogwase, there are in Mogwase.

Q: But they have the money, their parents can afford to buy the books ?

R: Yes, the parents can afford, it is only that they don't want to buy the books for their kids as they were told that their kids would be supplied with books. So in Science the government has never supplied books.

Q: So that actual media you are using in teaching ..... there is no problem with it ?

R: We don't have a problem, the problem with media is in Std. 3 . But now this year, the media of instruction is starting in STD. 2, so they have a problem of interpretation.

Q: So you don't have a problem with charts, those are enough ?

R: Well, this year because of money, we didn't buy any teaching aids.

Q: But normally, you would be able to buy them ?

R: Yes, if things were normal, we would be buying them all along.

Q: And there are always sufficient science equipment each year ?

R: Well, we have a Science kit.

Q: Is it sufficient to use in the classroom ?

R: No, it is not sufficient.

Q: So what do you suggest could be done to overcome these problems ?

R: In my view, I think what I can say is that if we can agree with the community so that they can, maybe pop out, maybe more than what is expected ..... let's say school fund is 30 rand. maybe if they can pay 50 rands, we can buy some teaching aids, and then well, sometimes, one could ask for donations from the companies..... they tell us to wait we keep on asking.

Topic; Importance of water

1) Not very neat. A few charts hanging on the walls

2) Classroom setting: ventilation, safety adequate. Sufficient for the class.

3) Teacher & teaching methods: oral-narrative, whole group.

4) Media, chalkboard, the environment outside. class work books.

5) Students: neat and quiet in class, well controlled. Limited interaction with each other and the teachers.

6) Media integration.

Beginning: look at the environment outside

Middle; teacher uses chalkboard to explain

End : Exercise books.

Adequate planning, suitable

7) A good lesson

RESPONDENT NO:4 [ 898 - 999 ]

Elderly teacher, has been teaching in the school since 1957  
Has got very strong views concerning teaching. Has the Primary  
Teachers Certificate for teaching.

**Q:** I just wanted to find out about your opinion concerning  
teaching aids.

**R:** I started teaching in 1967 and during that time we were  
doing all the subjects, whether eight or not, one man, all  
the subjects and then about the teaching aids, when  
P.E.U.P. (Primary Education Upgrading Project), we then  
started having these charts and then that kind of  
education is too expensive.  
You need charts, you need bostik.... disifix you need  
corky pens, you need a pair of scissors, it is so  
expensive and you have to keep a record, you must be up  
to date, and you have to mark all the subjects, all the  
work given you have to mark, yes that's all.

**Q:** difficult, did it make teaching more difficult ?

**R:** It was, of course.

**Q:** What about now ?

**R:** Now, we don't follow .PEUP. We just teach ordinarily.

**Q:** meaning you just use .....

**R:** we use chalkboards and charts and illustrations from the  
books..

**Q:** Do you think that is enough ?

**R:** It is enough. You don't need scissors. You don't such  
things.

**Q:** Don't you think it makes learning better ?

**R:** No They are expensive .

**Q:** okay they make learning better but they are expensive ?

**R:** No, they are a burden to the teacher.

**Q:** you are right.

**R:** yes, let's say I do Afrikaans this year. I must draw.  
Next year I do another group of subjects. I must draw  
again. Keep on drawing and then it is expensive in the  
sense that if you drew your chart and you need to keep it  
for a long time, you must disifix it. You must apply

disifix on it so that you can keep it for a long time.

TAPE NO. 2

RESPONDENT NO:4 [001 - 180]

Q: What are the problems in teaching , especially when using teaching aids ....What other problems do you thing are here ?

R: We've got the problem of children , lately the children are repulsive, they don't adhere to what you are telling them, they are not studious, and then in the early days we need to lash them in order to make them work harder. Lately we don't have to , and so they are doing what they like ... like you see now they are jumping around, and break is over, they are not going in the classes, and if you lash them, you are not a good teacher so it is making it tough for the teachers.

Q: What do you think can be done , in your opinion ?

R: the salvation of an African teacher , lies on his return to corporal punishment. Yes, for a teacher to survive well without problems, children must be lashed. Spare the rod , spoil the child, that's my contention.

Q: Methods of teaching. I just want ro find out what methods of teaching do you think are right in the class ?

R: teaching methods , there is no correct method of teaching You should understand you cild, and see to it that when you teach , you drive the point home. The child must understand, and when you reach your goal , that is the best method, not somebody's method. Use your own method.

Q: What do you think is right for that child ?

R: As long as you drive the point home, the child must understand what is being said.

Q: So these new things that they are saying that teaching , is learner-centred,what do you think about that ?

R: teaching must be child-centred, it must be there.....effective teaching will come from a few groups of children and here we've got 127 children in standard 4 Imagine , the teacher must mark 127 compositions. You can't give individual help, they are too many and some of them are stubborn., these are the problems. Children do not want to work they work in their own time. they know there is nothing you can do to force them to do their

work. Even corrections, they don't them. You do the work, you give them work, you mark it, you give them corrections, they still miss, they get the corrections wrong, or they are not concentrating, .... cause they are not concentrating.

How can you? ..... who do not care?

You keep on talking and talking, you are just a talking person.

**Q:** So do you think the community can be brought in maybe to help?

**R:** If the community can come together things will go smoothly. Some parents say my child should be lashed, some say they should not be lashed, some say we must not pay school fund we say we don't have to. The school cannot run as a school, there is no school fund, it is very difficult. We need very many things here and there ..... cannot afford to buy them

**Q:** Is it only in the community schools?

**R:** I worked in the community schools for the whole 37 years, I never worked in any other school.

**Q:** Is it the same in all other community schools?

**R:** the same, we are experiencing it. It is not that easy to manage children of these days ..... the time when you try to punish them they walk out of class and go away and then you don't have to lash them, coming to school in time is a problem. If you try to be rigid, they absent themselves from school and then your work suffers. and at the time of the examinations, they fail. The department says you did teach. You cannot teach a child who is way ..... and when the child comes, you cannot do that lesson again, you are wasting other children's time, so it better, ... that we have to swallow, but we have to stomach it with hardship.

Life is not smooth for a teacher lately. It is very high. You can hear the noise, they are in the class with the teachers, but they are making noise

If you try to be harsh on them, they go to their parents and complain about you ..... teacher so and so is harsh to the children.

RESPONDENT NO: 5 [181 - 488]

Another teacher who has signed for the Upgrading project. She explained that she was just standing in for the Science teacher, and that she was normally a grade one and two teacher.

**Q:** I just wanted to find out what problems, your views concerning teaching aids, using teaching aids in the classroom. How to use them. What your views are .....

**R:** yes they are necessary, because i grade one like now when I say a baby its not their mother tongue. but I when I take a picture of a baby and say baby, the picture, it stresses what I am saying. It gives them the real picture of what a baby is, like mother, in Setswana we say....Mme when I want to translate, to make them be .... understand ... I say mme. the very same picture, that looks the same as that, .....then I say mother, then they understand what I am talking about..... in english I'm talking about the very same person, that I am talking about in tswana.....

**Q:** What about the problems what problems are you facing concerning teaching aids? The problems that you are having,

**R:** The problems that I get, in maths, we don't have much teaching aids. So sometimes you say, when you want to show that the value of five. You just write the number five and write the five sticks.....When the child does not understand, the value of five, he can't be able to know how many sticks must he write underneath that five.

**Q:** What about improvisation?

**R:** The thing is like, I was telling you, we have many. Sometimes, you collect the bottle tops, Tomorrow when you count them, they are not enough., You'll not say, you, you,.....They all say this is the one who has made it So there it is you can't solve the problem. The numbers are too big, the problem is the number.

**Q:** What do you think should be done?

**R:** More classes must be built. we must, the principal must organise, see to it that the classes are enough and the teachers also.

**Q:** How can he do that if the ones here are not paying the

funds ?

R: We have thought of a plateau , some kids come in the morning, from eight o'clock to ten and then from ten to two o'clock.

Q: Shifts, but what about the teachers ? Where will the teachers come from, because that will need a lot of manpower ?

R: Yes it is going to be the very same teacher with the very same class but being divided the stress is going to be on the teacher now.  
We really do not know what is going to happen. The thing is, the one who has come early is going to get the proper education. Later on, from ten o'clock we are tired. The ones that come later are not going to get .....it is not going .....

Q: What about the teaching methods that are used ? I also want to find out about these ?  
Is it group ?

R: Yes, we group them and we take the ability ones, the top one, the brighter one and then , the middle one and then the slow learner. We first tackle the gifted one, it is where you are going to get the problem. If they can't cope, automatically the bottom one can't cope. Immediately you change the method. When you see that this brighter one cannot cope, immediately you change the method, so that your method can suit the lower one.

Q: In other words you are saying that the methods are learner-centred, centred on the children, rather than teacher .....

R: In the old days the teacher used to say ..... and the learner had to cope somehow.

Q: Now you are actually saying that you take the children into consideration ?

R: Yes

Q: What about the actual teaching , are they in small groups or do you attend one large group ?

R: I divide the class according to their abilities. Other groups are going to be few, and the middle ones are a bit more. That one, the slow learners, .....as they are very big and the time goes on they pick up.

Q: But you think the weak ones would benefit if they are also in small groups ?

R: They will benefit.

Yes , because the teacher is going to be able to attend to them individually. Individual method is the best method.... Yes, get the best method, Yes,..... get as much individual attention is the best method.

Q: What about the problem I've been hearing about.. the lack of control, lack of funds, and what can be done ?

R: Concerning the funds, the principal can make a parent's meeting. He must tackle to the parents , he must make them understand. In the past Mr. Mandela said that we blacks, are not going to pay school fund... the grade ones and grade twos are not going to pay. But as the time goes on, we met problems.. they don't even have the teaching aids. When we come to the office and ask some teaching aids or money to buy something... he says that the class you are teaching does not pay school fund. Which money are you actually asking for, so you just go on, because you are already answered.

But concerning the bigger ones, the ones that pay school fund, the principal should organise a parents' meeting and address the parents so that they can understand the problem we have concerning money in the school.

Q: A big problem.

R: Even now you can get into the classroom , there is not even a single teaching aid, no corky pen, no prestik, no .....

Q: How do you expect to go on ?

R: I really don't know what's going to happen ? with other kids? with these kids in std # it was a wall before it was a wall before it was divided. So division is damaged, so now it is just a thick thing. Imagine a teacher is going to....

Q: How many students in a class ?

R: Maybe a hundred and something. They are more, as ..... the school is big.

Q: But can't some of them , do all of them have to come to this school ? Is is the same in other schools. Are the schools also full ? the primary schools in the area ? Why do all of them come here ?

R: They like Mochini, I don't know why.

Q: Can't they be encouraged to go to other schools ?

R: I don't think so

Q: Thank you very much.

In the following school, all the teachers involved in teaching science were called and the researcher had to interview all of them. The questions were not directed to one researcher but to the whole group.

