

**AN INVESTIGATION OF FACTORS WHICH INFLUENCE
INTEGRATING INDIGENOUS KNOWLEDGE OF MEDICINAL
PLANTS INTO THE LEARNING PROGRAMME FOR
GRADE 9 GENERAL SCIENCE**

Submitted in partial fulfilment
of the requirements for the degree of

MASTER OF EDUCATION

RHODES UNIVERSITY

by

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March 2001

ABSTRACT

This study explores knowledge of some medicinal plants amongst the sub-urban community of and around a township in the Eastern Cape province.

This qualitative interpretivist case study presents the prior knowledge of medicinal plants possessed by Grade 9 learners, which is used as a springboard toward interviewing traditional healers, herbal practitioners and lecturers at a university in the departments of Botany and Pharmacy. The data obtained from the informants reveals the factors that can influence integration of indigenous knowledge of medicinal plants in the learning programme for grade 9 General Science. These factors include: prior knowledge and enthusiasm of Grade 9 learners and teachers, support of the community which include parents, traditional healers, herbal practitioners and professionals who could introduce indigenous knowledge of medicinal plants into formal education, availability of resource materials and complexity of identifying pharmacologically tested plants from other indigenous medicinal plants.

The analysis and discussion of the findings, have led me to conclude that the enthusiasm of learners who have a rich background of indigenous knowledge on medicinal plants is likely to be hampered by the unenthusiastic teachers as well as the reluctance of herbal practitioners in their communities to part with this knowledge. Hence I recommend that teachers be motivated through workshops and in-service training, conducted by government paid herbal practitioners using the prior knowledge of learners as a stepping-stone.

TABLE OF CONTENTS

	Page
Title page	
Abstract	i
Table of contents	ii-vi
A map indicating the study area in the Eastern Cape province of South Africa	vii
A list of photographs and tables	viii-ix
Acknowledgments	x
CHAPTER ONE	
An orientation into the study	1-5
1.1 Introduction	1
1.2 Rationale	1
1.3 The purpose of the study	2
1.4 Background to the study	3
1.5 Clarification of key concepts	4
1.5.1 Defining science	4
1.5.2 African science	4
1.5.3 Indigenous knowledge	4
1.6 An outline of the study	5
CHAPTER TWO	
Literature Review	6-25
2.1 Introduction	6
2.2 The nature of science	6
2.3 Closing the gap between African science and Western science	7
2.4 Introducing Outcomes Based Education (OBE)	10
2.4.1 Defining OBE	10
2.4.2 Characteristics of Outcomes Based Education	11
2.4.3 Constructivism as a theory behind OBE	12

2.4.4	Challenges educators face in conceptualising Constructivism	13
2.5	A multi cultural enrichment to learning	13
2.6	Instructional language	14
2.7	Integration of environmental education in the science curriculum	14
2.8	Reasons for learning about medicinal plants	16
2.8.1	Reasons given by a family physician	16
2.8.2	Cultural aspects of healing	17
2.8.3	Efficacy and safety of medicinal plant products	18
2.9	Areas of agreement among the different disciplines concerning complementary medicine	18
2.10	Reasons for not knowing about the uses of medicinal plants	19
2.11	Uses of some common medicinal plants	20
2.11.1	Common medicinal plants that are used worldwide	20
2.11.2	Common medicinal plants that are used in South Africa	21
2.11.3	Common medicinal plants used in the Eastern Cape province	22
2.11.4	Common medicinal plants used on livestock	23
2.11.5	Common poisonous plants	24
2.12	Summary	24

CHAPTER THREE

Research Methodology **26-38**

3.1	Introduction	26
3.2	Justifying a qualitative interpretivist approach	26
3.3	Justification of a case study research	27
3.4	The choice of the research site and informants	27
3.5	Research instruments used	28
3.5.1	Questionnaires	28
3.5.2	Observations	29
3.5.3	Interviews	29
3.5.4	Focus groups	30
3.5.5	Artifacts	30
3.5.6	Field notes	30

3.5.7	Research Journal	31
3.6	Designing of questionnaires	31
3.6.1	Designing a learner questionnaire	31
3.6.1.1	Justifying the categorising, allocation and phrasing of the statements	32
3.6.1.2	Designing a learner focus group	33
3.6.2	Designing a teacher questionnaire	33
3.6.2.1	Justifying the choice of statements in the teacher questionnaire	34
3.6.2.2	Designing a teacher focus group	35
3.7	Triangulation of data	35
3.8	Discussion of the methodology	36
3.8.1	Constraints	36
3.8.1.1	Time constraints	36
3.8.1.2	Limited access to informants	36
3.8.1.3	Language	37
3.8.2	Strengths	37
3.9	Summary	38

CHAPTER FOUR

Data collection	39-60	
4.1	Introduction	39
4.2	The situation at X SSS	39
4.2.1	Strengths	40
4.2.2	Weaknesses	40
4.2.3	Opportunities	40
4.2.4	Threats	41
4.3	Parents' intervention	41
4.4	Prior knowledge and enthusiasm of informants at X SSS	42
4.4.1	Data gathering using a learner questionnaire	43
4.4.2	Analysis of responses in the learner questionnaire	45
4.4.3	Data gathering using a learner focus group	50
4.4.4	Analysis of the learner focus discussion	50

4.4.5	Data gathering using a teacher questionnaire	53
4.4.6	Data gathering using a teacher focus group	55
4.4.7	Analysis of data from the teacher focus group	57
4.4.8	An interview with the principal of X SSS	58
4.4.9	Analysis of the interview with the principal	59
4.5	Summary	60

CHAPTER FIVE

Collecting data and analysing responses of community members

and academicians		61-79
5.1	Introduction	61
5.2	Support of the community members	61
5.2.1	Observations	61
5.2.1.1	Attending a therapy session at a traditional hospital	61
5.2.1.2	Collecting medicinal plants with a sangoma	63
5.2.2	Analysing the observations	65
5.2.2.1	Analysing the therapy session	65
5.2.2.2	Analysing the collection of medicinal plants with the sangoma	66
5.2.3	Interviews	66
5.2.3.1	An interview with a herbal practitioner	66
5.2.3.2	An interview with a foreign traditional healer	68
5.2.3.3	An interview with a second foreign traditional healer's brother	69
5.2.3.4	An interview with the sangoma	71
5.2.3.5	An interview with the first parent, Mr. R	72
5.2.3.6	An interview with the second parent, Mr. K	73
5.3	Analysing interviews with the community members	74
5.3.1	Training of healers	74
5.3.2	Common medicinal plants that can cure diseases	75

5.3.3	Views on introducing indigenous knowledge of medicinal plants into the science curriculum	75
5.4	Support of professionals at a university	76
5.4.1	An interview with a professor of pharmacognosis	76
5.4.2	An interview with a taxonomist	77
5.5	Analysing the support of the professionals	79
5.6	Summary	79

CHAPTER SIX

Discussion		80-84
6.1	Introduction	80
6.2	Discussion of the learner questionnaire	80
6.3	Discussion of the teacher questionnaire	80
6.4	Discussion of the principal's interview	81
6.5	Discussion of the interviews conducted amongst community members	81
6.6	Discussion of interviews conducted amongst professionals at the university	82
6.7	General discussion	82
6.8	Summary	83

CHAPTER SEVEN

Conclusion and Recommendations		85-88
7.1	Conclusion	85
7.2	Recommendations	85
7.3	Reflections of the study	87

REFERENCES		89-94
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APPENDICES		95-115
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PHOTOGRAPHS		
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A map indicating the study area in the Eastern Cape province of South Africa

LIST OF TABLES, PHOTOGRAPHS AND APPENDICES

Table 2.1	Internationally recognised medicinal plants	21
Table 2.2	South African common medicinal plants	22
Table 2.3	Eastern Cape province's common medicinal plants	23
Table 2.4	Medicinal plants commonly used on livestock	24
Table 2.5	Some poisonous plants	24
Table 3.1	Instruments used with different types of informants	28
Table 3.2	A category of statements in the learner questionnaire	31
Table 3.3	A list of statements in the teacher questionnaire	34
Table 4.1	Learners' responses as per statement in each category questionnaire	46
Table 4.2	Response percentage ranges for each category	49
Table 4.3	Number of teachers' responses per statement	54
Table 5	Some medicinal plants used for psychological healing	65
Photo 1	Grade 9C learners at X SSS answering a Learner Questionnaire	43
Photo 2	Grade 9C learners at X SSS attending a practical session of identifying some medicinal herbs	44
Photo 3	A traditional hospital where the observation was carried out	63
Photo 4 & 5	Collection of some medicinal plants from a veld by the sangoma and a herbalist	64
Photo 6	Preparation of some herbs by a traditional healer assistant	71
Photo 7 & 8	Uprooting of medicinal plants by herbal assistants	78
Appendix 1	Grade 9C Medicinal Plants assignment	95
Appendix 2	A memorandum of the medicinal plants assignment	96
Appendix 3	Learner Artifact of the medicinal plants assignment	97
Appendix 4	Learner Questionnaire	98
Appendix 5	Teacher Questionnaire	99

Appendix 6	A SWOT Analysis of school X, the central research site	101
Appendix 7	A transcript interview with a herbal practitioner	103
Appendix 8	A transcript interview with a sangoma	106
Appendix 9	A transcript interview with a foreign traditional healer	108
Appendix 10	A transcript interview with a second foreign traditional healer's brother	110
Appendix 11	A transcript interview with a professor in pharmacognosy	112
Appendix 12	A transcript interview with a taxonomist	114

ACKNOWLEDGMENTS

Research has never been a one man show. I have a noble obligation of thanking all the people who have helped me in putting the pieces of this research together. In particular, I would like to express my gratitude to the following individuals who have directly or indirectly been supportive throughout my academic preoccupation:

My supervisor, Mrs. G. Bolt, though she had seven M.Ed science students to supervise, gave my half-thesis her special attention. Her motherly guidance and advice have really shaped this work. Prof. E. Janse van Rensburg whose advice and donation during the infancy of the study, contributed to some pieces of work within this research. Prof. B.J. Wilson for having supplied some material that I have used in the literature review. Mrs. J. Cornwell, Mrs. M. Hendricks and Mr. K. Ngoza for having proof-read this document.

I would like to extend my gratitude to the NRF and Eskom John Maree scholarship for having funded my M. Ed. Course. I thank the principal, some colleagues and some learners of my school along with community members who took part in this study.

It would be unfair of me to leave out Mr. K. Nadarajah who introduced me to the M.Ed course and Mrs. D. Gruneberg who helped with the format of this piece of work.

Last but not least I would like to thank the special person in my life, Blossom, for having endured those sleepless nights of typing. To my children Ben and Phina, the voluntary breaks in-between the study, were utilised as breathe-taking spaces. To the rest of my family members, you have been supportive and understanding.

CHAPTER ONE

AN ORIENTATION INTO THE STUDY

1.1 Introduction

THERE IS NO CONTINENT of the globe in which one cannot find herbal medicinal products and there is no society which could claim that it has never used some plants as medicines to cure various diseases (Dechamp 1999:309).

After encountering these words coupled with my little indigenous knowledge about medicinal plants, I decided to set off on an expedition to learn more and find out why such knowledge has not been integrated in the science curriculum. The process of the investigation and findings are reflected in this research.

I have embarked on an interpretivist case study in a semi-urban area in the Eastern Cape province. The study focuses on the prior knowledge of medicinal plants possessed by Grade 9 learners and educators at a school X, where I am offering General Science.

The study includes a target group of community members who are known to be a fountain of indigenous knowledge in the area. I believe that finding out the nature, status and perception of the knowledge about medicinal plants from these people can influence the integration of such knowledge into the science curriculum. Their attitudes and ways of teaching about these plants at school, which are basic in this research, will be sought. The views of two academicians in the field of medicinal plants have also been included.

1.2 Rationale

Identifying factors that could influence the integration of indigenous knowledge into a learning programme for Grade 9 General Science is the purpose of this research with an aim to inform curriculum developers, who include educators, on learning materials' development. With the

introduction of Curriculum 2005 in the Senior Phase, learners are expected to demonstrate eight Specific Outcomes in the Natural Sciences. Two of these outcomes, S.O.4 and S.O.6 have a bearing on the indigenous knowledge of medicinal plants. According to the Senior Phase Document, S.O.4 is about demonstrating an understanding of how scientific knowledge and skills contribute to the management, development and utilisation of natural resources that include medicinal plants and other resources. S.O.6 is concerned with the development and understanding of the relationship between science and culture. Zhang (1999:321) who contends that traditional medicine is deeply rooted in history and culture would probably concur with S.O.6. Zhang (*ibid.*) views it as part of the traditions of a country to employ healing practices handed down from generation to generation. Unfortunately most of this knowledge is passed over by word of mouth and in many cases the custodians die with knowledge that they have not passed on. Hence I feel that there is a need to investigate factors that could influence the integration process of indigenous knowledge of medicinal plant into the science curriculum.

1.3 The purpose of the study

This study uses prior knowledge of Grade 9 learners on the uses of medicinal plants as a springboard to gain more insight and identify factors that could influence the integration of indigenous knowledge into a learning programme for Grade 9 General Science. The investigation will make use of the following guidelines:

- ◆ to find out the indigenous knowledge which a small sample of people in and around the semi-urban area have on the uses of some common medicinal plants,
- ◆ to determine these people's attitudes and support towards integrating indigenous knowledge of medicinal plants into a learning programme for Grade 9 General Science,
- ◆ to explore the availability of resource materials and conservation methods for these medicinal plants.

1.4 Background into the study

I grew up in Uganda with a grandmother who had a good knowledge of medicinal plants. She used to grow some of these plants in a garden that was at the back of our house. Apart from inoculations I do not remember a single day in her last fourteen years of life with me, going to a medical clinic for treatment. She knew the right herbs to give me whenever I suffered from a cold, stomachache, malaria or any other ailments. Unfortunately, she died with her knowledge and left me too young to have thought of recording it. However, I happen to have excelled in chemistry at high school, majoring in it in my undergraduate course and pursuing it in this postgraduate course. Now that I have become of age as a researcher, I see it as an opportunity to introduce knowledge similar to what my grandmother had in the science curriculum.

Among others, learners could make better sense of their world if indigenous knowledge of medicinal plants is introduced into the Natural Sciences. It would bring about a shift from a traditional approach to an Outcomes Based Education approach, on which Curriculum 2005 is based. Also the Curriculum Framework Document of September 1996 (as quoted in South Africa 1997b: 37) stipulates that it will become each individual school's responsibility to develop their own learning programmes. However, Hunkins & Ornstein (1993:18) warn that because schools usually adapt conservative and cognitive designs to curriculum, highly liberal and humanistic designs are likely to have problems in most formal settings. Furthermore, the integration process is likely to raise questions about the scientific nature of indigenous knowledge and accessibility of resource materials by the curriculum implementers. These questions are likely to be raised by those people or departments who feel that indigenous knowledge and science are two different subjects. Lastly, little has been written down about the indigenous knowledge of medicinal plants. This could mean that resource materials are likely to be scarce.

1.5 Clarification of key concepts

1.5.1 Defining Science

According to Barba (1995:217) science is the process of “finding out.” She maintains that it is the art of interrogating nature, a system of inquiry that requires curiosity, intellectual honesty, skepticism, tolerance for ambiguity and openness to new ideas and the sharing of knowledge. The Oxford dictionary also defines science as a branch of knowledge requiring systematic study and method. Hence accepting indigenous knowledge of medicinal plants as science raises a need to find out more about this knowledge and accommodate the ambiguity that surrounds it as it is integrated into mainstream science popularly known as western science.

1.5.2 African Science

This study will use the term African Science to refer to the science that has its origin in Africa, which is imbedded in African traditions and beliefs. Many researchers who include Urevbu (1984) and Fako *et al.* (1990) use a term “traditional practices” of Africans to refer to their indigenous knowledge of medicinal plants. On the other hand pharmaceutical knowledge of the same plants is seen as western science. The term “traditional practices” does not only degrade the science within these practices, it also hinders efforts to close the gap between these two sciences.

1.5.3 Indigenous knowledge

Heyd (1996) in Masuku (1999:9) acknowledges a dichotomy that draws a line between indigenous and western knowledge. However, he asserts that all scientific knowledge is clearly not western and not all-western knowledge is scientific. It can be argued along this vein that some indigenous knowledge constitutes science and this knowledge could have been and can still be the stepping-stone for western scientists. Furthermore, Ulluwishewa (1993) in Mtshali (1994:4) views indigenous knowledge as a people-derived science that represents people’s creativity, innovations and skills. In light of the above statements, indigenous knowledge is approached in this study from an understanding that it is knowledge that:

- ◆ may link the gap between African science and Western science,
- ◆ may motivate African learners into liking science, which could improve on their poor performance,
- ◆ could lead to the conservation of the environment and
- ◆ could enrich learners in understanding and contributing to the dynamic nature of culture.

1.6 An outline of the study

This piece of work comprises of 7 chapters. Chapter 2 reviews the literature on the nature of science, closing the gap between African science and Western science and it also looks at Constructivism as a theory underlying the implementation of Curriculum 2005, which is based on OBE. Chapter 3 deals with the methodology involved in the case study that uses a qualitative interpretivist approach. It justifies choice of a research site and informants. It also discusses instruments used, constraints and the strengths of the study. Chapter 4 presents the data gathered on factors that influence the integration of indigenous knowledge of medicinal plants into a learning programme for grade 9 General science. The data collected are analysed in chapter 5. Thereafter a discussion of the results follows in chapter 6 leading to a conclusion and recommendations in chapter 7.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

New sources of pharmaceuticals are developing as a result of continued research in African traditional medicines that are dominated by medicinal plants. Through this research, several biologically active compounds have been found in South African plants. Rabe & van Staden (1997:81) note that a large proportion of the South African population use traditional medicine for their physical and psychological health needs. Rabe & van Staden (*ibid.*) realise that with increasing acceptance of traditional medicine as an alternative form of health care the screening of medicinal plants for active compounds is very important.

Hence this chapter will seek to review literature on the nature of science, the debate on closing the gap between traditional and western sciences. It will examine the characteristics of Outcomes Based Education, on which Curriculum 2005 is based. It will then explore the issue of integrating environmental education along with indigenous knowledge into the science curriculum. Lastly it will look at the uses of and reasons for using medicinal plants.

2.2 The nature of science

Rubba & Anderson (1978) in Barba (1995:6) identified six characteristics of scientific knowledge:

- ◆ ***Amoral:*** scientific knowledge itself cannot be judged as morally good or bad;
- ◆ ***Creative:*** scientific knowledge is the product of human creativity;
- ◆ ***Developmental:*** scientific knowledge is tentative, that is, it is the best possible explanation of phenomena, based on what is currently known;
- ◆ ***Parsimonious:*** scientists explain phenomena in terms of simplicity rather than complexity;
- ◆ ***Testable:*** scientific knowledge is capable of being tested; and
- ◆ ***Unified:*** scientific laws, theories and concepts are interrelated.

All these characteristics have a bearing on the nature of indigenous knowledge of medicinal plants as a science.

Indigenous knowledge in and of itself is neither good nor bad; rather it is how we perceive it and how much we know about it that causes moral dilemmas. Fako *et al.* (1990) note that traditional medicine, which is dominated by medicinal herbs, is associated with primitive practices including witchcraft that is seen as bad. However, many researchers including van Wyk (1998) have carried out studies that have confirmed the presence of active ingredients in most medicinal plants used by herbal practitioners and traditional healers worldwide.

Indigenous knowledge of medicinal plants is a creative enterprise, which encourages us to use our intellect, sometimes with the help of ancestors, to solve real world problems. In April 2000 traditional healers from all over Africa held a workshop in Durban on a cure for AIDS patients. Although the press did not reveal the outcome of the workshop, such a summit gives African healers a chance to discuss the creativity within indigenous knowledge from different cultures on the continent.

As a science, indigenous knowledge could be failing to be developmental. It seems that a new generation does not add to the knowledge of the previous generations. Instead, knowledge is transmitted from the previous to the new generation and in most cases orally. Furthermore, due to intellectual property rights, there is knowledge about medicinal plants that traditional healers cannot divulge to the public. It is feared that if the trend continues in this manner without documentation, useful indigenous knowledge on medicinal plants could be lost and chances for it to develop into a science would be jeopardized.

2.3 Closing the gap between traditional science and western science

Authors such as Odhiambo (1972), Tegede & Okebukola (1991) as cited in Dzama & Osborne (1999:387) contend that there is a conflict between science, African traditions and African worldviews. They maintain that this conflict is an important factor in determining the poor performance of African learners in science. Urevbu (1984) moderately notes that learners who originally do not come from the west perform poorly in Western Science. However, Dzama

& Osborne (1999:389) distance themselves from the above authors. They argue that the conflict between science and traditional beliefs is not only a problem to Africans, but with even the English, Japanese and Indians. They cite examples of developed countries such as Japan and England where improvement in the performance of students followed rather than preceded industrial and technological development. They stress that poor performance in science is caused by an absence of vocational incentives rather than conflict. On the other hand, Peng (1995) carried out a study in USA on why Blacks, Hispanics and American-Indians had lower achievement test scores in science and mathematics than other students from a Western cultural background. One of the major findings was that most of these students came from poor families, who had fewer learning materials such as books and computers at home. Based on the views of the authors above, it can be argued that there are several factors that contribute to the poor performance of learners in the science subjects in different countries and on different continents.

Turnbull (1997:551) recommends that science be recognised as a set of practices so as to develop a framework within which all knowledge systems can be equitably compared. Peat (1997:563) acknowledges that European consciousness is a way of thinking and behaving that has had an influence across much of the globe. However, he states that traditional cultures have enormous power and, in the end, may transform or renew our own technological society. Elsewhere, Turnbull (1997:552) concurs with Peat (*ibid.*) and maintains that in the general sense of systematic knowledge, science was never uniquely western; it has its origins in a wide variety of cultures including Islam, Indian and Chinese.

There are those who recognize the differences between knowledge systems but are not concerned to find ways in which they can co-exist. It is in this vein that Hutchings (1996:v) quoted the late Dr. M.V. Gumede, a medical practitioner as saying:

What is little appreciated is that there is no conflict between the two systems, vis-à-vis, the old and the new or the traditional and the modern systems of medicine. The two apparently contradictory systems are only complementary. Where one fails the other takes over. Each needs to understand the working of the other one. (M.V. Gumede 1990)

In a way Gumedde (1990) appeared to answer a question about the accommodation of alternative viewpoints from both the African science and Western science that was put forward by Peat (1997:566). Peat (*ibid.*) raised the question after he had been struck by the way Blackfoot science existed with the new western science such that their traditional vision and metaphysics survived untarnished. Mwamwenda (1995:430) asserted that Africans have chosen to be a dynamic society that utilises Western science while living their cultural heritage. Both Peat (1997) & Mwamwenda (1995) maintain that cultural heritage, which includes sacrifices, ceremonies and acts of renewal have nothing to do with the mechanical world but are more to do with a relationship to a living cosmos.

Peat (1997:568) further notes that plants have the power to heal. Healing involves a relationship between man and the entire plant. This includes its power, energy, and spirits. According to Peat (*ibid.*), the Blackfoot, who are Native Americans, speak of their traditional ways as a science that embraces society and good government, with a norm of balance and harmony. He notes that indigenous science of the Blackfoot includes metaphysics of the reality in which they live, a set of relationship with the natural world, a deep understanding of their immediate environment and a technology appropriate to their lifestyle. Such a science is common to traditional people worldwide. Unfortunately, little is known about these people's science, which is richly integrated with environmental education.

Peat (1997:570) maintains that our modern world exhibits much that we now desire to change. Yet there is a great deal to be proud of in indigenous science and technology. He recommends that radical changes require a shift in perception and a transformation of consciousness.

However, as long as indigenous science is only employed in a fragmented way it will make little impact on the western mind. Sarup (1993:133) predicts that in the post-modern age science will probably strengthen its pre-eminence in the arsenal of productive capacities of the nation states and the gap between developed and developing countries will grow even wider.

Sarup (1993:135) maintains that there are two types of knowledge, the scientific knowledge and narrative knowledge obtained from popular stories such as myths and legends pre-eminent in traditional societies. It appears that Sarup associates scientific knowledge with the modern technological world and the narrative knowledge with the pre-industrial era. Sarup (*ibid.*)

further asserts that though both types of knowledge are equal, the main difference between scientific knowledge and narrative (non-scientific) knowledge is that the former requires one language to play the game. By this, she probably refers to the rigidity that surrounds defining scientific knowledge, which is seen as knowledge that uses careful and systematic study, observations, and tests of conclusions. However, Doll (1993), an advocate of post-modernism warns that defining may be problematic, as definitions tend to limit and close rather than generate and open. Hence from a post-modern perspective, the difference between indigenous knowledge of medicinal plants that Sarup refers to as narrative knowledge and scientific knowledge could be seen as minor. It is along this vein that one can be justified in integrating the indigenous knowledge of medicinal plants into the science curriculum.

Furthermore, one of the most important points noted in the national statement about an effective contribution to education in South Africa (1997b:9) is the commitment of the Natural Sciences Learning Area to broaden the access to material, resources, knowledge acquisition and conceptual development. In order to get there, the National Department of Education in South Africa is in the process of implementing a new curriculum based on Outcomes Based Education (OBE) that is to replace the traditional curriculum. The following section looks at the definition of OBE, its characteristics, constructivism as the theory guiding it and problems that educators face when conceptualising OBE.

2.4 Introducing Outcomes Based Education (OBE)

2.4.1 Defining OBE

Musker (1997:10) states that an official definition in the NQF Discussion Document (1996) of OBE is given as follows:

Outcomes-Based Education and training requires a shift from teacher input (instructional offerings or syllabuses expressed in terms of content) to focusing on learner outcomes.