There were three Science teachers, a male teacher with a Teacher's Diploma who had been teaching for over seven years. A female teacher, also a Diplomat who had been involved in teaching for over ten years.

RESPONDENT NO. 6: [ 490 - 719 ]

**Q:** I just wanted to find out about your teaching aids/media in the school especially when teaching Science.

**R:** We don't have many teaching aids .... so we just teach some of the subjects.....practically..... you can tell them something but there is so .....  
.....for example ,an experiment..... the effect of heat on water. I have to take a retort stand , a test tube, ..... test and all....then I say it goes like this and it expands....it contracts and expands. So we just do that theoretically. I just tell them.

But where I am from we used to have this .....

So if the school does not have any apparatus. It is better that they have just a small cupboard I think that is the answer for those who need a specific laboratory. This what

..... When I teach standard 3 about the experiment. I just tell them that it happens like this..... I just say if you are at home you just go and boil the water..... then do this and this .....

The practical things I don't do them here. For instance, when I am making an experiment about air, I take a glass. Is there .... This is a glass. I say let us prove.

So if you have a big bowl, then they do it, they just put in the water then the bubbles come. They see for themselves. So if I tell them they don't believe you see. Some of the things, some of the things they are suitable for different I.Q's, this is suitable, the pupils can understand, some of them the faster ones.

**Q:** Do you have any textbooks, does the government supply textbooks ?

**R:** It has but Science, we don't have I have different sources where I take , then I just pick the material.

**Q:** So the children don't have any textbooks at all ?

**R:** No

**Q:** Not even worksheets ?

The other thing I was trying to find out., you say there are no equipment. What about improvisation ?

R: Improvisation, sometimes, lets say in Geography, you do improvisation. But sometimes I can't make, I take the coke bottle. It would not resist heat. .... the effect of heat on a solid. I can take a solid, then I heat it, it expands. In the mobile lab they had it. .... it means that solid, it is brass. When you heat it, it expands. When it expands. So it is very important that we get this.

Q: The other thing I have found out is that some teachers say they don't have the time... you don't have that problem. Is it the same here?

RESPONDENT NO. 7 [ 720 - 810 ]

R: We know the things but we don't have the time. I think there should be specialisations.

Q: What exactly should be done to improve the situation in your opinion?

R: My opinion is that schools must have for special subjects. Especially when it comes to standard 3, 4 & 5. At least there must be a subject teacher. At least I know I am offering a language and two contents, that one is offering a language, that way it becomes easier. Especially those who are teaching Science, if there is no laboratory .....there are able to prepare and ..... If we are many, at least we can improvise. But if we are staffed, like if we are.....He teaches Std. 4 alone.... All subjects. It is too much.

Q: The other thing I wanted to find out is what methods of teaching you are using in class.

RESPONDENT NO. 6 [ 812 - 999 ]

R: Some of the subjects, the teacher-pupil ratio. We find that in the school there is a teacher who has 66 pupils. You want to group them in groups of 10, 80 in grade one,

Q: It is impossible.

R: Sometimes it is very difficult. You find that you want to give the pupils more information but because of this ... they are many many. And some pupils are faster. Those are behind and maybe ... these ones understand better, they cannot should cope up with the ones who understand better. ....these ones, let me say that they are slow learners, it becomes very difficult.

And when coming to Science subjects, the most important, they say we should work through the discovery method.

they should discover for themselves, then ... when I do an experiment I ask them questions, I just pump in some questions, then they respond.....I just ask them questions, then they respond. When they respond, I just know they understand, like for instance when I am teaching about the source of heat, the main source of heat, ....I can just go around, I just tell them they should go outside, ..... I just tell them ..... How is around? How is the weather outside. In the classroom it is more cold and outside it is warmer,, why? And what makes them to be different. So you get information from them and then you know that when you come to do some of these experiments, you'll be able to realise how ..... faster or they realise slower so the main thing is ... If we could get this apparatus..... because when I was a student I never had .... I was just did it theoretically. I learnt them when I was at tertiary level and some of the things ..... these things I could have learnt at a lower level but I learnt them at tertiary level.

**Q:** What we are worried about ... okay I am from a training institution, we train people to use these things, and then you come to the actual situation, they are not using them, so we are trying to find out what is happening, but apparently there are so many problems.

**R:** The problem is the environment, like our environment here. This is a new school, we have nothing we have to sacrifice, we have to do some of the things like for instance if you can go out, I have done a windmill, ... in Geography.....These are some of the improvisations.

TAPE NO. 3

RESPONDENT NO. 6 ; 7 and 8 [ 000 - 999 ]

**Q:** As science teachers, do you ever attend any workshops .. or what course?

**R:** Science courses?

**Q:** What I see in the Gauteng region. Teachers are getting a lot of things, they are getting new information. Even these science kits that you are talking about. They are available at very low prices. What I have found in this area is that hardly any courses take place ..... people can go.... somebody was saying that since I started teaching I have never attended any workshop. I have never attended any science course.

R: We don't have science, but I have attended a Maths course

Q: Where was that ?

R: At Moruleng.

Q: At least you have attended a Maths course .

R: We have attended many of them but we don't have of science. ....We've found out that as time passes I can't go to course whereby I know that when I get inside I know the whole information

R: Nothing will happen

Q: There is nothing new.

Who is running these courses ?

.....not that I want to criticize anything . But is it teachers within the region ?

R: What I can tell you, what I have realised is that I have attended a Maths course it was a workshop about a ..... Maths . They ..... about fractions. The reason ..... I use different books. They just came and they tell us that when we teach fractions .... we should do like this.... then I found out that they are telling me the one thing they were telling me, a week before I attended the course, I've done that with the students. So I feel that for me I could have gone out but just because I come for the school , I know the information . My feeling is that they should be something that's new like there is , as teachers , we don't have the same qualifications ..... some have diplomas , some have P.T.C. , ..... when they select, they should select different people . people who are suitable. Because what happened is that all the people , they knew, and the point is these people they are advertising this book..... we should see the book, and as teachers we take different books and we just grade them . I have many sources of Maths textbooks. I take this and I read this .. then if I find that this one is not .....I can use it. So that is the some of the problems..... I realise that for instance , .....they can prepare a Science workshop and they can just come to me and say , You are going to make an experiment , you know this apparatus of Libenberg. .... you do this. The region from where I started teaching Sometimes we can say that .....

Q: Where is that ?

R: ..... Sometimes we can find that teachers have knowledge it but some don't have, we are different. The person who was conducting that course ..... he was so embarrassed that one of the teachers was asking..

Do we have water underground ? a science teacher, and then people say oh, he doesn't know that we have underground water. ....What I want to say that when there are these courses, let there be a selection. I can't go to a course where I know that information.

**Q:** Selection in terms of what, in who is to come to the courses.

**R:** Selection in terms of teachers, who should attend. For instance I can't attend a course where I know the information, the main thing they are advertising books.

**Q:** Don't they tell you that the course is going to be about this so that you can chose ?

**R:** no they just say Maths course.

#### RESPONDENT NO. 7

**R:** And you know what embarasses us is that you'll find that they sat it is a course ...when you arrive there, it is not a curse, they are advertising their books. There are no apparatus there to show you ..... in fact not show but to revivie your mind , how to teach ..... or whatever.

**Q:** So they are not really geared to helping you

**R:** They are just there to advertise their books.

**R:** They can just say come up with a problem .

**Q:** Before you attend the course or during the course.

**R:** During the course. When they ask... what is the problem ?

**Q:** So what do you need now, what exactly do you need now ?

**R:** Relevant course, real courses. where the lecturer is having relevant apparatus ... for instance they went to Letamorenng where they .... it was a Gegraphy course. . at least they have done somthing although they were to be creative , but thay create from something from which they saw, so when they went out for excusions , it was somthing better. So what we need is real courses where the conductor of the course must have real apparatus ... and when we go there we must know, ,what are we going to do , either be a Maths or a Science but what are we going to do ? not to just say Maths or he is going to deal with the Biology part, then you already know and I am only interested in Physics because I am unable to perform the experiment if I am having apparatus . So and if I go there and I don't have apparatus, then some of the things I don't know how to improvise , then I attend that course, he shows me this is how you can do this .....not to say when you arrive there they are advertising books. ....

Q: Is there a collection of teachers like a Science Teacher's club or whatever.

R: I don't know about the science teacher..... I only know about the History ..... we have a covcener .

Q: Well that was started by the teachers themselves ?

R: Yes It was started by the teachers because the syllabus was chnged . They said that where would we get the material because the previous books , they don't have the syllabus.... the materials for the syllabus of 95 ... you can't get the material unless you get to the library and there is no library. You have to go to Rustenburg.

RESPONDENT NO. 8

Q: What about you ?

R: This conducting of of Science course .....

Q: Maybe the direction we shold go is to ask teachers what the problems are so that whoever comes must deal with those problems. .... because I remember at the beginning of last year, I tried to get into contact with the Primary Science Project, so they were asking me what the problems were ... I didn't know ..... you must go and fins out what are the problems ....., in order to find out what the workshop would be about.

R: And another thing is maybe if there can be courses, for instance , .... for performing or making an experiment ... maybe it must be the problem of some of the teachers , for instance I could have taught for two or three years without doing an experiment , only teaching theoretically, ..... when I talk about this Libenberg apparatus, it is very complicated , some of the teachers do not know .....

Q: But It doesn't have to be complex, what they need is something practical .

R: It is what I wanted to sat ,I should know how to use .. I should have to stand and embarass myself in front of the pupils. When I say I am going to do this thing I should be sure. Let me tell you, we can ahve apparatus but we cannot use it .....

Q: Why is that ?

R: It is a matter of maybe I don't know how to use it. If I don't know how to use it , if I don't know how to drive a car , the car may be in the garage, ... you will see

someone with a driver's licence,, and you say come and drive this car for me. ... and it is there. Some of the things , for instance in Science, there are precautions , for instance when we use these chemicals ... when we use these, we should be aware of ..... the pupils they should do like this .....

Q: They talk about subject committees, are they still running?... What happened to the science committee ?

R: There were Science committees. Yes, .....as the new changes came they stopped.

Q: But previously there were here ?

R: maybe they were waiting for some .....

Q: So these things were here, they just stopped ? What do you think is the reason for this ?

R: Maybe it is because of this new syllabus .

Q: So are you now... do you know what you are going to do next year ?

R: We have syllabuses.

Q: Do you have the new one ?.... You have the new one, you know what you are going to teach in 1996 ?

R: Yeah.

Q: What about the textbooks, do you know the textbooks that you are going to use ?

R: We only choose .

Q: Do you just choose your own ?

R: In short we don't have textbooks relevant to the the syllabus.

Q: But the government is prepared to supply you with books?