Dr. Roy Killen of the Newcastle University in Australia also gave a similar explanation when he met Rhodes University students (Killen 1999 pers.comm.). He argued that OBE was a way

of thinking about education where pupils had to understand what they were doing rather than memorise a textbook. It would appear that OBE is learner-centred and is orientated to outcomes with a belief that all individuals can learn.

2.4.2 Characteristics of Outcomes Based Education

According to an Education Department document on OBE (in South Africa 1997a:17), there are six characteristics of Outcomes Based Education:

- ◆ What a learner is to learn is clearly identified. There is a clear focus on culminating outcomes of significance.
- ◆ Each learner is given time and assistance to realize his /her demonstrated achievement.
- ◆ Emphasis is on achievement of outcomes and application of the learner rather than on covering material.
- ◆ Each learner's needs are accommodated through multiple teaching and learning strategies and assessment tools.
- ◆ Each learner is provided the time and assistance to realize his/her potential.
- ◆ All learners work to become more responsible for their own learning. Time is viewed and applied as a variable, while learning is a constant.

Educators are used to a traditional education system where everything is based on a pre-arranged time framework. They are likely to face challenges with the characteristics that concern provision of time to enable each learner to achieve their outcome and realise their potential. Furthermore, in the process of waiting for each learner to catch up with others as implied in the second characteristic above, impulsive learners may become frustrated, something that could lead to their underachievement. However, it is not known whether Curriculum 2005 intends adopting all the above OBE characteristics.

- According to Spady and Marshall (1991:67) and Spady (in Kuiper 1999:1), Outcomes-Based Education (OBE) is founded on three basic premises:

- ◆ All learners can learn and succeed but not the same day, in the same way.

- ◆ Successful learning breeds more success.
- ◆ Schools control the conditions of success.

If one were to focus the first premise on science subjects that are poorly passed by African learners, it would appear that even the weakest student could succeed given some time in a certain way. According to my teaching experience over the years, I find it difficult to believe in this premise. Furthermore, Spady & Marshall (*ibid.*) fail to cite some of the ways to success that could possibly include the integration of indigenous knowledge into the science curriculum. On the other hand, the premise in essence purports that there is a need to consider a variety of teaching and learning strategies together with different assessment techniques.

I would also argue that a learner, who succeeds in a certain topic in science, might not necessarily succeed in the next topic. In view of this argument, there is a need to rephrase the second premise to ‘Successful learning **may** breed more success’. Furthermore, I am concerned with the term ‘schools’ in the third premise. There are some questions that these authors may be required to answer, such as; which schools are these? Does ‘schools’ refer to stake holders that include the Department of Education, School Governing Body, its parents, teachers and learners? If the answer to the previous question is yes, is the term not too general to apportion failure of learners to teachers, as done by the Department of Education?

2.4.3 Constructivism as a theory behind Outcomes Based Education

Scott *et al.* (1992) are of the view that constructivism is a theory that is aimed at changing and developing learners’ conceptions from their informal ideas to those of accepted school science. Also Driver & Erickson (1983) contend that it embraces epistemological issues that deal with conceptual framework of learners, their origins and the methodological issues in the documentation of conceptual frameworks. The learners’ informal ideas and their conceptual framework usually build over time in their local surroundings and are imbedded in their cultural backgrounds. Judging from these views, it appears that constructivism does not only challenge the transport metaphor, which sees knowledge as a package to be conveyed from teacher to learner, but it may prove a vital tool in closing the gap between different cultural ideologies and views.

Kahn (1995:444) asserts that the National Department of Education in South Africa chose social constructivism as a philosophy underlying the design and implementation of Curriculum 2005. One of the reasons given by Kahn (*ibid.*) was 'to incorporate the core values of democracy that are characterised by equity, non-racism and non-sexism'. Probably Kahn was of the view that accommodating learners' informal ideas that are imbedded in non-Western cultures, in a subject like science based on Western culture, would bring about equality in cultures and stop racism and sexism.

2.4.4 Challenges educators face in conceptualising constructivism in a multicultural classroom

The studies carried out on African-American learners by Stewart & Benson (1988) and on Native American learners by Harris (1985) as cited in Barba (1995:13) indicated that the child's culture influences interactions with educators and the way they construct knowledge in the classroom. Barba (*ibid.*) maintains that culturally diverse learners sometimes find that their ways of thinking, knowing, and interacting are unacceptable in the elementary science classroom. It would seem that educators have a task of understanding the different cultural views that their learners bring to the classroom. Furthermore, they have to bring these views together before moving on to the accepted school science views.

2.5 A multicultural enrichment to learning

Coutts (1992:97) defines culture as a body of ideas, beliefs, values, activities and traditions that are common to a group of people. He maintains that it is dynamic and usually transmitted from generation to generation. Elsewhere, Coutts (1992: 91-2) is of the view that it is the meaning of 'culturally neutral' to each particular group that can give a multicultural enrichment to learning. Probably by using this term, Coutts (*ibid.*) refers to the tolerance and understanding of what is enshrined in a culture of each cultural group.

Among the suggestions Coutts (1992) lists on how to offer multicultural education are the following, which can be linked to the integration of indigenous knowledge of medicinal plants:

- ◆ Themes that are of interest to many cultures might be selected.
- ◆ The cultural identity of each child should be reaffirmed.
- ◆ Issues that are of special importance to a particular culture might be open to discussion.
- ◆ Reasoned persuasion should be used in accepting the reality of diversity.
- ◆ To achieve an exchange of ideas, the teacher might use partner, group or class work in an open framework, with the expression of viewpoints and opinions encouraged.

2.6 Instructional language

Barba (1995:15) asserts that new knowledge can be integrated with existing knowledge only when existing knowledge (which may have been constructed in the learners' native language) is restructured and learners elaborate on what they already know. She advocates learners' use of their 'home language' in small group settings as a way to encourage them to bring their 'home learning' to class and combine it with 'school learning'. Although evidence that relates language with construction of knowledge is not conclusive, studies on the use of a mixed-language approach that were carried out by Rollinick & Rutherford (1996:102) among Swati speaking learners and by Muwanga-Zake (1999:153) among Xhosa speaking learners, were a success in helping their learners understand the implications of concepts.

Mtshali (1994), Ngwane (1999) and Masuku (1999) carried out studies that demonstrated how indigenous knowledge could be integrated into environmental education. In those studies the mixed-language approach was used when referring to names of some common medicinal plants. Also, they considered how such knowledge could contribute to the development of environmental education, a subject that has already been integrated into the science curriculum.

2.7 Integration of environmental education in science

The lack of relevance in both the content of the school curriculum and the examinations led to reforms in examination systems in the Southern African Development Community (SADC)

(Njabili 1997:131). Masango (1997:173) contends that in Zimbabwe, the science project contributed to the division of the national science syllabus into three sections, which were of use to all pupils. They included Science in Energy sources and uses, Science in the Community and Science in Structures and Mechanical systems. These sections covered the main areas in which pupils could become employed.

Ogawa (as quoted by Masango 1997:166) points out that the goal of scientific and technological literacy is featured in non-western countries who are said to have lost the freedom to exclude science in their own culture, because science and technology have become a culture spread worldwide. Most countries in Africa view science as an important and effective agent in development, not only of human resources but of the nation as a whole. Hernandez (1990) in Masango (1997:166) points out that science education has been ranked as one of the most important areas after literacy and numeracy. However, UNESCO (as quoted by Masango *ibid.*) contends that science education is not partaking, as it should, of the local environment, the socio-cultural background and the occupational patterns prevalent in the country. It is criticized for being insensitive to social cultural issues such as language, gender and attitude. It is in this light that science curriculum changes worldwide are aimed at accommodating the socio-cultural issues and environmental education.

Probably, closing the gap between traditional science and western science in an attempt to empower South African learners in acquiring a positive attitude towards science would be to integrate knowledge about plants used for food, medicine, perfumes and cosmetics in cultural settings into their school science. In order to gain an understanding of indigenous science knowledge and values, ways have to be established in which the poor and marginalized can present their realities to those in power and be believed, so as to influence policy and make a difference.

Ngwane (1999:31) notes that lack of indigenous knowledge is a socio-cultural factor that has contributed to a decrease in indigenous plants. Knowledge about the importance of certain plants to man is losing its value; people are being detached from their environment and only read about its importance in papers. They do not see themselves directly involved with nature and as a result they take more from nature than it can replenish.

Another factor might be the exposure of the youth to electronic media, which provides an

alternative form of recreation. Ngwane (1999:32) insists that the young generation has erroneously been deprived of this knowledge about their immediate environment due to modern development.

Bellany (1989) in Goodall (1994) gives the following reasons for the importance of the environment:

- ◆ A need for a diverse gene bank, especially to ensure continued food production.
- ◆ All life depends ultimately upon food production by plants, which use the sun's energy.
- ◆ Diverse habitats are little studied and may contain unknown sources of medicine.
- ◆ Humans seem to need wild places for spiritual and physical well being.

Best (1994:51) claims that environmental education furnishes suitable means for introducing science in user-friendly fashion. However, those inspired by it, with time encounter difficulty when attempting to pursue that interest at a higher-level course because of the science content involved. Best (*ibid.*) maintains that the crux of environmental education is the interaction between human and natural systems, in which relationships involve dependence, partnership and dominance. Environmental education intervenes in the dynamics of the situation manipulating process to the advantages of the future of both natural and human systems.

2.8 Reasons for learning about medicinal plants

2.8.1 Reasons given by a family physician

Kliger (1998:1064) a scientist practicing as a family physician, gave the following three reasons for learning about herbal medicines:

- ◆ About 60 million adult Americans regularly use herbal medicinal supplements. The principles of patient centred and comprehensive care require that patients be asked about this practice.

- ◆ Herbal medicinal supplements and conventional medications may have significant interactions and complications that need to be documented in order to deal with them responsibly.
- ◆ Herbs might provide an effective alternative when conventional medicines have not been well tolerated because of side effects.

2.8.2 Cultural aspects of healing

South Africa is a nation with a rich cultural diversity that comprises of Western, Eastern and African cultures. This diversity is also reflected in its approach to medicine. It would appear that each culture uses its own solutions for the preventive, curative and promotive aspects of health in a way that resonates in harmony with its particular worldview. Below are some of the natural therapies used in South Africa and even in Western countries, which have origins in the East:

Acupuncture	It is a system of treatment rooted in ancient Chinese thought, which seeks to rebalance energy by inserting needles in points on the body's meridians (energy channels).
Ayurvedic medicine	It is a 4,000-year-old traditional Indian system in which diet and therapies such as herbal inhalation and massage are dictated by individual body's type.
Hydrotherapy	The use of water's healing powers includes the medical use of mineralized waters and the application of heat and cold amongst other treatments.
Herbal medicine	The use of herbs for medicinal purposes dates back at least 5000 years according to ancient Chinese and Egyptian records.

2.8.3 Efficacy and safety of medicinal plant products

A growing number of people now realize the importance of health and fitness and are taking more responsibility of their own health (Stanway 1987:10). This realization has come with a dramatic shift in public opinion in favour of natural medicine. According to Stanway (1987:10) the term natural medicine covers a wide range of different therapies and medical practices. These medical therapies include homeopathy, herbalism, aromatherapy, Bach flower remedies, naturopathy, hydrotherapy and traditional medicine.

Stanway (1987:13) maintains that today it is precisely in those countries with a long history of orthodox medicine that most of the newer natural therapies have originated and it is there that interest in the possible alternatives including old therapies that are characterized by indigenous knowledge is most widespread. Busse (2000:15) shares the similar view and he notes that the interest in herbal products is due to more available evidence regarding their safety and efficacy. Elsewhere, Busse (2000:22) further asserts that since the quality of herbal preparations is a key parameter for safety and efficacy, it is important to characterise the active ingredients and define suitable ranges. Ernst (1999:87) concurs with Busse (*ibid.*) when he notes that whereas some herbal treatments are safe at a recommended dose, others are associated with adverse effects and most of them can cause problems when overdoses are taken.

2.9 Areas of agreement among the different disciplines concerning complementary medicine

Firstly, complementary medicines that are referred to as natural remedies tend to be more holistic in approach than is the orthodox system. While orthodox medicine focuses on a disease, healers who use complementary medicine treat the whole person, healing mind and spirit.

Secondly, most natural remedies are safe and non-toxic and are thus more suitable for self-medicine than orthodox medicines, which can have unpleasant side effects. One criticism often leveled at complementary medicine by the orthodox medical profession is that these remedies

are not only harmless but also useless and patients get better because of a placebo effect.

Thirdly, most natural therapies stress the body's innate capacity for self-healing. Also many remedies are directed at strengthening the body, soon healing and reverberating its energy flow rather than at fighting disease or curing symptoms as such.

Natural medicine practitioners generally encourage their patients to understand as much as possible about why they are ill, and usually take an active part in their own recovery process whether through diet, and/or specific exercises in relaxation. This approach is facilitated by the length of time a natural therapist generally spends with his or her patient. It has been estimated that on average a natural therapist takes at least eight times more over a consultation than does the average orthodox health professional.

2.10 Reasons for not knowing about the uses of medicinal plants

Mtshali (1994:52) carried out a study on reasons for not knowing about the uses of medicinal plants in two rural black communities in Natal. She pointed out that informants, who did not acknowledge the uses of medicinal plants, might have belonged to organizations, which do not encourage the use of traditional medicine, such as some mainstream churches. Another reason she suspected was that of pleasing her by those who might have thought that she was associated with organisations that are opposed to the use of traditional medicines. However, she failed to acknowledge that some of her informants did not genuinely know because of either preferring to use pharmaceutical drugs to traditional medicine or they could have grown up in an area that was scarce of medicinal plants.

Furthermore, Fako *et al.* (1990:15) note that many discussions of traditional medicine often lead toward discussions of witchcraft. Such discussions are often motivated by a concern about fraud, harmful customs and rituals believed to be associated with traditional medicine. Also, they are associated with an undocumented widespread belief among Africans in witchcraft as a source of illness in many traditional systems of thought.

Thorpe (1993:108) asserts that a traditional Zulu healer, whose training is largely in the finding

and preparation of certain herbs and other medicines, can take as long as 15 to 20 years to become a qualified 'inyanga'. Yet in the *Guidelines on the conservation of medicinal plants* (1993:21), in some countries, housewives traditionally grow a range of herbs essential for the health care of their families in pots around their houses. It appears that knowledge of some medicinal herbs may not need long time training. These medicinal herbs could be similar to medicinal drugs sold in supermarkets that do not need a prescription from a doctor.

2.11 Uses of some common medicinal plants

There are so many different medicinal plants used in almost each and every country throughout the world that they cannot be exhausted in this piece of work. However, I have decided to tabulate names and uses of the common ones in the subsections below:

2.11.1 Common medicinal plants that are used worldwide

Certain countries can claim to be origins of some of the commonly used medicinal plants. The table below shows some of the internationally recognized medicinal plants compiled by Prof. Ernst (1999:85) & Duke (2000) foreign to South Africa but can be grown and are used by some South Africans:

Table 2.1 Internationally recognised medicinal plants

Botanical name	English name	Country of origin	Medicinal use
<i>Hypericum perforatum</i>	St. John's Wort	European countries	mild depression
<i>Allium Sativum</i>	garlic	cultivated worldwide	controls high cholesterol, allergies, vaginitis and relieves rheumatism
<i>Panax ginseng</i>	ginseng	China	general health promotion, sexual function fertility and athletic ability
<i>Ginkgo biloba</i>	g i n k g o biloba	China and Japan	circulatory disorders, allergies and dementia
<i>Zingiber officinale</i>	ginger	South East Asian countries	arthritic pain, nausea, vaginitis, slows the processes of atherosclerosis
<i>Echinacea angustifolia</i>	echinacea	USA	nasal inflammation, bronchitis, earache promotes wound healing and stimulates the immune system
<i>Cannabis sativa</i>	dagga	India and Middle East countries	unblocks a congested chest
<i>Tanacetum parthenium</i>	feverfew	European countries	inflammatory diseases, migraine headache

2.11.2 Common medicinal plants used in South Africa

Some common medicinal plants in South Africa are called different names and at times have different uses amongst different cultural groups. The following table shows some of the nationally recognised medicinal plants in South Africa that were compiled by Roberts (1990) & van Wyk (1998):

Table 2.2 South African common medicinal plants

Botanical name	English name	Afrikaans name	Xhosa name	Medicinal use
<i>Agathosma betulina</i>	Buchu	Boege	ibuchu	Treats kidney and urinary tract diseases
<i>Hypoxis argentea</i>	African potato/Star flower	Geel sterretjie	I l a b a t e k a / Inongwe	Boosts the body's immune system
<i>Aloe ferox</i>	Cape Aloe/ Bitter aloe	Kaapse aalwyn/ bitteraalwijn	iKhala	Leaf juice is used to treat burns and venereal sores
<i>Acacia karoo</i>	Sweet thorn	Soetdoring	umNga	Treats diarrhoea and is used as a remedy for colic, heartburn and flatulence
<i>Asparagus africanus</i>	Wild Asparagus	Haakdoring	Itali/ Umathunga	Used for rheumatism and pulmonary tuberculosis
<i>Cannabis sativa</i>	Dagga		Intsangu	Unblocks a congested chest
<i>Cotyledon orbiculata</i>	Pig's ear cotyledon	Plakkie	Iphewula	Heals wounds, soothes earache and toothache
<i>Clematis brachiata</i>	Traveller's joy	Klimop	iTyolo	Eases painful sinuses and headaches

2.11.3 Common medicinal plants used in the Eastern Cape Province

The table below compiled by Cocks & Dold (1997) shows some of the commonly used medicinal plants on human beings in the Eastern Cape Province:

Table 2.3 Eastern Cape province's common medicinal plants

Botanical name	English name	Afrikaans name	Xhosa name	Medicinal use
<i>Hypoxis argentea</i>	African potato	Geel sterretjie	Ilabateka	Used in anti-cancer therapy and boosts the immune system
<i>Acacia karoo</i>	Sweet thorn	Witdoring	umNga	Cleanses blood Back chewed to relieve stomach ache and bloody stools
<i>Aloe ferox</i>	Cape Aloe	Kaapse aalwyn	iKhala	Cleanses the stomach and kidneys Sap stops child from breast feeding
<i>Haemanthus albiflos/Asparagus africanus</i>	Wild asparagus	Haakdoring	uMathunga	For healing broken bones
<i>Marrubium vulgare</i>			uMhlonyane	Soothes coughing
<i>Gasteria bicolor</i>			iNtelezi	Used to drive away bad spirits
<i>Rhoicissus digitata</i>			uChithibhunga	drives away evil spirits
<i>Senecio deltoides/Clematis brachiata</i>	Old man's beard	Klimop	iTyolo	Applied on pimples and other skin complaints

2.11.4 Common medicinal plants used on livestock

There are some medicinal plants that are used by human beings that can also be used on their livestock. Others are specifically used on livestock. The table below shows medicinal plants commonly used on livestock in the Eastern Cape Province that were compiled by Masika *et al.* (2000:87):

Table 2.4 Medicinal plants commonly used on livestock

Botanical name	Xhosa name	Part used	Medicinal use
<i>Aloe ferox</i>	ikhalana/ikhala	leaf	treats redwater and intestinal worms
<i>Hippobromus pauciflorus</i>	ulatile/ ilabateka	leaf	treats eye inflammation
<i>Asparagus africanus</i>	umathunga	leaf	treats broken bones
<i>Pittosporum viridiflorum</i>	umkwenkwe	stem bark	treats gallsickness
<i>Hibiscus malacospermus</i>	umasangelo	root	treats retained afterbirth

It appears from the table that *Aloe ferox*, *Hippobromus pauciflorus* and *Asparagus africanus* that were noted in the previous tables to be used by human beings can also be used on livestock.

2.11.5 Common poisonous plants

There are some poisonous plants that are claimed to have medicinal properties. In order to be informed about these plants that may be a threat to animals as well as human beings, Williamson & Wyandt (1999:4) and Louw (1999:51) compiled the following table:

Table 2.5 Some poisonous plants and their effects

Botanical name	English name	Poisonous part	Effect
<i>Nerium oleanders</i>	Oleanders	entire plant	heart palpitations
	Thorn apple	seed	hallucinations followed by fatal convulsions
	Century plant	bulb	hallucinations
	Morning glory	seed	hallucinations
<i>Symphytum officinale</i>	Comfrey	leaf	obstruction of blood flow to the liver, can lead to death

2.12 Summary

The first chapter explained what the study is about and presented reasons for its being conducted. This second chapter has reviewed literature on the nature of science and how the gap between traditional science and western science can be closed. It has looked at Outcomes

Based Education and the possibility of a multicultural enrichment to learning. Reasons for learning about medicinal plants have been laid down. Furthermore it has indicated areas of agreement among the different disciplines concerning complementary medicine. It has ended with lists of tables on some common medicinal plants used worldwide, in South Africa and in the Eastern Cape in particular. A table of medicinal plants used on livestock and a table of poisonous plants have also been included.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

I have conducted my fieldwork from an interpretivist perspective. Being aware that the community in which the study is based is unique, I have described this research at one school in the Eastern Cape Province in terms of a case study. The characteristics, as noted by Anderson *et al.* (1994), of such a study are qualitative research methodologies of which the most important are observations and in-depth interviews. To complement the data, it was necessary to use instruments of written artifacts of learners, journals, books and photographic evidence. A multiple data collection technique popularly referred to as triangulation in Cohen & Marion (1994:23), was achieved by the use of questionnaires.

This chapter explains why an interpretivist approach was chosen and how the various research instruments were used in compiling this case study. It also includes my strengths and weaknesses, which shaped the research. I start with the justification of an interpretivist perspective.

3.2 Justifying a qualitative interpretivist approach

The study portrays the complex pattern of identifying factors that influence the integration of indigenous knowledge of medicinal plants into the science curriculum in sufficient depth and detail. It required of me to frequently interact with the informants so as to maximise the investigation. Ary *et al.* (1990:444) share a similar view and they contend that findings of a qualitative study are simply a matter of opinion. To counter such a charge a variety of techniques will be employed to demonstrate the consistency of the results. Lincoln & Guba (1985:225) contend that the interpretive paradigm has a design that emerges, develops and unfolds. Furthermore, it emphasises an understanding and interpretation of complex interrelations between social structures and the meanings people give to the phenomena (Cantrell 1993:101).

3.3 Justification of a case study

I have decided to name my research a case study after realizing the uniqueness and the complexity it involves. Johnson (1992:84) who holds that the purpose of a case study is to understand the complexity and dynamic nature of an entity, which can be a learner, teacher, or programme, supports this view. She maintains that it is also used to discover systematic connections among experiences, behaviours, and relevant features of the context. Furthermore, Hitchcock & Hughes (1995:321) reveal that an interpretive case study is not only rich in detail, it is used to develop conceptual categories or to illustrate, support or challenge existing assumptions that were held before the start of data collection.

3.4 The choice of research sites and informants

I decided to choose the school where I am currently teaching to be my central research site. I found it a convenient place in which an investigation of factors in the integration of indigenous knowledge in the learning programme for grade 9 could be carried out in a natural setting. By a natural setting, I refer to a setting where most of the informants were known to me before embarking on the study. The informants at the school included 40 out of the 50 grade 9 learners whom I had taught the previous year while still in grade 8 and 14 out of the 26 educators who had been colleagues for about a year. It is with regret that I could not include the views of the 10 learners who had either not yet returned from the June holiday or had made several mistakes in answering the learner questionnaire and the 12 teachers who, due to their tight programmes coupled with lack of interest, failed to answer the teacher questionnaire and were not available for interviewing.

Other informants included a sangoma whom I had known for about a year, a herbal practitioner who is popular on a local radio station programme and two traditional non-South African healers from different African countries. The study brought me closer to these two healers when they revealed to me some of what they knew and said about the uses of medicinal plants. All these informants were serving the community of and around the semi-urban area. Also the views of 2 parents who were in their sixties, were sought. The inclusion of parents is in line with the current expectation that parents must be partners in decision-making processes and

their implementations (Heystek & Louw 1999).

The data obtained from the school informants and the community members in the township were triangulated with that of two academicians, one a taxonomist and the other a professor in pharmacognosy at a university in the Eastern Cape province.

3.5 Research instruments used

Several instruments were used in this study. However, not all of them could be used on each informant. The following table summarises how each instrument was used with the different types of informants:

Table 3.1 Instruments used with different types of informants

Instrument	Type of informants
Questionnaires	Learners and teachers
Observations	Traditional healers
Interviews	Principal, academicians, traditional healers, herbal practitioner
Focus groups	Learners and teachers
Artifacts	Learners
Field notes	All informants
Research Journal	All informants

A discussion of each instrument follows below:

3.5.1 Questionnaires

According to Charles (1995:175), a questionnaire is used to obtain information from informants who cannot be interviewed personally because of distance or time constraints. In this study, the learner and teacher questionnaires were used as a result of constraints in meeting informants during favourable time intervals. Charles (1995:32) further notes that a Likert scale is used to assess attitude or opinion and it is useful in questioning. Hence statements in the learner questionnaire were arranged on a Likert scale of five in order to

assess the learners' attitudes and opinions.

Standardised questionnaires from the Human Science Research Council (HSRC) are known for their validity and reliability. However, I could not use them due to time constraints. To ensure validity and reliability of the learner and teacher questionnaires, two friends who had designed similar questionnaires before cross-examined them for me.