R: It is prepared but the publishers, they don't have the good relevant books. for instance if I could talk about... just to go away from science. History, we don't have any text book ..... then I have to point out . They say that the History of 22-26, they say that I should have been there.... At least in science , there is a lot of information. For instance the standard threes, we started teaching them , we started teaching them the basic things , the source of water.... these things are basic. When we go to standard 4 , it is a continuous thing,

they have the background. They have pushed that syllabus to standard two. The syllabus of standard 3 is now for standard four. . Those who were in a good position are are the standard two's of this year. They have started good. But the standard threes of this year, they have not started ..... so I have to teach the two syllabi, I have to teach them the syllabus of standard four.... so I have to teach them the source of heat which is taught in standard two. ....that is the main point.

R: And on top of that no textbooks, dealing with two syllabi with no textbooks. so you can just imagine how difficult it is for the teacher.

R: And you see that these books, they were based on the previous syllabus. .... when we talk about Geography it was specifically for Bop.

Q: It has not ben joined to the whole South African syllabus ? Is it now the same throughout ?

R: No it not the same . . It is different

Q: Is is still for Bop, or is it now the national syllabus ?

R: It is now the national syllabus.

Q: So where does the circuit office now come in ? Are the teachers called to be informed about what this is going to be the new syllabus?

R: We were given the pamphlet....we just analyse what is going to happen. We were given a pamphlet to say that this is a standard ..... this going to be Biology and Science, It is going to be water,..... etc. basically it is going to be water and air.....

Q: So in another words they introduced you to a new syllabus, they didn't tell you what the implications were, you were just given the thing on paper ?

R: In maths they have tried. They say they should use the calculator , .....

Q: So what are your feelings now ? What should be done next year ? What should be done to improve your teaching ?

R: What we need for next year, we need relevant textbooks and courses must be conducted. At least by qualified personnel. They must not just come and say Mam..... you are going to conduct courses and I have never taught standard five. .... This is a new primary school , you are going to conduct courses. How can I talk to the standard five teachers ... when I am able, I have only taught standard four. so if courses are conducted, they

must choose suitable teachers for that course. .. and what is important really, relevant books to the syllabus must be supplied, for instance, in this case ... in History, we are having a new syllabus, but we are not having how to teach what, what, what.... it has nothing to do with the syllabus. So we have to struggle to give the pupils information.

Q: So there is no link between the material and the syllabus. Nobody has gone to that effort to say that these are the prescribed books, they are the ones which are suitable for .....Anything else ?

R: Okay I don't know,..... at least a mobile lab. Maybe a ... But, sometimes when you are teaching this kind of subject, you need something that will enforce what you are saying. For instance I am teaching Geography, no map. I just draw. Sometimes I am not accurate. I just draw. When we talk about a glass test tube or a rubber stopper, this is some of the things that they should touch it, they ..... should see this is a rubber stopper, ... so if I can..... they know a rubber because they use a pencil and a rubber, but it is very difficult, that rubber is not the same. It is not the same. They should have at least. or they should give, the school could, let me say if the mobile laboratory costs about five hundred rand, the government should give us two hundred and fifty, maybe .....we need to put more information to the pupils. I don't want to teach my pupils the way I was taught. . It is not good. We need those things, we need the relevant books, we need sources.... and teachers I don't know in South Africa if there is any teacher teaching like me.....I am teaching nine subjects. I have to teach them a language, spelling, ... comprehension and the like.

Q: You teach your class ? there is one teacher for each class?

R: So we don't have teachers, it is bad.

Q: Some teachers say they don't have jobs, I don't understand.

R: We have a job But ....

Q: Are there grants ?

R: No. The problem is allocation of grants. You find that this is a new school, in a big village like Ledag, so there are only four grants. we cannot manage if you have got one hundred and ninety students for three teachers. What are you going to do ?

So you know that the government know that there is a new school in Ledag. Why don't they just supply grants, they simply..... specifically for the new school? The teachers are roaming around without schools. Your school

is small.

R: They give us one grant, I go with my students to Standard four. They lack information. That grant they have given us we put it into standard grade. He or she don't have that spirit of ..... then she say I think I have got too much then she goes. She can go to Taung, she can go to Kuruman. They are some of the teachers, my colleagues, they just teach two subjects. Then I told them I am teaching nine ... subjects, they say you are playing. I say nine subjects.

Q: Where are they working ?

R: They are working around. .... And I am worried about the pupils. they should know English, they should know Maths, they should know all these subjects. ....i know that there are some pupils they don't like this. they like this..., each one has his way. So if I plan I see, this one likes science, this one likes I encourage her or she. If there were three, two or more., it is better. Unlike if I am alone ..... even the circuit office knows the school. Each teacher is stressed. 66 pupils.

Q: But I have been to Mokhine, that side. It is the same problem. 120, I couldn't believe it 127 in a class. What is happening ? Nothing is happening. Grade one by August, ... the kids could not write. They said they have been writing one word since the beginning of the year, they can't do it. So is s not only here.

R: The allocation of grants. ... Some of the publishers. Yes these are the people, they are making money. They just come and convince you that this is a good book. ... if the company can come back. They could go to the circuit office ..... when coming to the teaching of Science. they should call all the science teachers and assess the material.

Q: Tell them to come and have a look. That is a good idea.

R: That is this relevant for the school... They just come and tell us please come and collect such books. When at least it would be better if we knew the books we were collecting. .... Geography textbook is now totally out. At least Science we have a number of books.

Q: Because I see that what is done at the college. I see that at the beginning ..... all the teachers had to go to all of the bookshops and then recommend. look at the books and recommend... I don't see why it can't be done at this level

R: You know these publishers when they come to the library. They usually put up a book show. You see the texture of this book. How can it stay, for how much. They can do S.A.S. before we close December, in order that January

everything will be in a good place. So the book show , should take place exactly when we close, just come and see which books , and this book is not okay and to say why, because you just cannot say that this book is not good. Others say that this book is not good.

Q: Because I've been to some schools where they say that publishers have gone there with some textbooks. What I don't understand ..... is that some schools , it seems as if they are able to buy books Is it the government which supplies these books ?

.....  
So each school fills in their book supply and they give it to the government ?

R: Yes

Q: All the schools do not necessarily have the same textbooks ?

R: No

Q: I thought that the requisitions came from all the ..... the schools being given one textbook.

R: The problem is that they give us a pamphlet. they say we should tick.

Q: The pamphlet is already there ?

R: So how can you tick the books that are not there ?

Q: there is already a list ?

R: For instance , they have a book which is called ..... Maths. I was in this topic fractions. Within a week I had finished that book. It is very short. .... What is important is that if they say , okay, this is a list, then they should say ..... Each school, we choose the best book we like. In the list they say we have the top book, they should supply us with one copy so that we assess it. It is better like that because people are aware that Maths can be fun is better than all the other books.....

Q: So the teachers don't have any way of contributing.....

R: We don't contribute

Q: There is no way they can say that this is the book I want. to use with my class ..... that channel is not there at all.

R: They just put words in our mouth.

Q: I have been to other schools and I was asking about why they don't have charts, or teaching aids, most teachers say we know, we used to use these things at school. .... disifix and what ..... but now they say they don't have any funds at all. Is it the same here?

R: There is nothing

Q: So exactly what does the government supply? It does not supply textbooks?

R: .... And the worst part of it for the grade ones, they use very expensive books. So the government doesn't supply that type of book... It costs something like thirty rands.

Q: Can't you ask the parents to contribute?

R: The parents, we ask the parents, but they are reluctant. They say there is free education for grade ones, they say we are making them pay school fund, and yet we want them to buy those books.

Q: So what do you think is going to solve all these problems? What exactly should be done?  
You'll have to come with suggestions because the government will say they are committed to do something but as time goes on .... I don't think it is going to be possible.

R: You see mam, if the government just didn't say in 1995, grade ones are not going to pay the school fund. Maybe after the first five years, it is then that they could have said from now the grade ones are not going to pay. because they say grade ones are not going to pay but things are not really that .... You will hear them that side, the feeding scheme has collapsed because of this and this... and when it comes to books, they are not supplying relevant books.

TAPE NO. 4

RESPONDENTS NO : 6,7,8,9 I 000 - 1351

R: In fact the department of education, ... all I can say is could you please photocopy this for me, because maybe I don't know how to operate it, and I just ask..... please photocopy me this. this is just for the office or the circuit office. But they say, now you people who come from those schools, you are not allowed.

Q: Because in the Saulspoort region, at least I asked ..... and they said that at one stage, because the high schools

would have a photocopier. So at one stage they had tried to ..... what is the name of the High school that side?.. The middle schools did not have any facilities, so they used to go to the High schools. The principle of the High school said that it was too much..... What he was saying that if the government could at least supply one in some central area. Then teachers can use that one instead of looking for very expensive books. Maybe they can just make copies and use these copies. But now there are just too many problems.

R: No I'm just teaching standard two and the problem concerning science subjects is a difficult one.... We would also like..... so maybe ..... the teaching aids , and even for .....

Q: What is there now, I think the teachers need some kind of guidelines . I think it is not fair to introduce to them .....

R: We even fail to get the material ..... but we do not have a lab.

Q: The problem is with funding . Okay, the PSP said yes, they could be funds but ..... as you have identified the needs. What happens is that the person who is ready to fund, somebody has already got to them .The supply the textbooks... what they might supply you might not be relevant. People are ready to supply some things, and you just don't need them.

So I think the teachers must also try.... to get together to make sure that their needs are heard of.

We from the college can run workshops, but it is very difficult to do this when you don't know what the needs are. ....

What about teacher organisations, when I go around the schools I am really concerned, there is nothing bringing teachers together.

R: Organisations like what ?

Q: Subject committees, not political

R: Up to so far there is nothing.

Q: So they have all collapsed, kind of ?

R: Each should see to that

Q: What about primary schools getting together ?  
Do you often do that ?

R: I think that .. sometimes they can organise this, they can just do this.

Q: Do you share material with the other two... are there two

others ?

R: No

Q: So you never get together ? ....., to try to share problems

R: No, we usually get together at sports. .... to compete.  
even for recreation, it is possible.

Thank-you very much.

This respondent was involved in preparing teachers for Primary school teachers in Biology. Since he had had experience in teaching Science in the primary schools in the region, his opinions concerning the use of media /teaching aids was also important to the investigation.

Q: What do you think about teaching aids ?

R: the cassette player?

Q: no, the teaching aids that you normally use in the classroom, .....media . What do you think about them ? Just your opinion ?

R: I have to prepare .....

Q: No I just want it to be as natural as possible.

R: Teaching aids ? in biology ?  
In Biology usually teaching aids are all found in nature, all kinds of flowers , seeds, all types of insects and animals and birds. they are the most useful teaching aids in Biology. At the same time we have charts and experiments , and surveys. Then .....

Q: What about the actual use in the classrooms , Do you find that you have any problems ?

R: It is just okay. If you have teaching aids then the students are interested. It makes them have interest in the subject and the topic. Things are okay, at times you can take them outside.

Q: So during your teaching periods you have not come across any problems ?