The learner questionnaire and teacher questionnaire were administered to some learners and some teachers respectively at X. Senior Secondary School. According to Walker (1993:91), questionnaires suffer some problems of mass production and lack interpretive opportunities. In order to counter such problems, the responses of the learners and teachers were followed by discussions carried out in the form of focus groups. The intention was to probe more into their knowledge and attitudes towards indigenous knowledge of medicinal plants along with its integration into the science curriculum.

3.5.2 Observations

The number of times I visited the three traditional healers interviewed in this study, were not in vain. It was like hitting two birds with one stone in that I observed and sometimes participated in their therapies and activities as I waited for a convenient day for the interviews. Cantrell (1993:93) asserts that observations render a researcher direct first-hand experience with the phenomena under study. My participation and insight enabled me to reflect critically on the nature of healing practiced by traditional healers.

3.5.3 Interviews

According to Anderson *et al.* (1994:170), interviewing is the main instrument used in case studies. This view is supported by Cantrell (1993:96) who explains that interviews can be grouped into structured interviews and unstructured interviews. Yet, Cohen & Manion (1994:271) assert that an interview is an unusual method in that it involves gathering data through direct verbal interaction between individuals. They further note that it has an advantage of allowing for greater depth than is the case with other methods of data collection. However, Cohen & Manion (*ibid.*) reveal that its disadvantage is that it is prone to subjectivity

and bias on the part of the interviewer, a problem that I feel is natural but can be minimised through triangulation.

The interviews conducted in this study range from informal to semi-structured interviews. In the informal interviews where the informants had been informed about the study, a number of key issues were raised in a conversational style. Yet in the semi-structured interviews, it was possible to change the sequence of questions and also change the wording. I found informal interviews more convenient, in that they were conducted in a cool and relaxed atmosphere where every one was at ease. Probably this explains why this piece of work comprises of more informal interviews than the semi-structured ones.

3.5.4 Focus groups

Kitzinger (1994) asserts that interaction between focus group informants stimulates an in-depth discussion and reflection on a topic. The data obtained from the two questionnaires in this study were not detailed. Hence I decided to discuss the learner questionnaire and teacher questionnaire with a group of learners and a group of teachers respectively. All the members chosen in both groups had shown a keen interest in the study and it was hoped that they could divulge more information concerning their attitudes and opinions on the statements in the two questionnaires.

3.5.5 Artifacts

Prior to administering the learner questionnaire, I gave grade 9 learners an assignment on medicinal plants (see appendix 1) in which they had to write down a name of a plant, part used, its medicinal use, where it is found and how it is prepared. One sangoma in the township helped me to work out a memorandum (refer to appendix 2) that I used in verifying the learners' entries (refer to appendix 3 for an artifact of a learner's assignment).

3.5.6 Field notes

Walker (1993) recommends that field notes are good in giving first hand information and in relating incidents. It was in this light that rough notes taken during the conversations held with

all the informants were entered in a book of field notes. The notes helped in recalling and extrapolating on whatever transpired during the discussions.

3.5.7 Research Journal

In this study I found a research journal useful in serving as an intermediary entry between field notes and thesis notes. It polished field notes, earmarked events and put the bits together.

3.6 Designing of questionnaires

3.6.1 Designing a learner questionnaire

The questionnaire comprised of 20 statements (refer to appendix 4) grouped into 7 categories that included: contributory factors for not using medicinal plants; knowledge of the link between medicinal plants and main stream science; knowledge of how medicinal plants can be conserved; views on who controls the intellectual property rights; enthusiasm of learners towards integration of indigenous knowledge of medicinal plants into their school science; knowledge of efficacy and safety of medicinal plants; and knowledge of the psychological healing of medicinal plants. The statements were arranged on a Likert scale of five and were divided into the 7 categories as shown in the table below:

Table 3.2 A category of statements in the learner questionnaire

CATEGORY	QUESTION NUMBER
Contributory factors for not using medicinal plants	10, 14
Knowledge of the link between medicinal plants and main stream science	2, 5, 19
Knowledge of how medicinal plants can be conserved	9, 15
Views on who controls the intellectual property rights	3, 6, 12, 17
Enthusiasm of learners towards integration of indigenous knowledge of medicinal plants into their school science	1, 4, 7, 13
Knowledge of efficacy and safety of medicinal plants	8, 16, 20
Knowledge of the psychological healing of medicinal plants	11, 18

3.6.1.1 Justifying the categorising, allocation and phrasing of the statements

The aim of dividing the 20 statements into 7 categories was to seek learners' attitudes and their opinions on a variety of issues.

Contributory factors for not using medicinal plants was chosen as a category to find out factors that could be clashing with integrating indigenous knowledge of medicinal plants into school science. The church doctrines and the negative attitude of some parents towards the use of medicinal plants were expected to be some of the major factors. Hence two questions 10 & 14 were set on each factor respectively.

In most cases, by the beginning of grade 9, learners have crude ideas on which subjects to concentrate on in order to pursue their chosen careers. It was in this light that a category of three questions; 2, 5 & 19 was chosen on the link between medicinal plants and mainstream science. Q2 was about whether one could study medicinal plants at university; Q5 sought their perception on whether learners in the rural area should be the only ones to study indigenous knowledge of medicinal plants and Q19 was set to determine if they were aware that some medicinal drugs are made from medicinal plants.

The fact that the literature review highlighted the urgent need to conserve medicinal plants that are increasingly in demand, this made me decide to have a category of two questions 9 & 15, on whether the learners knew how to conserve these plants in a traditional way.

Questions 3, 6, 12 & 17 were about perceptions of who should be the people to control or know more about the indigenous knowledge of medicinal plants. Questions 1, 4, 7 & 13 were on the enthusiasm of learners in integrating such knowledge into the science curriculum. These two categories of questions that dominated the questionnaire were aimed at finding out whether learners would like to be taught and if they would be interested in studying about indigenous knowledge of medicinal plants respectively, which in my view form the backbone of this study.

A category of questions 8, 16, & 20 on the efficacy and safety of the medicinal plants was included to probe their perception on the effectiveness, worth and safety of using these plants.

Lastly, a category of questions 11 & 18 on the psychological healing was included to find out about learners' beliefs on the unscientific traditional uses of medicinal plants, which are popular amongst some black Africans.

3.6.1.2 Designing a learner focus group

A few days after learners had answered the questionnaire, a discussion in the form of a focus group that comprised of 40 learners who had shown a keen interest in the study followed. These learners were divided into 8 groups. Each group consisted of 5 learners who included a secretary who had to summarise and write down their discussions and a time-keeper. Each statement was discussed along with other statements in the same category.

After the discussions within the groups, I decided to have a class discussion in which different views from the different groups were compared and contrasted. The section that follows below is about designing the teacher questionnaire and justifying the selection of statements in the teacher questionnaire.

3.6.2 Designing a teacher questionnaire

In designing the teacher questionnaire (refer to appendix 5), I had in mind that it ought to probe how much teachers knew about OBE, how it differed from the old type of education and what new subject matter could be integrated in the new curriculum based on OBE. Then it had to find out what teachers knew about medicinal plants and if such knowledge was related to ones' culture, a factor that some researchers such as Urevbu (1984) attribute to the poor performance of African learners in science. Also, it was designed to find out whether it was worth changing the present science curriculum. I then discussed these views with some of the male teachers. The discussion helped me to design 12 statements that are summarised in the table below:

Table 3.3 A list of statements in the teacher questionnaire

NO.	STATEMENT
1.	Knowledge of OBE principles.
2.	Reading through some grade 8 OBE books.
3.	Similarity in content between OBE books and the old ones.
4.	A need for in-service training as well as workshops.
5.	Knowledge of inclusion of African traditions and beliefs in the new curriculum.
6.	Indigenous knowledge of medicinal plants as part of one's culture.
7.	Cultural background as a contributory factor to learners' poor performance.
8.	Motivation of learners by integrating indigenous knowledge of medicinal plants.
9.	Curriculum changes will never belittle the major role of teachers in the success of their learners.
10.	The irresponsibility of learners to their learning can frustrate even the best teacher.
11.	A good knowledge of medicinal plants is only held by a particular group of people.
12.	Synthetic medicinal drugs are better than medicinal plants.

3.6.2.1 Justifying the choice of statements in the teacher questionnaire

The first statement (S.1) was chosen to find out whether teachers had knowledge of the principles that guide Outcomes Based Education. The second statement (S.2) was about who had or who had not read through the OBE books for grade 8 that had been issued by publishers to teachers in the circuit about two months before administering the questionnaire. It was followed by S.3 about the comparison of contents in the old books, which are based on the traditional ways, with those in the new ones based on OBE. S.4 was about whether teachers saw a need for in-service training and workshops on OBE.

S. 5 was about teachers' knowledge of the inclusion of Africans traditions and beliefs that have a bearing on science in the new curriculum. S. 6 was set to find out whether teachers see a link between indigenous knowledge of medicinal plants and one's culture. S.7 & S.8 probed teachers' views on the cultural background as a contributory factor to learners' poor performance and whether the integration of indigenous knowledge of medicinal plants into the science curriculum could motivate and improve on the performance respectively. S.9 was about a teacher seeing himself/herself as a major factor in the success of their learners despite changes in a curriculum. It was aimed at finding out from colleagues whether they saw any need in changing the curriculum as well as their major role in the success of their learners. S.10 probed the views of an educator about the lack of responsibility of learners to their learning.

S.11 sought the perception of educators on whether traditional healers, herbal practitioners and people who grew up on farms are the only ones with a good knowledge of medicinal plants. Lastly S.12 was about the efficacy of medicinal plants as compared to synthetic medicinal drugs. It was chosen after realising in the literature review that many patients were of the view that herbal medicine was more efficant than the pharmaceutical drugs.

3.6.2.2 Designing a teacher focus group

Teachers had to fill in the questionnaire by selecting a suitable choice that had to be accompanied with an explanation in support of their choice. However, very few teachers managed to give some explanations. Hence I decided to focus on a group of 6 teachers who had shown some interest in the questionnaire statements.

Each statement in the questionnaire was discussed in detail. I noted down the positive and negative aspects of each statement. The rich contributions of these teachers collectively provided an insight into the study.

3.7 Triangulation of data

According to Cantrell (1993:100) triangulation involves cross-checking and interpretation drawn from different data sources, methods and perspectives. This view is shared by Hitchcock & Hughes (1995:323) who maintain that it can help the researcher to establish the validity of the findings by cross-referencing for instance different perspectives obtained from different sources. It is in this light that prolonged and repeated conversations with key informants were held in the hope of reducing researcher subjectivity and identifying typical and atypical characteristics.

The testing of rival explanations and seeking of divergent cases placed me in a role similar to that of a devil's advocate. Also, thick description will allow the reader to determine the 'fit' with another context and a clear description of the design and procedures will enable others to reconstruct and collaborate the study.

Lastly, I will utilise a recommendation by Guba & Lincoln (1981) in Hitchcock & Hughes (1995) of taking data and interpretations back to the subjects for their comments. At times I will ask colleagues to comment upon the findings as they emerge and request some participants to write up findings, a process that is likely to expose my own biases.

3.8 Discussion of the methodology

3.8.1 Constraints

The journey of this research was not a smooth one. The constraints, which I would like to discuss in this section included: time, limited access to learners and other informants as well as language as a barrier in a quest for more knowledge.

3.8.1.1 Time constraints

This piece of work was done on a part-time basis. It meant that in between my leisure time of playing chess and adoring the wonderful natural creations within my household, I had to move up and down gathering data, followed by sitting down for hours to try and put pieces together. Also, time had to be set aside to prepare work for my classes that included both physical science and mathematics of a matric class.

3.8.1.2 Limited access to informants

Although my principal gave me permission to include grade 9 learners in my study, I found it appropriate to meet them only during their free periods so that I would not inconvenience any educator. However, in most cases their free periods would find me busy teaching another class. Other informants included traditional practitioners and herbal practitioners whom I used to find busy attending to their patients. Some of them kept on promising to assist next time I came. There is one herbalist who seemed to have a good command of indigenous knowledge about medicinal plants, but was so rude to me the next time I checked on her that I decided to withdraw her from the list of my informants. These were her words in quote:

*...you want me to discuss the assignment about medicinal plants that you gave your learners, but look at those people who have come to buy medicine. Where the hell can I get time for your business. You and whites think that you are clever. Do you see this herb called **ilabateka**, the same herb is treated by whites and later sold as **African potato** at a higher price. I do not think I will ever have time for you.*

Since that incident, I never went back to find out whether she would have some time for me.

3.8.1.3 Language

English, the medium used in this study, is a second language to all the informants and myself, with the exception of two academicians. At times, this led to encountering some communication problems. Sometimes, I had to mix English with my 'broken' Xhosa to reach out to those informants who preferred to use their mother tongue when narrating their knowledge of medicinal plants. This could have led to leaving out some important information.

3.8.2 Strengths

In spite of all the above problems, I had a will in me that kept me going. It was guided by the following:

Designing the two questionnaires on my own, enabled me to include statements that I thought could probe into what and how much my informants knew about the uses and integration of indigenous knowledge of medicinal plants. The observations carried out on the two traditional healers provided me with first-hand information on their practices and their indigenous knowledge of medicinal plants. These observations in which I could isolate salient points (Walker 1993) refreshed my memories of how my grandmother and I used to collect and use medicinal plants during my childhood.