R: Sometimes you see, we are not truly prepared with our teaching aids. Then you may have problems of students losing interest. ....

Q: one problem which is troubling the teachers in the schools is the lack of improvisation ... What can you..... comment should be done there ?

R: In biology, actually we can get everything from nature. You simply have to go out and collect the things, the only thing is that you have to find the time. ....the thing is you have to spend some time on it.

Q: And the other thing I wanted to find out is the mode of teaching. When you are using these teaching aids. Which one do you think is better, is it large groups or do you think is it the smaller groups ?

R: Actually in Biology we have a problem that they are always in a larger group. Some have a problem. Smaller groups we you can give more attention to the pupils..... and we are managing.

Q: Thank-you.

RESPONDENT NO. 11 [246 - 372]

The respondent is a University graduate who was initially teaching in the primary schools but is now the principal of one of the schools. Has been teaching for over four years.

**Q:** What is your opinion concerning teaching aids ?

**R:** They help you in..... presenting a lesson and they help the students to participate in the lesson, they can get involved and one other thing is that when I use a teaching aid I feel more confident about my teaching .....in explaining because I can see that pupils are following, so I am more confident.

**Q:** Problems ? Any problems you have met throughout your teaching career ?

**R:** Usually availability of teaching aids and having to make them your self, and at time I don't have the time . Even I don't make them ..... I know I can make them

**Q:** What do you suggest should be the way around this problem ? What can be done in the schools ?

**R:** Maybe have a teaching lab within the school where teachers can go and find what they need and order form the department. Maybe the teachers can be taught to make the materilas themselves from the rubbish ..... rather than to buy a cart ...

**Q:** And the other thing I am interested in is the modes teaching ..... the way people teach . You've got large groups , small groups, which one is better ?

**R:** I mean the best thing would be to teach them in small groups . .... to allow the teacher.... and maybe observe each student doing their own work

**Q:** But is that realistic in the actual teaching situation ? Can it be achieved ?

**R:** Yeah it can be achieved , you can divide pupils into groups.

**Q:** Because when I've been going around in the schools, the teachers are saying it is impossible. We have groups of 87 in a class , usualy if you wanted you can't,.....

**R:** Not with large groups, it cannot be achived with large groups, but there are ways in which it can be done.

**Q:** What are those ways ? Those are the ways I would like to find out. What do you think could be done ?  
In a situation where you fins that there are 127 students

in one class...

R: Like for instance if they are 127 students in one class, then you can split them or else it would mean that you'll have to make a lot of learning aids.....maybe you can ask

Q: But it would also mean more work for the teacher.

R: More work for the teacher. The more you have actually to prepare.

The next respondent was also a college graduate, who had qualified in 1989.

**Q:** Can you tell me about what you think about teaching aids, media ?

**R:** What do you want me to say., about teaching aids.... They are very good if well prepared. It depends what subject you are teaching. Maybe for Sciences like Chemistry, you need to have enough money, you need to have enough money or you need , something that you cannot improvise , you have to buy them .

**Q:** Problems ?

**R:** If they are not well prepared, then they are as useless as not having any. And another thing is that even if you are well prepared and then you take a very large group, only those people in the front can will be able to gain from the teaching aids, or maybe sometimes we have the problem of periods , our periods, the time is too little for all the work.

**Q:** Suggestions for improvement ?

**R:** Resource lab , If we can have a resource lab. And if we can have workshops for teachers, where they can be taught how to improvise, how to make teaching aids, where we can all exchange ideas on how to improvise, beacuse sometimes and another thing is that if you are having a very good teaching aid but you are not carrying out the message properly, the student won't understand.

**Q:** Thank-you

The sister is a very talented teacher with a number of years in Primary, secondary and tertiary teaching. The interviewer felt that her contributions would have a tremendous effect on the direction of the discourse, especially in the area of how best to teach a practical subject like Science and, suggestions on how to improve the whole instruction process.

**Q:** Tell me what you think about teaching aids  
The problems and suggestions to how we could solve these problems.

**R:** Personally, I believe for Home economics is a practical subject. We teach more effectively if we can teach with the aid of the media. You do dressmaking and you want to show them how a seam is made, to expose the materials and zips to be stitched in. It is very difficult. So if I can show them by a step by step process. I will deal first with the preparation of a zip, I would prepare the seam, I would insert ..... Now teaching that by saying it means nothing, so therefore for this purpose yes, and step by step samples made up of real materials ..... its difficult but lets say ..... you must show them,

like today they are doing convenience foods. There are so many on the market. .... and also to know what, on convenience foods, to know from the labels, the ingredients, what you should still have to do in order to prepare a meal and what is already done.... they will see the serving instructions.

Now the main..... is to have a teaching aid such as the cartons which shows like how to prepare oven chips. They are parboiled, half finished, now you have to just ..... Now in order to show that you will bring the carton and therefore for me personally I think it depends on the subject, and it is on the area of the subject.

Certain teaching aids specifically where the process is difficult to understand in theory. Like making a tailored welt pocket. For that pocket, they can see it a hundred times and still not know tricky it is. Now the samples are made and they are preparing for themselves. So you see step by step .....

**Q:** What about the problems, any problems ?

**R:** Problems from the students side ?

**Q:** Whatever.

Either from you or from.... most people I have talked to say they are not available., we want to use them but they are simply not there.

R: So teaching aids, you mean home made ones or .....

Q: Whichever ones .....

R: Now for me there are lots available in the form of charts that you can get from the dairy board, from the meat board, citrus board... especially Rama, they make the most beautiful charts which you can't prepare for yourself. So food systems which are so difficult to explain, the suspensions, emulsions and ..... now Rama gives these in the form of charts and also the Sugar board. .... showing crystallisation, and how this occurs in charts. Rama has a special education unit .....

Q: I wish we could tell some of the teachers around. Because they are saying they don't have any .

R: I go I tell the teachers I give all my addresses .I give them to Mrs Matsipa too. I go to the phone book ..... they have a specific education department to teach emulsions.....making menus, ..... So I have several charts on cleaning agents, germs. When I go to the school I collect the addresses as well. The rest I buy..... and others they have to be made.

Q: What I am trying to find out is what can be done. Because obviously, there is information but people are not aware, it seems they can't make too .....

R: I think it depends on the subject matter, like this subject maybe for science too, you would get..... Now the difficulty is the time..... I have to sit down and sew these samples. The same applies to writing to these firms ..... you have to have the motivation, .....

Q: I suppose for your subject I can't really talk about the mode of teaching., it is very difficult to teach them in a group. Do you find it difficult to teach in a large group ?

R: Well..... I have to use the large groups for demonstration. I encourage them to make their own teaching aid as a demonstration for them, they are not many in the schools.

What I say I ask them to do a lot of aids now. And really another advantage is, if they all make their own teaching aids, the day comes when they are going to be moderated and I find that ..... and when they go off teaching they can learn from one another ... and it encourages them to have their own supply.....

It has an advantage if they make them. ....because when they get to the schools they won't make any new ones. They teach with nothing, they teach the old way. So for me it is very important that they do it now. .... the other thing is that they don't have time and they are not specially motivated. They remember what their teachers did and they continue doing the same thing.

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Q: What do you think can be done in the actual schools?  
...because when they get to the school they stop? What  
do you think should be done to encourage them ?

R: They need to be informed, it has to be internalised that  
they need to have better results, better education, and  
they need the teachers that can stimulate them ..... In  
this subject , a home economist should be able to develop  
skills. If she hasn't got them , therefore she must make  
teaching aids especially in the line of crafts. ...  
They need to be . In the classes I have taught , we do not  
reach all of them , half of them fall by the wayside. They  
need things to be interesting so the cycle of non-learning,  
of slow learners is perpetuated.

Q: Thank you sister.

The respondent is a young recently qualified college graduate posted to one of the remote community schools.

Q: I want to ask you some questions about teaching aids Anything that you use to aid with your teaching, even blackboards, yourself, everything that you use.

R: To me teaching aids , they are important because it helps us to make things more simpler ..... like for example when you are using chalkboard, I cannot find ..... so the people should see what I am talking about. and even teaching aids like models, they make things simpler. So teaching aids to me are important.

Q: During your schooling , as well as your teaching, What problems do you encounter when you try to use them or whatever, what problems do you encounter ?

R: While using teaching aids ?

Q: Yeah.

R: Sometimes they can make things to be complicated., like when drawing structures. If you try to make your own structure, you make it so complicated , in such a way that the pupils will not understand what you are trying to deliver. And then sometimes they waste time, when you want to put a chart

R: Some other problems, like you get the chalkboard, some of them are old and some of them are ..... they are not flexible. They are there and some of them are not divided., and when you enter, you have to divide them and then after teaching a certain topic, if the period is still not over, you have to erase and write again., and that is a waste of time. So I think teaching aids, they are important. You must take care of them. You must not leave, ignore them tell ourselves taht if I am having a chalk board, that is okay. You have to do something with them.

Q: What about improvisation? Availability of media in schools. How did you find that?

R: Yeah improvisation is also useful. But you find that in some schools there are no equipment. There are no apparatus for making some, like improvisation apparatus. So you find it diffivult when you have to improvise. And then you find sometimes like when teaching about the environment, when you are taking the pupils out. There are times when it is causing a problem when you have to take them to teach them about the environment, because you take ten minutes to move out of the class and another ten minutes.

Q: It is time consuming. The other thing I wanted to talk about are the modes of teaching. What do you think about group teaching, small group teaching as opposed to large group?

R: I think small group teaching is better beacuse of.... as a teacher I can check whether I did reach my objectives. But the large group. You won't have a chance of knowing whether you have reached your objctives because they are too many. But if the class is small, you can move around and check who is a slow learner and who is a fast learner.

Q: Is that realistic in your actual teaching situation?

R: No I don't think it is.

Q: Yes, people are saying that it is good, but is it practical?

R: It is not practical and even right now, where I am from. The class are overcrowded. So you find that you are having to teach more than seventy pupils in a classroom. So this is not practical, we are just blaming and discussing about it, but when coming to the actual situation, we cannot even perform it because of the number of students in the

class.

Q: Thank-you.

Another newly appointed teacher , but this time in a government school near Mogwase.

**Q:** In your subject. What are your views concerning teaching aids ?

**R:** Teaching aids are important but they must be relevant like maybe a subject like Setswana, maybe you don't know any teaching aids. You can only use charts, and the chalkboard as teaching aids. But other subjects like Home Economics you can use most of the differnet. Like when you are doing needle work, you can bring some pieces of material for the children and .... or sorts of clother that you are talking about. ....

**Q:** What do you thing are the problems ? concerning the use of teaching aids, according to you ? Why do you think that teachers find using teaching aids very difficult ?

**R:** Okay. In some schools like here in South Africa , Some of the schools don't have the material so it is a problem if you have to pop out of you pocket to buy something for showing the children what you are talking about, so it is very difficult because things are also very expensive. That is the problem to some teachers but some are just lazy. , only use when they are in college, and then after that they say ah ,, it is not important any more, you see. So it is just laziness.