Also, in the semi-structured interviews, I could compare data from other interviews with that

emanating in the interview that was current. Furthermore, the discussions held within the focus groups of learners and teachers provided me with rich data in which similar and differing views were obtained from participants. All these improved on the reliability and validity of the data gathered.

3.9 Summary

This chapter has explained why a qualitative interpretivist approach was used in this case study. It has given reasons for choosing the research sites, informants and has discussed the research instruments used. It has revealed how the learner and teacher questionnaires were designed. It has also explained the triangulation of data and has discussed the constraints and strengths of the research methodology.

CHAPTER FOUR

COLLECTING DATA AND ANALYSING RESPONSES OF X SSS INFORMANTS

4.1 Introduction

This chapter will start by looking at the situation at X SSS, the focus of this research. In particular it will reveal the Strengths, Weaknesses, Opportunities and Threats (SWOT) of X SSS, which were compiled by its teachers in the form of an analysis (see appendix 6) at the request of the Department of Education officials in Bisho. It will be followed by data gathered in administering learner and teacher questionnaires in the quest for prior knowledge and enthusiasm of learners and teachers respectively in integrating indigenous knowledge about medicinal plants into the grade 9 learning programme. It will cover an interview with the principal of X SSS and lastly it will analyse the data gathered.

4.2 The situation at X SSS

X SSS was established in 1990. It is a mono-racial day school with an enrollment of 852 learners and a staff of 26 educators. The science subjects offered are Agricultural science from grades 8-12 and General science that is taught in grades 8 & 9, which later splits into Physical science and Biology in grades 10, 11 & 12.

All the schools within the circuit of X SSS that got below a 40% pass rate in the 1999 matric examinations were told by the Eastern Cape Education Department to compile and submit a SWOT Analysis. My school, X SSS, where I have been since July 1999, was one of them. Its Strengths, Weaknesses, Opportunities and Threats were discussed and endorsed by all teachers before being handed over to a director general in the provincial Education Department.

Although the SWOT Analysis was not part of this study, the discussion that follows below provides an insight into factors that could influence integrating indigenous knowledge of medicinal plants into the science curriculum.

4.2.1 Strengths

It was agreed unanimously that the school boasts of qualified and experienced educators who socially work as a team. It had a management team in place and a responsible SRC. Also it had in the past got several exemptions and had excelled in music and sport. Furthermore, the school has embarked on study sessions in which resources that it obtains from All Saints College can be effectively utilised.

4.2.2 Weaknesses

The unpunctuality of some teachers and their inability to honour their periods contributed to poor class control, which led to absenteeism and laxity amongst learners. Teachers felt that the Education Department and their learners did not motivate them. Teachers were of the view that demotivation by the department resulted from not delivering the necessary resource materials in time as well as small annual increments in their salaries. The failure of teachers to give guidance on study skills and choice of subjects to their learners was also seen as a weakness.

Decisions sometimes taken by the management team were not passed on formally to teachers and learners. Such a problem contributed to poor academic teamwork and inconsistency in implementing what had been discussed. It was also found that the management team controlled work only during examination time and some members on the team supervised subjects that were not their majors.

Lastly it was noted that despite a functioning School Governing Body (SGB), parents lacked cooperation in attending meetings to discuss matters arising during the academic year and some failed to pay school fees in time.

4.2.3 Opportunities

The school had a unique chance in that the Education Department offices and a community library were next to it. Having a school policy in place, a photocopier and study materials from All Saints College were found to be opportunities that could be utilised.

4.2.4 Threats

The fact that the school had no fencing meant that, its chances of breeding gangsterism and being vandalised were high. It faced a shortage of teachers in crucial subjects like mathematics and science. It lacked necessary resources such as a laboratory and textbooks. Furthermore, it was noted that the abolishment of corporal punishment by the Department of Education is a threat to the discipline and responsibility of learners to their studies. After the analysis, teachers had to apply what could improve on the performance of their learners.

4.3 Parents' intervention

One of the outcomes of the SWOT analysis was a decision to call a Parents' meeting for each grade in which a teacher-parent partnership advocated by the democratic principles of OBE and multi cultural educationalist could be forged. It was hoped that such a relationship could improve on the poor performance of learners, which teachers mainly attributed to a lack of learners' responsibility for their learning. I have decided to focus on what transpired from the meeting of grade 9C, the focus of this study.

The meeting opened with a prayer. Afterwards the class teacher explained to the parents how their children had failed dismally in the June examinations asserting that learners were not responsible for their studies. She then requested inputs from parents on what could be their children's problems and how they could work together to improve on learners performance.

The Outcomes-Based Educationalist probably would have asked the educator if she was using a variety of techniques. Nevertheless, most parents noted that the current situation prevailed because of the abolishment of corporal punishment by the Department of Education. They encouraged teachers to ignore the bill and start disciplining their children in a way similar to what their teachers used when they were still learners. I find such a suggestion unsuitable for the highly politicised South African learners who are more unruly than the learners before the 1976 Students' riots. Some parents noted that their children spend most of the time after school with friends, having no time for their books. Others stated that their children enjoyed watching television programmes. It appeared that most parents lacked control over their

children and little was being done to allocate them some time to do their homework.

When learners were given a platform to have an input, many admitted that they did not read enough for the examinations due to a congested examination timetable. Some learners found some subjects like science difficult to pass.

The parents appreciated the initiative of the class teacher, for the first time in the history of the school, to invite them and discuss the performance of their children. They pledged to work hand in hand with subject teachers to improve on the standard of the school. Then one parent was requested to close the meeting with a prayer.

Although the SWOT Analysis was not part of this study, it revealed the lack of responsibility of learners towards their studies and their interest in watching TV programmes. Such interest could be utilised by including educational programmes on medicinal plants in the TV programmes. Educators have a task of guiding learners in taking responsibility of their studies and ensure that what is taught is relevant to the learners' lives. The analysis has also revealed that some parents do not have enough control over their children and they lack interest in the studies of their children. These revelations could contribute to factors that could influence the integration of indigenous knowledge of medicinal plants into the science curriculum.

4.4 Prior knowledge and enthusiasm of informants at X SSS

It was necessary to find out what science educators and grade 9 learners knew about the traditional uses of medicinal plants in their area. This would provide a foundation and a background for introducing indigenous knowledge of these plants in the grade 9 General Science learning programme. Also, it was important that some of the informants in this study, especially learners and educators, be enthusiastic about the integration of indigenous knowledge of medicinal plants into the science curriculum. If a learner or educator is inspired and positive about this noble and challenging task, where local scientific knowledge is studied side by side with orthodox scientific knowledge, the importance of enthusiasm could never be overemphasised. Vincent Peale had this to say about enthusiasm in his book "*Stay alive all*

your life”:

When you cast out pessimism and gloominess and cultivate the attitude of optimism and enthusiasm, amazing results will be demonstrated in your life (Peale 1996: 24).

It is important that educators and learners break through the inferiority attached to traditional ways of using medicinal plants by some educated Africans. Also, it is worth noting that Western scientists who used to despise the value in these ways have recently embarked on more research into indigenous knowledge worldwide. It is in this vein that the enthusiasm of educators and learners was sought through questionnaires and interviews.

4.4.1 Data gathering using a learner questionnaire

Prior to the administration of the learner questionnaire, an assignment (refer to appendix 1) was given to grade 9C learners at X SSS to probe into names, parts used, preparations and medicinal uses of some common plants. Also a practical session in which common medicinal plants were identified was held. Both the assignment and the practical session provided an insight into what learners knew about such plants.

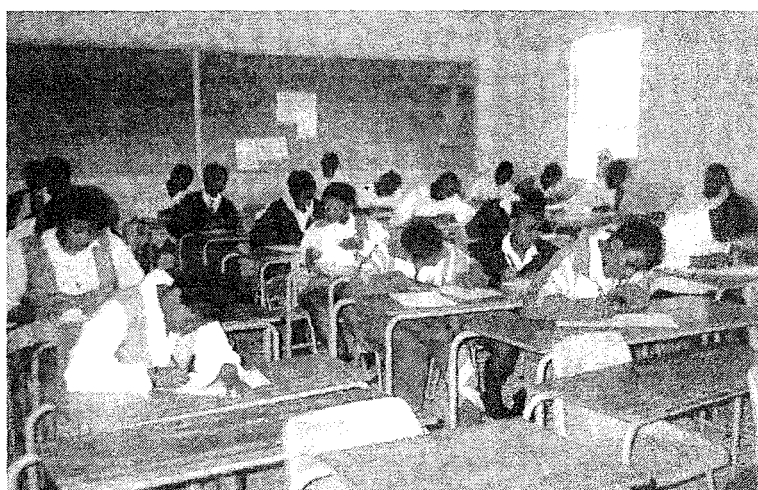


Photo 1: Grade 9C learners at X SSS answering a Learner Questionnaire

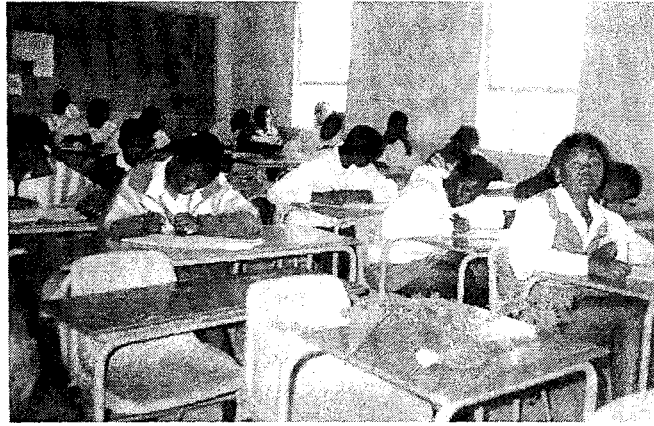


Photo 2: Grade 9C learners at X SSS attending a practical session of identifying some medicinal herbs

A pilot learner questionnaire was then given to 10 learners. Five learners were selected from grade 8C and the other 5 learners were chosen from grade 10B. Problems encountered by these learners included lack of knowledge of some terms such as, toxicity and pharmacy. These problems were noted and led to making some alterations and explanations in the final draft of the questionnaire. However, I experienced a problem in answering the following questions from one frustrated learner:

'Sir, why does a learner who wants to become a doctor or a pharmacist have to learn about the boring factorising and geometry in mathematics? Why is it that they are not just taught how to go about healing people?'

Probably the learner came up with these questions after realising in the pilot questionnaire that some statements referred to the possibility of studying about medicinal plants at school and at university. Furthermore, these questions could be indicating the learner's frustration with the old curriculum that in most cases makes no link between what is taught at school and real life situations.

The learner questionnaire was administered in the second week of the third quarter of the school calendar. Out of a class of 56 learners, 16 had not yet come back from the holidays. As a result only 40 learners answered the questionnaire.

4.4.2 Analysis of learners' responses in the learner questionnaire

The section that follows below analyses the number of responses by learners in each question as grouped in categories justified above. It starts with a summary table of the number of responses by learners per statement in the questionnaire.

A key to the table:

Abbreviation	S. No.	S. A	A	N	D	S. D	F
In full	Statement Number	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Faulty

Table 4.1 Learners' responses as per statement in each category (n = 40)

STATEMENTS IN EACH CATEGORY	S. NO.	S. A	A	N	D	S. D	F
Contributory factors for not using medicinal plants							
My church does not want me to use medicinal plants.	10	9	6	5	9	9	2
My parents do not want me to use medicinal plants.	14	6	7	2	13	10	2
Knowledge of the link between medicinal plants and main stream science							
At university, one can study about medicinal plants.	2	15	10	6	8	1	0
Studying about indigenous knowledge of medicinal plants is only useful to learners in rural schools.	5	5	13	4	12	4	2
Some medicines sold in pharmacies are made from medicinal plants.	19	15	18	5	1	1	0
Knowledge of how medicinal plants can be conserved							
Medicinal plants can grow anywhere.	9	11	10	4	7	7	1
Some people grow medicinal plants.	15	12	21	4	0	3	0
Views on who controls the intellectual property rights							
Some witch doctors use toxic medicinal plants to harm or kill people.	3	14	8	3	7	8	0
Traditional healers are the only people who have knowledge of medicinal plants.	6	7	9	2	17	2	3
The preparation of herbs for a cure involves several stages.	12	5	9	14	8	4	0
Older people know more about the uses of medicinal plants than the young ones.	17	19	10	1	3	5	2
Enthusiasm of learners towards integration of indigenous knowledge of medicinal plants into their school science							
Knowledge of medicinal plants in my area is important.	1	30	3	2	3	2	0
General Science would be more interesting if a topic on how we use some herbs for healing is included.	4	15	11	6	6	1	1
Learning about medicinal plants used in my area helps to know my culture.	7	9	17	3	4	7	0
I enjoyed learning about plants in grade 8.	13	12	15	2	6	4	1
Knowledge of efficacy and safety of medicinal plants							
Some medicinal plants perform better than drugs bought from pharmacies.	8	16	15	1	3	4	1
It is not easy to differentiate between toxic and non-toxic medicinal plants.	16	5	8	14	10	3	0
Some medicinal plants are dangerous.	20	24	9	2	3	0	2
Knowledge of the psychological healing of medicinal plants							
Bathing water with some medicinal plants brings good luck.	11	15	10	7	4	4	0
Evil spirits can be chased away by using some medicinal plants.	18	17	13	7	2	0	1

In the first category of contributory factors for not using medicinal plants, 15 learners either strongly agreed or agreed to S.No.10 that their churches do not allow them to use medicinal plants. 5 were neutral, whereas 18 either disagreed or strongly disagreed and 2 learners ended

up with faulty choices. Also 13 learners either strongly agreed or agreed with S.No.14 that their parents do not want them to use medicinal plants as compared to 23 learners who either disagreed or strongly disagreed. Only 2 learners were neutral and the remaining 2 made faulty choices. A faulty choice in this case refers to either crossing two slots for one statement or leaving all slots of a statement blank.