**Q:** What about yourself ? Have you found any problems? Any particular problems ?

**R:** No myself I don;t have any problems when using the teaching aids because it also makes the subject matter easier. The pupils acan understand you better if you have something infront of them. Because what they see they cannot forget easily, than talking about something you don't know. If you bring a branch of a tree to the classroom then they won't forget , but if you talk just about the tree and some of them don't even know what you are talking about , but they think maybe you are talking about the leaves , you are talking about the branch so I think you must bring something to the class= room every time when You talk about something, a new topic.

**Q:** What do you think can be done to encourage teachers because everybody believes it is nice but still people are not motivated . What do you think should be done to encourage the teachers ? to improve, you know, the education of the

schools ?

R: I think if there can be a competition maybe, If my pupils got better marks because I would be using teaching aids then there is a prize for that , I think other teachers will be encouraged to use teaching aids every time they are going to the classrooms. If there is a competition.

Q: And I also want to find out about the methods that you use for teaching. Which methods do you approve of, is small group or large group ?

R: I think small group is better because you can manage it, better than a large group. I think if you use a small group method, you can also see those who have problems , the children don't speak out , sometimes they are afraid to speak in a large group so when you facilitate that small group, you can find their problems, they can talk out what are their difficulties.....

Q: But in today's society where people are saying that the classes are too big. Do you think that this is practical can it work ?

R: No. It won't work unless if you divide your class into groups and then you see ..... others maybe in the morning , others in the afternoon, which is impossible too, because you can't work for the whole day. You have to get a time for your rest.  
It is just that more schools should be built and then , few people should be put in the classroom like 25 , not more than 30.

Q: What about the teachers ?

R: I think more teachers should be employed. If there are some schools , then more teachers should be employed then one teacher to 30 will do better than to 50 or 60.

Q: So do you think South Africa has got enough man power ? to deal with the situation ? because there are teachers who don't have jobs at the moment.

R: Yeah , because of ... you find that the person is overloaded, 104 kids find in one classroom so she is making the job of five people to teach, that's the problem and others are not employed.

Q: So what can be done to bring the two together ?

R: More schools will make an employment for other teachers. That's only what can be done. The government should extend the schools and also build caravan classrooms to ..... then they can employ more teachers.

Q: Thank-you

RESPONDENT NO. 17 [ 243 - 473 ]

The next respondent was a student teacher who happened to be in one of the schools on teaching practice.

Q: What are your views concerning teaching aids/ media ?  
whatever you use in the classroom ?  
What is your opinion ?

R: I think if you use teaching aids in the classroom, as long as they are appropriate and they are ... you the teacher must know how to use the teaching aids correctly.  
..... you will be of good help to the students .....

Q: Have you found any problems ? as a teacher ?  
Did you encounter any problems ?

R: Yeah, sometimes you find that like in the classroom, different students understand in different rates, so you might find that our students might not immediately understand what you are saying from the teaching aid so you have to find another means in order to strike what the aid was meant to do.

Q: What about issues like availability and what .....

R: I think in our schools there is a problem of teaching aids because the government does not provide as much teaching aids as we need, and then you might find that those you make for yourself, it will take you a lot of time to make them and you find you have to take money to make those different aids and it will take you out of budget sometimes.

Q: So what do you think should be done ?  
to encourage teachers ? I mean because they are expensive you say you don't have time, you have to take out money.  
So what is the solution to this problem ?  
What should be done in these schools ?

R: I think teacher should be encouraged to use things like, things that you can recycle. Anything that is available, as long as the teacher is creative. He must use that creativity.  
Things that are easy to get and you don't need any cash to buy them.

Q: Because the problem is okay, how do we tell these teachers  
How can we get to them ?  
What should be done ?

R: I think things like RDF should be introduced to schools. Maybe you would call teachers to a workshop, and try to show them different things to use. What material you use maybe, boxes of eggs, cans of cold drinks and to make things, teaching aids out of those things... I think it will work.

Q: And then whom should carry out these things?  
Who do you think should carry out these things according to you?

R: The teachers.

Q: From the same..... the ones who know can help.

R: Because they are the ones able to communicate with them. They know how they can address each other.

Q: The other thing I wanted to find out was about modes of teaching. What type of teaching, the modes of teaching that you prefer, There's been a problem, they say that the schools, there are just too many students, so which how can the student be taught so that they actually understand?

Should we go for large groups because that is the practical situation or should we go for small groups?

R: I think small groups is the ideal thing, if because, if the government can build more schools and then that will help. Again if children are trained from their own goal that they must go for the careers that they want to do, so they must be sent to schools which are appropriate for them, not just build schools and everybody is sent to that school, and then you just have lots and lots of students in the same class, with different..... You might find that others want to become artists, while others want to become teachers but you still have the same.... the whole lot of people in the same class. That won't help because you might concentrate on one level of, one career at the expense of others so that will kill the children.

Q: What about now, in between, because the government won't be able to build school now?

In this period what do you think should be done?

What is the practical thing that can be done?

that could be used to help students now as it is?

with very large classes and no material?

R: I think.....

Q: Or is the situation completely impossible?

R: It is difficult

Q: Like somebody said that maybe they could have competitions to motivate them or what? Is there anything practical you can think of?

R: Maybe if ... to encourage teachers to get the pupils more involved, than just talk and teach. The more pupils are involved I think the situation will be because I think the better the situation will be, the students would learn the things practically, experience for themselves, so there won't be much problem from the teacher's side to concentrate on each individual so if they themselves can help each other I think that can work.

Q: Thank you so much.

This is a fellow teacher with whom I felt I could exchange ideas and find whether my view were off the point.

Q: What is your opinion concerning teaching aids/media ?

R: They are good . . . because at least the student has... usually has. it is simple to explain . you might think that whatever you are teaching the student has understood, while they haven't..... at least when you've got that thing in class . .....You are sure they know what you are talking about. ....this thing of just like talking and talking without any demonstrations , or without bringing something else in class , sometimes it bores and students can't be bored by the teacher.

Q: I am also interested in the problems , the problem of of the schools , and the problems you as a teacher faces

R: Yeah, the problem for instance I will give you an example with the school that I was working at. It had less teaching aids so sometimes we would just explain and explain or ask the students to improvise , sometimes they don't do that but it becomes a problem again because some of the things you can't just explain them ..... and again I think the problem of using them . You need to have a small group ..... sometimes you have divided your students only to find what are those doing..... especially when they are in lower classes, they tend to not to be co-operative.

Q: The other thing is ..... they find improvisation very difficult. I don't know why.

R: I don't think it is difficult. It is probably because they don't give themselves time to probably do that. Unless you probably ask children. to do them ..... when you wena don't have to time to do that, and you ask the students to do it for you as long as you have given them the instructions.

Q: The other thing I am trying to find out is what can be done ? to motivate the teachers, because some of them okay, they know, they learnt these things in the college but they can't improvise, especially the lower classes, the things they do are not that complex, water, the environment , which you would think somebody would get the things but they say they can't..

R: What happens that , in most of these schools the H.O.D are not doing very much whereby they should see to it that the ,... the teachers are motivated. wabona . They think that their work is just to look at the scheme book, the register. ... not to get in class and probably discuss with the teacher. . If it is a Biology H.O.D., he knows what is needed and what is not, and probably discuss with the H.O.D. what probably what the teacher concerned they can do, or probably the teacher ena ..... test whether this teaching aids, the students, is it different or the student in the classrooms has not used these teaching aids.

Q: What about the teachers themselves, can't they motivate themselves ? Do they always have to have somebody around to motivate them ?  
What do you think can be done ?

R: They can do it themselves. . But probably it is because as a teacher you probably have to tell yourself , you teach them to learn, you want to produce a certain percentage pass. But if you are not interested in that ..... interested in the kids' learning .

Q: What can be done ? okay you go to these schools and you say they don;t have materials .....

R: Usually, the you find that in a certain area they have these workshops, whereby all the biology teachers, teachers would come and discuss .... for instance in the matric syllabus, there are certain experiments are not there,. You would come together and probably come with ideas on how to improvise for a certain experiment. How to... some of the teachers would not know, sometimes we teach , you improvise and you give small examples whereby some of the things you just leave out. Because sometimes in clas we would say if you are a teacher, you should improvise, but now how do you go about designing this..... he knows that he must improvise but he doesn't know how ..... but I think that is the other thing that makes them..... but I think if they come together ..... in workshops, they come with ideas....

Q: What I am worried about is that you people, it was the teachers ..... the teachers felt that they had a problem

R: I mean like the Biology matric's level. it needs experiments. You can't just..... I mean as a teacher you can go and explain without doing all those experiments but it goes back to you ...

Q: But with the Primary teachers what I find is that , that

is not there. .... that realisation that actually we can get together and do something.

R: Somebody has to initiate it .

Q: Who ?

R: Probably the teachers don't know. They don't know that they can do those things. They could come to Biology teachers and try to do something.

Q: cause I was asking them when do you get together ? sports ?

R: There is thing that we get together when there is sports. But when it comes to school work.....we are competing our results are better. I think most of them don't understand they should actually .... one thing and

Q: One of the things is that we have these workshops , people from outside and they come and tell them things they already know.

R: Why don't they involve them ?  
You know what we had in Mabopane is what we started, not somebody from outside. It would be presented by different people... whatever topic.  
Somebody would present a topic. But you know you don't present it in a one-way thing.  
You look for ideas from the others, yours is just to control the whole thing.  
The input is more from the teachers., but you as well being one of the teachers.

Q: So how can that be encouraged ?

R: The principals..... it doesn't mean.... that it has to be after school. It would be time consuming. But it can also be done during school hours.  
And the principal should be the one encouraging this. to kind of mobilise. I think when it comes from the principals and not from outside.

Q: Anything else ? Thank-you.

TAPE NO. 6

RESPONDENT NO. 19 [ 043 - 107 ]

This was a standard ten teacher who had been teaching for some time. She was working in a community school.

R: The schools that we are ..... we are in the villages. They are having maybe..... a a teaching aid ..... and in the cases of some teaching aids like charts , you make a good chart and when you enter the class..... You must improve ot , so you start to be frustrated. You have done your best but they say it is not good. It is up to the individual teacher whether she wants to use them or not.

Q: Do you think they are not important ?

R: They are not so important .....because as a teacher you can teach without teaching aids if you are well prepared. You can use anything, or a student in the class can be a teaching aid. So I don't think .....

Q: So any other problems ? apart from saying that they are not relevant ?

R: When I am making teaching aids , sometimes I find that they are inconveniencing. because I have got to look for this and that ..... I need a lot of time. I have got to go here and there,they are time-consuming because I have got to look for this and that .... we need to make a model,you have got to go there looking for equipment to make that model ... maybe I would use that time for preparing my lesson.

Q: But isn't that preparation for your lesson. Aren't you trying to make your lesson better ?

R: I didn't see the need

Q: You really don't see the need.

R: yes.

The next respondent is also teaching in a community school. She is involved in the upgrading project.

R: I think the teaching aids are burden because some pupils are afraid of them ,,, for instance , maybe you are doing about reptiles , then bringing the reptile into the class room. The children are afraid of the reptile and they disturb the lesson. Some are going to go out of the classes and some that are not afraid are going to stay inside, so that child is going to miss the lesson.

Q: But , so there is nothing good about them ?

R: I think a chart can be better than taking real thing into the classroom if the people are afraid of it, for instance , if you can , others are not so dangerous. If you can go outside and show them the real thing that is happening outside, they can see the flowers and the leaves. They can see the practical without drawing the chart. It is so difficult to draw a chart, So what is important is to show the pupils how photosynthesis occurs. I think that if the things are practical, then it is better to take the class outside and see

Q: So you are in favour of the real thing ?

R: Yes

Q: But only in some occasions ?  
What are the problems ? you encounter ?

R: I think to make a teaching aid is cumbersome , you take a lot of time to prepare the teaching aid.

.....

Q: What about making learning aids ? when you think about teaching aids .Some teachers think that it is something the teachers have to use. What about thinking that you are making learning aids, things that the students can use ? to help them learn, what about that ? Do you ever make something like that ?

R: Yes, You can make a model ..... then afterwards you can leave that to be used by those children.

Q: What about that, have you ever tried to make them something they can use ?

R: No.

Q: Why not , it can be something simple. If it is time

consuming you could ask them to bring materials.  
They could make their own instead of you having to  
make it.

R: I think as a teacher, they want you to do the teaching aid,  
You must not depend on the children

Q: But if they make learning aids..... they can make charts  
for themselves., they can make a lot of structures for  
themselves . Because teaching and learning aids , these  
days we call them media ..... they are supposed to be  
centred on the learner.  
The other thing I wanted to find out is what type of  
instruction do you use. large group or small group ?

R: Teaching aids ?

Q: as a teacher, do you normally divide them into small  
groups for the whole class ?

R: Well, it will depend on the kind of teaching aid you are  
going to use. If you have prepared a chart, you are going  
to place it in front on the chalk board so that the whole  
class can see. So you make it so that it can be visible  
to all the whole class.

Q: Do you think that that mode of instruction is good ? the  
large group ?

R: No, I don't think so

Q: Why ?

R: Because sometimes you are teaching... some children will  
be doing something else. .... But I think in the case of  
maybe as ... as a group or for individuals, they are both  
problems for the teacher, because like you said, when you  
are teaching some are playing. It is the same like  
group work. If you have maybe four groups, when you are  
with group four, maybe group three is talking .....  
So I think it is best to teach them as a whole class.  
because I think it is very... it is better and managable  
..maybe in groups you find that one group is talking and  
then the other group..... You can't see whether they've  
gained or what...

Q: The other thing that I've found, where I'm asking other  
teachers as well. Your views are very important. The other  
thing thT I have found is that people find it very  
difficult to improvise. ....What about improvisation,  
what do you think about it ?

R: Improvisation is good anyway because you are trying to show  
the people the importance of the things you are going to  
use. In any case it is the same as when you are using a  
teaching aid. .... because yo are going to use your time

while improvising.

Q: What do you think should be done to help teachers, to help you to make the learning process more productive ?

R: I think they have to build laboratories. For instance for Sciences.

Q: What if they don't have the funds to build laboratories?

R: They have to build them. The people they can make a raffle. Then they state the aim of having the raffle. Then they go around the community and ask for donations.

Q: ' cause when I go to schools they say we don't have this, we don't have this and everybody expects these things to be coming from somewhere and you wonder where. ....

R: They have to work hand in hand the teachers and the students. Like they should do the raffle, fund raising. I think the government should subsidize and give some money. And can help them to build laboratories, language laboratories..... so that the pupils can get the.....  
.....dissection and then they don't have apparatus that and that. So the teachers , the community, the education department , .....

Q: What about for you as teachers, what do you think should be done ?  
What can be done to make them aware that....

R: I think they can do the seminars where the teachers are brought together to gather them. For instance if they can select a town here, only the science teachers have to go and show them the importance of the learning.....  
how they can put the learning into the other schools, for instance like improvisation. If there is no apparatus for a certain experiment so they have to improvise.

Q: Anything else ?

R: I think also on the other side, the teachers , the students who are doing the sciences/practicals have to pay something.

Q: The other thing is that the new teachers, when they go to these schools they are very eager to put everything in practice. .... as they are taught in the college. Our problem is if you are taught in the college why is it that when you move into the actual situation,.....  
and some of them say that when they get there, they are kind of ridiculed by the other teachers.

R: ..... So myself I am a new teacher I don't have any experience .... Maybe after some experience I will be able to .

The next respondent was a teacher at the college who had had tremendous experience in the region .The researcher had consulted him initially to find out hoe best to interview the teachers. This last interview was a summary to try and find out how best the problems could be solved.

**Q:** I just what you to generalise..... learning and teaching aids. or media, what is your general opinion ?

**R:** For me they are really, important.... like this morning I was using a model, it was made by one of my students. Some of the students, they really didn't know what a crater was all about. Even when I was tring to explain and make a sketch on the board. But immediately when I brought this .....

**Q:** then you could see that they were following.

**R:** the whole concept.  
You know the reason I've come back to the students.

**Q:** Okay we say it is good..... But when you go into the actual practical situation, you find that it is very difficult. It is really dificult

**R:** You mean the teaching aids are not there ?

**Q:** They know it is good.... important, but in the practical situation they do not use them.

**R:** perhaps it might be an attitude , the attitude that some of our students who are going out to teach. The other one is lack of funds or nobody in the school is encouraging or emphasizing .

**Q:** So this why I am coming back to you, what do you think can be done ?

**R:** I think in schools , the head of department must try to encourage his team to .....because if he is just there let me check on your work, not emphasizing the use of teaching aids they are going to be so ...many problems will also think that was just for

**Q:** So you are saying that the heads of departments should  
Where does one start to do that ?  
The heads of department are already in the schools ?

**R:** yeah, But I think that perhaps a workshop. Because sometimes we do have people who come to school and sell  
There is a need for a workshop. Maybe, starting with the principals and calling them and saying look, here I have

some teaching aids, demonstrating to how the teaching aids are used .... for a group of teachers, let's say like Geography equipment, maybe demonstrating..... maybe calling the heads, together with the subject teachers. Because sometimes you just come ..... people just come and thereafter they collect the money and the teaching aid is there in the strong room and that's it.

Q: Because when I went to some of these schools they said that some of the workshops we attend, we do not gain anything. .... speaks about science or algebra, he is telling us something we know already. Or he is trying to sell a book or something. What I am surprised when I go around. .... is who should start these things? Who should start these workshops. It is as if everybody is expecting somebody else to start these things from .... I was of the opinion that it is the teachers who should start these....

R: yeah, The problem among our schools is that the subject teachers are not organised. They do not have subject committees, because if they have subject committees, it is very easy for them to come together and say look, here is a problem, we want this and they can discuss and share their problems, perhaps they can even come to an extent of saying let us invite somebody, not to come and tell us about this and this, but to come and demonstrate something ..... that will make our teaching better.

Q: Because that's where my problem is. Where do you start to go these teachers. you ask them where are the subject committees.... we used to have subject committees, ... and then you ask them what happened.... the only time we interact with other school is during sports.

R: really by the time when I was still at High school, there were many subject committees then ..... the only working subject committees were Geography and Mathematics. The others had many problems, some principals not for the idea. so that is why there was a breakdown in those committees. And I think the two committees are still remaining.

Q: You are quite right. In the primary schools those are the only two committees that I hear about, the maths committee and the Geography committee.

R: Perhaps the problem might be attitude.... because one principal once said, But why do you have..... we had even gone to the extent of writing a common paper. ....he said you should as well set our monthly test. because it is common, everything is common..... we said we were just operating in the same way the examiners are writing a common paper but each teacher has their own way of setting question paper..... as long as by the end of the program he has covered the whole syllabus. Those were some of the problems that led to the breakdown of some of the committees.

But I think if these committees , they come together and share their problems, these are the committees that can ultimately bring about that change.

**Q:** Who do you think should initiate these committees, is it the principals?

**R:** Yes I think the principals, ..... our principals work better if they get this from the inspector.  
If you want the to do something, you go via the inspector and then the inspector tells them . In that way it is then that they.....

**Q:** Because I was going around and thinking where does one start, because it seems that motivating the few teachers in the schools does not work.  
They agree with you , yes this is right, but you go back three weeks later it is still the same.

**Q:** What I am worried about is the primary schools, for me that is where the greatest problem is .....  
The high schools seem to have more qualified teachers, more exposed teachers.  
I have been to schools where kids can't write . .....  
*It worries me what is going to happen to that child after*  
.....

**R:** Some of our teachers, sometimes they are not aware of the problems that they face.

**Q:** A standard three teacher had 127 ..... It is 90, 127.  
Actually she said you come to my class ..

TAPE NO. 7

RESPONDENTS NO. 21 ,22 & 23 [ 081 - 366 ]

These are newly qualified teachers who are teaching in one of the government schools. It is interesting to note that they have solutions of their own problems.

**Q: I just want to know about your views concerning teaching and learning aids..**

**R: They are very important because they can bring reality inside the class, and sometimes., maybe it is difficult to explain about something then it is easy for a child to see it..... to have knowledge about it.**

**Q: What about problems, what problems have you encountered ? Don't only think about teaching aids also learning aids, things that you make or they make, what type of problems**

**R: Like sometimes it is difficult to make your own teaching aids.... then it is better if ever you've got the apparatus the equipment ready , the problems that we encounter is the size of the classroom you cannot make your own teaching aid. it becomes ,... a problem .**

**Q: And what suggestions should you make .....**

**R: I think the school must have plenty of teaching aids, maybe**

**Q: Where will the money come from ?**

**R: From the money we pop out, the fees ?**

**Q: What about the schools where they are not paying anymore ?**

**R: By doing some fund raising and using that money and then...letting the students go to the streets to ask for money and then doing some few projects ?**

**Q: What are your views, I have talked to some teachers and they say they are useless ?**

**R: They are very important because you have to you have to find ways of imparting knowledge so that our..... education may improve.**

**Q: Problems ?**

**R: Like you must know how to manipulate them. It is very**

important. Because now we are science teachers we are going to teach badly, and some of the experiments we cannot do. We are afraid, so it is better if we maybe get the chance of using them properly. ....

R: I am thinking that teachers should always improvise ...if where possible. If you want to maybe ... give the learners complete things, then you improvise, do our own teaching aids and we know that if we have done our own teaching aids, then you are bringing life to the class. complete things to the class..that is what I have to .....