In the second category of knowledge of the link between medicinal plants and main stream science, 25 learners strongly agreed or agreed with S.No.2 about the possibility of studying medicinal plants at university. 6 learners were neutral and 9 learners either disagreed or strongly disagreed. 18 learners strongly agreed or agreed with S.No.5 that studying about medicinal plants is only useful to learners in rural schools. 4 learners were neutral, 16 either disagreed or strongly disagreed and 2 learners made faulty choices. Also 33 learners strongly agreed or agreed with S.No.19 that some medicines sold at pharmacies are made from medicinal plants. 5 learners were neutral and only 2 learners either disagreed or strongly disagreed.

The third category on knowledge of how medicinal plants can be conserved, 21 learners strongly agreed or agreed with S.No.9 that medicinal plants can grow anywhere. 4 learners were neutral, 14 learners disagreed or strongly disagreed and only one gave a faulty choice. 33 learners strongly agreed or agreed to S.No.15 that some people grow medicinal plants in their gardens. 4 were neutral and only 3 learners strongly disagreed.

In the fourth category, which was about views on who controls the intellectual property rights, 22 learners strongly agreed or agreed with S.No.3 that some witch doctors use toxic medicinal plants to harm or kill people. 3 learners were neutral and 15 learners either disagreed or strongly disagreed. 16 learners strongly agreed or agreed with S.No.6 that traditional healers are the only people who have knowledge of medicinal plants. 2 learners were neutral, 19 either disagreed or strongly disagreed and 3 learners gave faulty choices. 14 learners strongly agreed or agreed with S.No.12 about the preparation of medicinal plants for a cure as involving several stages. 14 learners were neutral and 12 learners disagreed or strongly disagreed. Furthermore, 29 learners either strongly agreed or agreed with S.No.17 that older people know more about the uses of medicinal plants than the young ones. Only one learner was neutral, 8 learners either disagreed or strongly disagreed and 2 learners gave faulty choices.

Like the fourth one, the fifth category about enthusiasm of learners towards integration of indigenous knowledge of medicinal plants into their school science comprised of 4 statements. 33 learners strongly agreed or agreed to S.No.1 that knowledge of medicinal plants in their area was important. 2 learners were neutral and 5 learners disagreed or strongly disagreed. 26 learners strongly agreed or agreed with S.No.4 that General Science would be more interesting if a topic on how we use some medicinal plants for healing is included. 6 learners were neutral, 7 disagreed or strongly disagreed and 1 learner gave a faulty choice. Also 26 learners strongly agreed or agreed to S.No.7 that learning about medicinal plants used in their area helps to know their culture. 3 learners were neutral and 11 learners disagreed or strongly disagreed. 27 learners strongly agreed or agreed with S.No.13 that they enjoyed learning about plants in Grade 8 the previous year. 2 learners were neutral, 10 either disagreed or strongly disagreed and only 1 learner gave a faulty choice.

The sixth category consisted of 3 statements a similar number to the second category. 31 learners strongly agreed or agreed with S.No.8 that some medicinal plants perform better than drugs bought from pharmacies. 1 learner was neutral, 7 disagreed or strongly disagreed and only 1 learner gave a faulty choice. 13 learners strongly agreed or agreed with S.No.16 that it is not easy to differentiate between toxic and non-toxic medicinal plants. 14 learners were neutral and 13 learners disagreed or strongly disagreed. Furthermore, 33 learners strongly agreed or agreed with S.No.20 that some medicinal plants are dangerous. 2 learners were neutral, 3 disagreed and 2 learners gave faulty choices.

Category No.7 consisted of 2 statements. 25 learners strongly agreed or agreed with S.No.11 that bathing water with some medicinal plants brings good luck. 7 learners were neutral and 8 learners disagreed or strongly disagreed. Lastly, 30 learners strongly agreed or agreed with S.No.18 that some medicinal plants can be used to chase away evil spirits. 7 learners were neutral, 2 disagreed and 1 learner made a faulty choice.

The table below shows the percentage ranges for learners' responses in each category:

Table 4.2 Response percentage ranges for each category (n = 40)

CATEGORY	S. A/A	N	D/S.D	F
Contributory factors for not using medicinal plants	30-39%	5-12,5%	45-58%	5%
Knowledge of the link between medicinal plants and main stream science	45-83%	10-15%	5-40%	0-5%
Knowledge of how medicinal plants can be conserved	53-83%	10%	8-35%	0-2,5%
Views on who controls the intellectual property rights	53-83%	2,5-35%	20-47%	0-7,5%
Enthusiasm of learners towards integration of indigenous knowledge of medicinal plants into their school science	65-83%	5-15%	13-27%	0-2,5%
Knowledge of efficacy and safety of medicinal plants	33-83%	2,5-35%	8-33%	0-5%
Knowledge of the psychological healing of medicinal plants	63-75%	17,5%	5-20%	0-2,5%

The percentages were calculated by dividing the number of responses per statement in a category by the total number of learners who answered the questionnaire. The range in each slot represents the lowest and highest percentages of the statements in each category.

It appears from the above table that the highest percentage range was of 65-83%. It was for learners who strongly agreed or agreed to statements in the category of enthusiasm of learners towards integrating indigenous knowledge of medicinal plants into the science curriculum. The learners who disagreed or strongly disagreed to the statements in the same category were few, which led to low percentages in the range of 13-27%. The second highest percentages of 63-75% came from learners who strongly agreed or agreed with statements in the category of knowledge of the psychological healing of medicinal plants. A percentage range of 53-83% for learners who strongly agreed or agreed with statements in both categories of knowledge of how medicinal plants can be conserved and views on who controls the intellectual property rights followed the highest percentages. The lowest percentages of learners who strongly agreed or agreed with statements in the category of contributory factors for not using medicinal plants were in the range of 33-39%. The highest percentages of learners who disagreed or strongly disagreed with the statements in this category were in the range of 45-58%.

The largest percentage range of 33-83% was registered with statements on knowledge of efficacy and safety of medicinal plants. It is worth noting that the same category together with the category on views of who controls the intellectual rights registered the largest percentage ranges of 2,5-35% for learners who chose to remain neutral.

4.4.3 Data gathering using a learner focus group

The discussion took place a week after learners had answered the learner questionnaire. Although all the 56 learners for grade 9C had come back from the holidays, I decided to focus on the 40 learners who had answered the questionnaire. The reason why I did not include the latecomers was that they had no prior knowledge of what was to be discussed.

The discussion of each statement in the questionnaire was first done in groups before I sought the input of the whole class. This was in accordance with the design of the learner focus group that was explained in 3.6.1.2.

4.4.4 Analysis of the data from a learner focus group

Each statement in the questionnaire was analysed along with other statements in the same category. The analysis began with the two statements in the category of contributory factors for not using medicinal plants. Analysing statements in the second category on knowledge of the link between medicinal plants and mainstream science followed it. Then analysis of statements on knowledge of how medicinal plants can be conserved, views on who controls the intellectual property rights, enthusiasm of learners towards integration of indigenous knowledge of medicinal plants into their school science, knowledge of efficacy and safety of medicinal plants and analysis of statements on knowledge of the psychological healing of medicinal plants followed consecutively.

Out of the 40 learners who took part in the focus group, very few learners agreed to the first category of contributory factors for not using medicinal plants. They maintained that their churches and parents do not want them to use medicinal plants. When asked for reasons, some of them believed in God and not in plants, while other learners were of the view that medicinal plants are not good in that they make people restless. Most learners disagreed that their churches and parents do not want them to use medicinal plants. Some of the reasons given were that it is within their culture as Xhosas to use medicinal plants and that these plants are efficient. Surprisingly no learner was neutral as was the case when they were answering the questionnaire.

About the second category on knowledge of the link between medicinal plants and mainstream science, an interesting pattern emerged for each of the three statements. Thirty learners as compared to 6, who answered neutral to statement no.2 in the questionnaire, did not know that at university one could study medicinal plants. The rest of the learners, who agreed, explained that it needs someone who has studied medicinal plants at university to sell them in pharmacies. Like their responses in the questionnaire, most learners did not agree with statement no.5 that studying about medicinal plants is only useful to learners in rural areas. Some of the learners who disagreed maintained that the use of medicinal plants, which is linked to their culture had to be studied by all learners. Other learners were of the view that it was also necessary for urban learners to study these plants because some of them grow next to urban areas and can heal anybody. About the last statement no.19 in the category, most learners did not know that some medicines sold in pharmacies were made from medicinal plants. They were of the view that it was not easy to identify medicines that are sold in the form of tablets or capsules as containing medicinal plants. However, this was in sharp contrast to the 33 learners who strongly agreed or agreed with the statement in the questionnaire.

The third category was composed of statement nos. 9 & 15 on how medicinal plants could be conserved. Most learners agreed to statement no. 9 that medicinal plants can grow anywhere. Some of the reasons given were that they grow naturally as a result of rain and were capable of being grown in gardens. The latter reason is similar to what is written in *Guidelines on conservation of medicinal plants* (1993) referring to growing medicinal plants in pots around the house (refer to 2.10). The few learners who disagreed argued that medicinal plants could neither grow in a kraal nor in a sandy soil. It is likely that such a view could be based on their experience. About statement no.15 that some people grow medicinal plants in their gardens, almost every learner agreed, as they had done in the questionnaire. Some learners indicated that they were growing them in their gardens whereas others knew of people who were growing them. The few learners who did not agree were not aware that medicinal plants could be planted.

Category no. 4 on the views of who controls the intellectual property rights was composed of 4 statements; 3, 6, 12 & 17. (Refer to table 4.1). Learners were divided in their views on statement nos. 3 & 6. Those who agreed with statement no.3 that some witch doctors use toxic medicinal plants to harm or kill people indicated that some people visit witch doctors when

they want to endanger their enemies. The other learners who disagreed were of the view that some witch doctors are not knowledgeable enough to differentiate between toxic and non-toxic medicinal plants. Learners who agreed with statement no.6 that traditional healers are the only people who have knowledge of medicinal plants were of the view that the healers use them daily when treating their patients. Some of the learners who disagreed with the statement noted that some people such as herbalists learn about these plants. Others were of the view that some people who were not traditional healers nevertheless knew about the uses of medicinal plants. About statement no.12 on preparation of medicinal plants for a cure as involving several stages, almost all learners noted that it is not always the case. They maintained that some medicinal plants are just boiled whereas others are burnt and the smoke that comes off is inhaled. The few learners who agreed with the statement were of the view that if the preparation did not involve several stages everyone would be capable of healing. All learners agreed with statement no.17 that older people knew more about the uses of medicinal plants than the young ones. They explained that in the olden days these old people used not to go to hospitals. They used to treat themselves with medicinal plants to cure their ailments. As a result, they had more experience in the indigenous uses of medicinal plants than the young generation.

The fifth category was composed of statements; 1, 4, 7 & 13. Almost all learners agreed with statement no. 1 that knowledge of medicinal plants in their area was important. The reasons given included the effectiveness of the plants in healing some diseases and helping to treat patients in the area. The few who did not agree just did not know. Most learners agreed with statement no.4 that General Science would be more interesting if a topic on how we use some herbs for healing was included in the curriculum. Their reasons were that they would be learning about familiar things and that they would be learning about their culture in science. The other learners could not predict what it would be like. Almost all learners agreed with statement no.7 that learning about medicinal plants used in their area would help them to know about their culture. The common reason given was that uses of medicinal plants are related to one's culture. Learners were divided in their views on statement no.13 that they enjoyed learning about plants in Grade 8. Learners who agreed were of the view that they could apply the knowledge they got at home. Learners who did not agree were of the view that what they learnt could not be easily utilised at their homes.