Q: What are the problems in the school situation, concerning use of media ?

R: The problem is that blacks have been somehow exposed to the situation where there is no material as such. But now if we as teachers push up in the way that centres around the child seeing for themselves. Even if there is no money we have to improvise where possible. so that the child can be started up with something concrete, cause from being a child, when you get up to tertiary level, you are exposed to the things.... for an example when you find that a child does not know the model of the atom .... you have to make some concrete models aso that ..... you have to be artistic somehow and show the child the model of the atom. Maybe it will help.

Q: From the schools the impression I get is that when you talk about improvisation, they say it is too time consuming. They simply don't have the time. What do you think about that ?

R: Personally, ..... ..some of things<sup>th</sup> you have to take the time.

Q: So they say they just don't have the time, even though they say they should use them .... they don't have the time.

R: And some of the models, you have to be artistic to make them .....

Q: So what do you think should be done to help teachers ? Within the schools, how can they be helped ? Apart from fund raising ?

R: I think the RDP can help.

Q: the RDP is you

R: yes but we also need some help from the government, to help us with some equipmen, things that we cannot do as teachers.

Q: The interesting thing is that sometimes these things are there ... they don't use them

R: That is up to the teachers.

We must be familiar with this apparatus so that we cannot be afraid to go and use them.....because in the schools we did not get a chance of using them , just using them . At our schools we didn't get the chance of doing experiments and touching those apparatus, we are starting now. We are not confident about whether we can use them in the classroom ?

Q: So if you have not had any contact with these things, what I am asking is that what can be done to help you now ?

R: I think we should have workshops...maybe to show us how to use these things.

Q: And who is supposed to run those workshops ?

R: The professors,

.....  
The problem is the time.... we have many periods . We must have few classes so that we are able to have a chance to  
.....

R: The attitude of the teachers in the school should be changed.

Q: Who is going to change this ?

R: Maybe the media..... so that they develop some programs for changing the attitudes of the teachers outside.  
If I come to the school with a teaching, they say I am trying to be better..... now the attitude of the teachers at the school should also change.

Q: Who is going to change them ?

R: The inspectors. .... can do that, because they have been doing that but just for a little time. .... they need to it regularly, otherwise the teachers pretend to be doing the work when they are not.... only for one period. So if we have a regular visit from the inspector, maybe that's one way of changing the teachers' attitude.

Another thing of changing the attitude is maybe if ever we are teachers , at a certain place. We should always have workshops to discuss, maybe Mpho knows pressure more than myself, she can come to my school and teach them.  
It will be better for them.

TAPE NO. 7

RESPONDENTS NO. 24, 25 & 26 [ 021 - 3391

This tape was a recording was taken right at the beginning of the research. The respondents were a mixture of primary, middle, high schools and the colleges. the purpose was to demarkate clearly which issues could be considered for the reseach.

The first section were complaints about the whle school environment in the Mankwe region.

**Q:** What about the environment in which you are teaching. Is it good? The fact is that there is overcrowding, but what about the other basic .....

**R:** You see, the problem maybe, well in the past we had these community schools.....  
I found one community school last year, .. the, I entered two classroom without a chalkboard, and there was something of this size as a chalkboard. You go into the classroom, they come and .....So now I think that is the type of environment our school have, not having facilities, even the chalkboard not being there. So if the chalkboard .....

**Q:** I had to sit on a broken chair.....

**R:** I think that is the responsibilities of the principal. They must do something about it. Last year the teachers were fighting over the chairs. ....He sees that there is problem of chairs and he doesn't do anything yet the money is there.

In this case, you know how chairs are supplied in the schools. You as a principal, you cannot buy the chairs. There is a form that you fill that is sent to the government. In fact it is the government that supplies you with the chairs. ....

But if they don't follow up. they just relax. they dn't follow up.  
Sometimes it is a problem of following up.

**Q:** The government, does it supply chairs ?

**R:** These days the government supplies but you find that in some government schools, it is really terrible. Normally when a school is built they supply, but you find that our students are also careless. you find that a year about forty chairs, desks broken. Sometimes our students are not careful with the school furniture.

Even the parents, they must be involved. They must come to the schools and see the conditions of the schools.

..... It is just that lack of interest on the side of the parents. That can be possible. For instance at a parents meeting in our school. We usually announce that over the radio, some placards were even placed at different areas where we know people are..... but the turn up is always very poor. I should think that .... it is the colour. Because if you take your children to schools like Fields, once they broadcast there is a meeting, Parents will flock.

.....  
There was a parents day here at Holy Family. I don't think there was a parent who missed but the following week there was a parents meeting here at Mogwase Middle school, 30 parents turned.  
There is something wrong in the parentas that has to be rectified.

**Q:** What about teachers standards? Primary teachers standards?  
It is something that people always say ..... poor qualification. Usually I find it embarrassing to ask them. What is the typical qualification? in the Primary school  
WHAT would be like the norm?

**R:** It is used to be PTC, then it turned to PTD, Primary teachers' Diploma, then it is now UEDP University Diploma in Primary education. I think that is ..... and one other thing is our primary education, it is neglected in the sense that our University even here does not cater for the qualification of Primary teachers. I think we need to have a degree in Primary education. There is no such thing. UNIBO focuses on middle schools and High Schools, that's how primary schools are neglected.

**Q:** It seems that there are so many teachers coming for the Upgrading Project. It suggests to me that they don't have the proper qualification.

**R:** Those are the ones who have Primary Teachers' Certificate.

**Q:** Was that obtained from colleges?

**R:** Yes.. from colleges before this Diploma was introduced.

But even teachers who have the The Primary Diploma. It looks like they are scared of teaching in these schools. If you look at the population in the primary schools, it is mainly ladies.

**Q:** That's true

**R:** I can think of one Primary school I know. The only male teacher is the principal. There has been two vacancies and the Principial said that he was going to reserve it for males but .....

Another problem is that these days , the Primary teachers are upgrading themselves, they are acquiring degrees. Once Primary teacher, acquires a degree, he or she leaves , it is now thought teaching school.....

But it is again.... if you go areas around Mmabatho. You find that there are teachers with degrees at the Primary schools . I should think that is only because the High schools they don't have places. It only in Mmabatho in the North West.

Most teachers are upgrading themselves.

Once a Primary teachers' degree is introduced, ... so that those who want to be trained in the Primary follow that direction. Only colleges are catering for Primary teaching.

**Q: I think I am becoming an expert.**

A distinguished educationist. Head of the Education Department. Very knowledgeable about the situation in the North West province. has over 20 years experience in teaching.

**Q: What is your opinion concerning teaching aids in teaching in Primary schools ?**

**R:** Teaching aids are vital for the primary school and I am basing my opinion on Piaget's theory of development. According to Piaget children at the primary school are at the concrete operational level of development which means that at that time, they are still not able to think abstractly. It means that everything must be introduced at a concrete level. At that for classroom practice means presentation of subject matter ... of all content should be first at the concrete level. .... So for me no primary school teacher should go into class without a teaching aid.

**Q: What my problem is concerning is the kind of training that these teachers get and the kind of situations in which they are not in touch with what is happening now or .....I don't know because for most schools I go to , they are using blackboard, blackboard , textbook .....**

**R:** At the moment there are two kinds of teachers in the Primary School. There are teachers who were given a two year training certificate but I think the importance of using teaching aids was emphasized. And again the new approach, see about eleven to twelve years ago , a new approach to teaching in Primary school was introduced and the use of teaching aids, worksheets, was emphasized.

**Q: Why don't they use them now ? Why does it seem going away again ?**

**R:** Is it because teachers don't have time, or don't make time I wouldn't know. But one can also trace it back to the type of education they have received and people..... the type of education they received made them to memorise and most of the time it was only learning, and the critical approach to learning was.....because of that ... the type of examiners, everything is based on memory. Many teachers ..... the exam system,

**Q: I find this fascinating because in some schools , they are right deep but you find a teacher who is using all these things , plants everywhere, objects collected from outside. And then you wonder, How come there is is one person to have this knowledge when the others are on the other side.**

R: When this Primary Upgrading Program was introduced, it was introduced in such a way that first in an area, they were the pilot schools, then information from the pilot schools was passed on to the other schools. So I think the teachers are aware, they have the information.

I know the History, this upgrading program was introduced, all the people, many of the ladies who were principals in the pilot schools were promoted to become organisers and these organisers had a status .....between a principal and a circuit education officer and they could do the rounds and the follow up. There is a belief that although the schools were upgraded... the amount of follow up that was done was not enough. So it seems that people know that things have to be done but because the amount of time required for making the aids, the amount of time required to change the atmosphere in the schools, people opt for the softer options and that is .....but I have seen.....

Q: So what do you recommend should be done at this stage ?

R: As we are, teachers who are being trained, The UDEF trained they know about Piaget, they know about the use of teaching aids. What I think should be done is ..... courses, pre-services, and a follow up more effective ....

Q: Well I was teaching in the upgrading program. Afterwards I was feeling that we were not doing any.....It was still a crash program and we tended to go back to the notes ... that kind of ... and to me it was just like a vicious cycle, I don't think that we taught those teachers anything practical. In those three hours what we were concerned with was trying to get through that pile of worksheets so that at the end we could answer a few questions.

R: I think we need to re-vamp teacher training, re-vamp in-service training but also re-vamp methods of assessment. It is often said that we could use the evaluation to break the door. If the examination, tests and examination or whatever stresses understanding and experience, we could have the teachers teaching for examinations and inadvertently introduce.....  
But we actually need a more structured follow up program with the inspectors going to see how the teaching is done, whether teaching aids are used and we need to have teaching aids workshops. As I say people who were not taught, who have no experience of teaching aids don't see the need for teaching aids. even if they go for training, as they go back to the schools they themselves, did not have those things to teach them.....

Q: The other thing, when I go and ask them is that they don't have them .... and then you ask them, there are some of them you can make, you don't have to .....they say we don't have enough money, the government should supply us with this ,

R: The belief is that teaching aids must be provided and improvisation is something that is never stressed and one would ask, are we actually doing it at the college? The attitude, even at this college, all the lecturers seem to think that teaching aids are work experience but then the work experience can only give the teacher trainees a very general idea of teaching aids. I wouldn't actually know what a model for Physics would look like.

Q: But the problem as you said is the evaluation process, because we are now just trying to finish the syllabus

R: We are actually perpetuating the same thing. We have dismissed teaching aids and we are seeing teaching aids as an unnecessary appendage. So it is a vicious cycle. We at the college don't do enough to teach our students to use teaching aids, to improvise and so on, we are too busy chasing content to be worried about teaching methods and when they go to the schools they are also too busy chasing content to worry about teaching aids.

Q: And another thing I have found about Primary teachers is that they seem to think that they are inferior. Whenever they upgrade the tendency is to move out and go to the Middle school. Is there a University course, I know there isn't a University Course for Primary teaching at UNIBO. Is there any other in the Universities around?

R: Wits offers one a teaching Primary Degree, But even the before the Upgrading of these teaching programs, teachers in the Primary school got less money than teachers at Middle schools and teachers at High schools. Actually Primary schools and Middle schools, .. middle schools came into being only in the mid seventies. Teachers in the primary schools were not paid as much as High school teachers. So there's always been a tradition of looking down upon the primary teacher, an unfair and regrettable attitude because the primary teacher is the most important ....so we have always had this .... Oh I'm high school teacher..... So when the UDEP was introduced. It was said that if you have UDEP diploma, it doesn't matter whether it is UDEEL or UDEP or UDES, you are going to be paid the same. And that was an attempt to level the status .....you learn the same, you earn the same. But even at colleges that offer all three diplomas the S students feel superior to the primary students who also feel superior to the early learners. But then again it is the hidden curriculum, those with the best symbols are put in the S, those with less attractive symbols, UDEP, those who manage to spoon through go to the Early learning Diploma. So the status of the Primary school teacher .....

R: There is something else I want to say. I was fortunate enough to be at Tlhabane, when the UDES, UDEP and UDEEL

was introduced. And as soon as they qualified they went to teach to the Middle school. A very good example of the view they have or their attitude towards the Primary school. And there were ..... Mr. Ntsime, the then secretary for Education said..... You colleges are not doing justice to the Primary course, because teachers who qualified in teaching in Primary schools are now teaching in High Schools. But it was not our fault, I said the department should not employ them where they don't qualify.

Q: When was the this UDEP introduced ?

R: 1982, because that is when I went to Tlhabane.

Q: Was is started from Tlhabane college ?

R: No .....before then all colleges..... were training colleges and not colleges of Education and before the UDEP program ... to train as a teacher you needed standard 8. And in 1982 when the upgrading of teacher training, the minimum qualification ws to be standard ten , the colleges would be colleges of education and one interesting development was.... to teach at a college of education, one had to have a degree, before that you could teach without and that's when teachers became lecturers and people had to leave training colleges because they didn't have the necessary qualifications.

Q: Is that so ?

R: All the teachers without degrees had to leave and had to be placed in schools. There was lots of hostility and bitterness. Many of them went to schools and studied. There was also something, those without degrees, were.....

[second side of the tape ]

[ 000 - 047 ]

R: with a four year diploma could continue. Blacks did not have access to a four year diploma so the whites could continue. Only whites., the bitterness was caused by the fact that for blacks ..... and for whites it was something which they had and many teachers .....it is the system so we were discriminating. They lost their posts at the colleges. I joined the colleg in March..... it was no longer principal but rector, and the rector said to them , ..... I must go now.....

Q: I am going to get an excellent thesis.

The respondent is an pre school teacher. Her output was also considered important at this stage.

**Q: Tell me anything about the teaching, teaching aids.**

**R: Anthing about my teaching ?**

I told you I like the little kids , they are quite different from those oldr ones, because Primary , secondary and High school, it is troublesome. Especially when they transit and nowadays everybody has law in his hands, so in this case we don't have anything to worry about because discipline him now , very soon he is happy, doesn't get angry for long. You can make a very good doctoe, a very good teacher .... you can lay a very good foundation, it depends on you. It needs a lot of observation . Is this a builder, a doctor , a nurse,... you are going to see. Even if they do graduate I usually want to put on the relvant ... gown.....

**Q: the colours, the belts ?**

**R: The relevant profession. Don't just put them as if thy've done nothing. If a child, fo an example likes playing with water, using it accordingly , playing with puzzles, completing it inrequired time, doing some sort blocks, building the according..... you say this one is a scientist or a teacher .....You just see. you will know it , because some will keep getting outside to..... but you must also have to make . to go all around the playroom because in our playroom we have got blocks, but ..... if the child doesn't have a logic in speech. It also helps in writing. And then we have also puzzles and mathematics, we also have ..... a water paly for scientists, sand play, those who want to build in the future. also for the mathematicians they measure, they do all sorts .....**  
There is a lot to be done and you can lay avery good foundation because you are going to see if this child is normal or abnormal or somehow emotionally disturbed or mentally derailed or physically .....unfit. It is your duty to observe.

**Q: I wish the Primary teachers would do the same, they are not seeing the children as you are...**

**R: That is why I give them time kits to grade ones . I know all of them . A teacher, a doctor or what so I don't expect any teacher to tell me, this child is dull or this one doesn't like screening or this one . I have laid the foundation and I know them all. There's is just to go on .**

The purpose of this interview was to review what the researcher had already observed in the schools, to get a second opinion with what had been observed.

.....

The beginning was an unrecorded conversation concerning teaching aids and media in general. It was agreed that the term teaching aid was more likely to make sense to the interviewees.

**Q:** What about these aids, the conventional aids like the blackboard, the textbook, and the charts, do you think that you are using it to .....

**R:** this idea of .....

**Q:** When I go around the schools, these are the aids they are using.....

**R:** They make the students under..... because as a teacher you always have to come up with new ideas so if you always refer to the book, the intake of the students is also affected. The very same textbooks the students are also having, so it really doesn't work.

I think maybe the textbook maybe used. like for instance in the introduction, sometimes there is a need for using a textbook, maybe referring to the students on a particular diagram and maybe I explain something and there after I refer them to a particular diagram, to study it and to check whether they have understood what I was explaining.

**Q:** What about the blackboard, do you think it is used too much? Do you think that teachers are aware of how it could be used?

**R:** Because sometimes some teachers do not use the chalkboard. He just comes into the class ..... They leave the board clean as it was.....

**Q:** There is another activity that I wanted to ask about. It seems in most cases people think that in order to have a good classroom environment, that class should be organized all the students should be seated neatly, straight rows, and they are just supposed to be doing what the teacher is saying ..... what do you feel about that kind of I've been to schools where even if they are observing, they stand them in straight rows. They must not get further than that because she says whenever not to ..... like that they get out of control.

R: You mean the teacher ..... just listening to him , and maybe asking questions when they want to ask ?

Q: Yeah. Not to interrupt, because she says if she allows them to do that they get out of hand, they disrupt the whole class..

R: I think that was the old system which was being used. That was what we used to call Bantu education, where it is only the teacher who ..... but nowadays they must be a thing between them, the teacher has a relationship . ..... everything must be centred on the children, they are the ones who must be taught during the lesson, as a guide.... almost as a guide.  
But that thing of the teacher talking to the children, At the end of the lesson they have not understood what he is talkin about. .... 95% must be form the students.....

Q: Can it work at primary level ?

R: I think if you teach them. If you show them, you are encouraging them to talk , to be free in class.  
I think that will work because the primary pupils they are young ..... I think they will.... unless the student is shy.

No but I think it was successful in primary schools.  
There was this program PEP, where the pupils are just ..... even th setting , is very much different from the conventional one . So then the classroom becomes a second home where they feel very free to do whatever.....  
So I think .....

Q: But why wasn't it adopted all over ?.....

R: I don't know what exactly happened because it was to be started from the primary , it was to go through to Middle school and High school level . Something happened , especially in the case where it was to transit to higher schools. I don't know what was the problem. ....

Q: When was this ..... do you know how long ago ?

R: When did the first .....

But I think the person who introduced it was a certain lecturer from Tlhabane ..... It was done in the time of Mangope. Maybe people from the primary run away thinking that , most of them were anti.....  
They were afraid, so they wanted to change it, to make it something like a family. But now our problem is that.....  
many .....

Q: Does the government supply teaching aids?

R: No. The schools but for themselves.

.....in some schools it is very hard, like in some schools ..... Teaching aids are very expensive. The roll of some schools is.....

Q: What do you think should be done ?

R: I think.....they must supply teaching aids.

Q: because the government says that all these problems must be dealt with at grassroot level, who is supposed to start all this.?

R: I think the principal must try and take care of them . Because what I have realised, most teaching aids that are bought only to find that at the end of the year they have been torn and damaged. The following year they buy again the same things that they bought last year. If they can just take care of them ,, buy ..... to cover on the all the subjects not to concentrate on one subject only.

I also think that this new free for of teaching from Grade I.....I don't know what is happening, where the schools get money . because they've got to be money to buy money to buy teaching aids, so in fact the government says that education is free and it does not budget some funds for teaching aids I think that implies a lapse of teaching.

Q: Do you think the situation is better in schools in townships like near Mogwase ?

R: It is better

Q: I was surprised that the school in Mogwase , they have computers. I was surprised even the one in Ledag.

R: Those are the schools which were sort of models for the... .... so the pupils who have gone through those schools are , right now it is just a waste because that was not continued because from their primary school, they had the knowledge they know how to work the computer and from there it stopped so really they have forgotten what they got from the Primary schools.

Q: Anyway the computers are very old, but I was actually surprised to find that some schools with those kinds of facilities.

R: I think to allow schools, to facilitate schools to have enough material, the greater part of the budget , the because this is the steering wheel of the department. Each one of the department..... the department must be given provision more than any other department.

Another thing would be the co-operation of the community with the schools. Maybe they can help the schools by organising some fund raising . In that case where they

can get something like that. I think it is where some money.....

**Q:** The other thing I was interested in is this radio broadcasting. Do any of you use this radio broadcasting ?

**R:** No you see the problem with radio broadcasting. Sometimes when it is time for a certain lesson like for instance, History for that day, that will may be come at nine o'clock when my period is commenced, maybe an hour or two hours so I cannot take the radio into the class to listen

**Q:** But do you think they are useful ?

**R:** I think they are useful if they are given a chance. You are supposed to, maybe what you are saying that the....  
..... but then where are you ?

**Q:** What about television, is any school around using television ?

**R:** The government supplied all schools with television to be used

**Q:** Even in Primary schools ?

**R:** Only in the high schools..... You see the problem with the television is that in the former Bop, is that they were very much special. They didn't buy ordinary television. They had special technicians and so on. They were also very expensive so there was a problem of maintainance. At the same time there was a problem of theft so once they had the problems of the video recorder, than it is difficult to ..... so most of them are without video recorders. If they could have just put that right.

**Q:** What about these things that you are saying that the Geography things are coming from outside ?  
Do you think educationists here are not involved enough in making teaching aids which are suitable for .....

**R:** I do think that South Africa is technically mature. to be able to do that, not to rely on America or foreign teaching aids. I think they are mature enough to be in a position to manufacture their own teaching material or ..... collecting their information around.

**Q:** But who is supposed to do that?  
Is it the teachers or is it some ...

**R:** It needs .... well the teachers may do that maybe as an initiative from the teacher, maybe the geography teacher going out, collecting his own material. But this requires more time and sometimes you don't even have transport, because some of the teachers are ... there is a particular teacher in Petersburg, another one in

Blomfontein, so you've got to go round and collect them and compile them and say these are the teachers that are found in South Africa. So now in that it needs sponsorship from certain organisations.

**Q:** It is proving difficult. Sorry.