Category no. 6 on the knowledge of efficacy and safety of medicinal plants composed of statement nos. 8,16 & 20. Almost all learners agreed with statement no.8 that some medicinal plants perform better than drugs bought from pharmacies. Some learners noted that some drugs are not only useless but are also harmful. The few who did not agree were of the view that even those traditional healers who have a good knowledge of medicinal plants use drugs from pharmacies. It appears their views were based on the possibility that different medicines could cure different ailments. Yet to determine the efficiency of one type of medicine over another, one has to compare the effect of both types on a particular ailment. Almost all learners agreed with statement no.16 that it was not easy to differentiate between toxic and non-toxic medicinal plants. They were of the opinion that it would be easier to differentiate these plants after learning about them. The few who did not agree were of the view that one could always find out from other people who were knowledgeable. About the last statement no. 20 on the dangerous nature of some medicinal plants, the responses were similar to those given in the previous statement. These responses were reliable in that the dangerous nature of medicinal plants is in most cases as a result of their toxicity.

The last category on knowledge of the psychological healing of medicinal plants was composed of 2 statements. Almost all the learners agreed to both statements. Some learners explained that believers in the powers of these plants are the ones who get good luck and have their evil spirits chased away. Others were of the view that these plants worked for them whenever they suffered from psychological problems.

4.4.5 Data gathering using a teacher questionnaire

I gave a copy of the teacher questionnaire to all 26 teachers at X SSS and requested them to complete and return it within two days. The questionnaire that had a design explained in 3.6.2 comprised of 12 statements. Teachers had to choose agree/yes or disagree/no for each statement and had to motivate their choices.

Out of the 26 teachers, only 14 managed to complete the questionnaire. Yet only 3 out of the 14 teachers motivated their choice of either agree/yes or disagree/no in all the 12 statements of the questionnaire. The implication of these responses is that one has to limit or avoid questions that require motivations when drafting a questionnaire.

A table summarising teachers' responses to the 12 statements in the questionnaire:

Table 4.3 Number of teachers' responses per a statement

NO.	STATEMENT	AGREE/YES	DISAGREE/NO	BLANK
1.	Knowledge of OBE principles	2	12	0
2.	Reading through some grade 8 OBE books	6	8	0
3.	Similarity in content between OBE books and the old ones	3	8	3
4.	A need for in-service training as well as workshops	14	0	0
5.	Knowledge of inclusion of African traditions and beliefs in the new curriculum	10	2	2
6.	Indigenous knowledge of medicinal plants as part of one's culture	12	2	0
7.	Cultural background as a contributory factor to learners poor performance	11	3	0
8.	Motivation of learners by integrating indigenous knowledge of medicinal plants	10	4	0
9.	Curriculum changes will never belittle the major role of teachers in the success of their learners	13	1	0
10.	The irresponsibility of learners to their learning can frustrate even the best teacher	13	1	0
11.	A good knowledge of medicinal plants is only held by a particular group of people	2	12	0
12.	Synthetic medicinal drugs are better than medicinal plants	2	10	2

Only 2 educators out of the 14 agreed that they had knowledge of the OBE principles. One of those who agreed noted that they are based on democratic principles. It was not clear whether the educator was referring to principles based on equity, non-sexism and non-racism. Two of the 12 teachers who disagreed gave lack of knowledge on OBE as their reason for not knowing the principles. Out of the 6 who had read through the books, 1 educator noted that they are learner centred and require both educators and learners to use more resources. One of the 8 educators who had not read through the books gave an excuse of not teaching grade 8.

About the similarity in content between OBE books and the old ones, 3 educators left the spaces for Agree or Disagree blank. Another 3 agreed that the contents are somehow similar, whereas 8 educators disagreed. All the 14 teachers agreed that they needed a lot of in-service training as well as workshops in order to base their teaching methods on OBE principles.

Ten educators agreed, 2 disagreed whereas 2 educators were not aware of the probable inclusion of knowledge on African traditions and beliefs in the new curriculum. On the statement concerning indigenous knowledge as part of one's culture, 12 educators agreed and 2 disagreed. About the cultural background of our learners as a contributory factor to their

performance in science, only 3 educators disagreed as compared to 11 who agreed. 10 educators agreed that the integration of indigenous knowledge of medicinal plants into the science curriculum could motivate and probably improve on their poor performance whereas 4 disagreed.

13 teachers against 1 were of the view that whatever changes are made in the curriculum, a teacher remains a major factor in the success of his/her learners. Furthermore, 13 educators against 1 agreed that the lack of responsibility of learners for their learning could frustrate even the best teacher.

About the statement on traditional healers, herbal practitioners and people who grew up on farms, as the only ones with a good knowledge of medicinal plants, 2 teachers agreed and 12 disagreed. In the last statement that was about the efficacy of medicinal plants in comparison with synthetic medicinal drugs, 2 educators agreed, 10 disagreed whereas 2 educators left it blank.

4.4.6 Data gathering using a teacher focus group

Most teachers either agreed or disagreed with the questionnaire statements without divulging reasons for their choices. Hence I decided to have a discussion with a focus group of 6 teachers so that I could get to know their views on each statement in detail. The discussion focused on what they knew about OBE and what their attitudes were towards the use and integration of indigenous knowledge of medicinal plants into the science curriculum.

On the question of who had read through the new grade 8 OBE books, many had seen them but had not yet read through them. Some of the reasons given ranged from not teaching grade 8 to still being busy with other school activities. The few who had read them saw a big difference between the new and the old books. Some of the differences mentioned included more preparation for teachers and more activities for learners.

There were two teachers who had attended courses on OBE, each at a different venue in different educational circuits. Both pointed out that all that they learnt from those courses was that there is a lot to get from a cow. 'We can get milk that is processed into several milk

products, its skin is used in the manufacture of shoes and jackets, the cow dung can be used as a fertiliser and other uses'. All the interviewees were of the view that a lot of meaningful in-service training is needed in order to empower teachers on OBE.

Many educators seemed not to know much about OBE. This meant that they could neither agree nor disagree with the statement that African traditions and beliefs that have a bearing on school science are likely to be integrated into school science. However, they indicated that though OBE requires more preparation and more resources, it was a wonderful idea. On the question of whether indigenous knowledge of medicinal plants is part of one's culture, many agreed but did not have good reasons to support their answers. The few who disagreed stated that different cultural groups use some medicinal plants of one culture.

All the 6 teachers agreed when asked if the cultural background of our learners could contribute to their poor performance in science. One reason was that some aspects taught in school science were abstract such as a topic on cell differentiation. The other reason was that in most African cultures some topics, such as sex education, are not passed on to the young generation by the old. Teachers were divided on the issue of integrating indigenous knowledge of medicinal plants into the science curriculum to motivate learners and probably improve on their performance. The 4 teachers who agreed with the statement viewed it as a way of bringing science closer to the lives of African learners. The 2 teachers who disagreed were of the view that learners have a negative attitude towards science as a result of poor teaching and poor exposure to science in their lower classes. They maintained that changing their attitude required changing the attitudes and teaching styles of their teachers, changes that could not easily be achieved.

All the educators agreed that whatever changes are made in the curriculum, an educator remains a major factor in the success of their learners. Some of them revealed that success is a result of unfolding and clarifying of concepts by a teacher. They also acknowledged that lack of responsibility by learners for their learning could frustrate even the best teacher. However, some teachers pointed out that sometimes such laxity is caused by lack of motivation by either teachers or parents.

Five educators believed that it was not necessarily the case that traditional healers, herbalists

and people who grew up on farms are the only ones with a good knowledge of medicinal plants. Some suggested that there is a need for every one to have knowledge of medicinal plants, whereas others maintained that there are some people who live in urban areas and have a good knowledge of these plants. The only educator who disagreed cited lack of enough written documents on indigenous knowledge of medicinal plants as one of the reasons for confining such knowledge to those few people.

Before the discussion, one of the grade 9 learners had brought me three different medicinal plants that he and some of his classmates could easily identify. In an attempt to find out whether my colleagues had knowledge of some of the common plants used in the area, I took out these plants. There was only one plant 'uMhlonyane' that could be identified by most of my colleagues. All the teachers mistakenly identified one of the remaining two plants called 'iNtelezi' as 'iKhala'. The third plant 'uChitibhunga' could not be identified by anyone (refer to table 2.3 for the botanical names of these plants).

Educators were divided in their views on the last statement about medicinal plants being not as efficant as synthetic medicinal drugs. Two educators were not sure of the meaning of the word 'efficant'. After explaining the term to them, they joined other two educators in disagreeing with the statement. They argued that some ailments are treated better with medicinal plants than with synthetic medicinal drugs and vice versa. On the other hand, those who agreed with the statement seemed to have a negative attitude towards medicinal plants that were bitter and were taken in large quantities in order to be effective. This latter view does not agree with what Busse (2000) noted about the increasing evidence regarding their safety and efficacy (refer to 2.8.3).

4.4.7 Analysis of data from teacher focus group

Most educators were of the view that the integration of indigenous knowledge of medicinal plants, which is part of the African culture would bring science closer to the lives African learners. This view is similar to the recommendation put forward by Turnbull (1997) of recognising science as a set of practices (refer to 2.3). Also the acknowledgment of all educators that whatever changes are made in the curriculum an educator remains a major factor in the success of their learners, indicates the need to involve educators when drafting

a new curriculum.

Educators failed to identify some plants that were easily identified by some learners in grade 9C. This could be seen as a threat to educators who might introduce indigenous knowledge of medicinal plants into the science curriculum. Nevertheless, as regards the statement on who should be the only custodians of indigenous knowledge of medicinal plants, some educators indicated that there is a need for every one including themselves to have that knowledge.

The majority of educators acknowledged that there were ailments that could be treated better with medicinal plants than with synthetic medicinal plants. One of the reasons given by the few educators who did not see any effectiveness of the medicinal plants was that they were bitter. However, bitterness does not necessarily mean ineffectiveness, besides some synthetic drugs are also bitter in taste.

4.4.8 Interview with the principal of X SSS

I decided to interview the principal after finding out that he had once done a course on OBE and he had knowledge of and believed in the healing power of medicinal plants. As a result, the questions asked were about OBE, medicinal plants and the integration of indigenous knowledge of medicinal plants in the mainstream science.

When I asked the principal what he thought of the principles that guide OBE, his response was that they are good because of being based on democratic principles. Although the head of my school teaches only grade 9, he told me that he had read through the new grade 8 books. He noted that they are learner-centred and need more resources. On any difference between the old and the new books, he found new books capable of engaging a learner into critical learning whereas the old ones encourage rote learning.

Asked about any need for in-service training as well as workshops in order for one to base their teaching methods on OBE principles, the principal responded that there is a dire need for teachers to be trained as facilitators who have to move away from a teacher-centred approach to a learner-centred one.

On the possibility of including African traditions and beliefs that have a bearing on school science in the new curriculum, the head saw it as good move by which African education and Western education could be fused together. Asked whether he viewed indigenous knowledge of medicinal plants as part of one's culture, he disagreed and backed up his response by citing different South African races that use medicinal plants found amongst the Xhosa people.

When asked if the cultural background of our learners could be contributing to their poor performance in science, the principal disagreed. He attributed it to the lack of knowledge and inadequate resources at the former disadvantaged schools. He viewed the probability of integrating indigenous knowledge of medicinal plants into the science curriculum as an excellent idea that could motivate our learners and probably improve on their performance. He also saw it as a good use of resources in this field.

About whether a teacher remains a major factor in the success of their learners, regardless of changes made in a curriculum, he responded that it was true for an educator to remain a facilitator throughout the teaching process. When asked if lack of responsibility of learners to their learning could frustrate even the best teacher, he disagreed. However, his explanation that educators must have courage, honesty and perseverance when dealing with learner problems did not really answer the question.

4.4.9 Analysis of data from the principal's interview

One of the educators in the teacher questionnaire indicated that he had not read through the new grade 8 books that are based on OBE because he was not teaching grade 8. On the other hand the principal who was also not teaching that grade, had read through them. Probably, the principal's motivation to read the books was due to his prior knowledge and interest in OBE.

The principal's view that indigenous knowledge of medicinal plants is not part of one's culture differs from the other educators' views at the school. The argument put forward by the principal was that different South African races use medicinal plants found amongst the Xhosa people. The counter-argument could be that the use of medicinal plants indigenous to a particular cultural group by different races does not disqualify the knowledge of these plants to be part of one's culture. The use of medicinal plants is not cultural bound whereas

ownership of indigenous knowledge of these plants could be seen as cultural bound.

Furthermore, the principal did not agree when asked if the cultural background of our learners could be contributing to their poor performance in science. This view concurs with the findings by Peng (1995) but differs from the views of Urevbu (1984) in the literature review (refer to 2.3) and other educators at the school.

4.5 Summary

This chapter has covered the SWOT analysis of X SSS that has provided an insight into the problems that surround the informants at the school. Some of these problems are likely to be factors that could influence the integration of indigenous knowledge of medicinal plants into the science curriculum. Furthermore, it has probed into the prior knowledge and enthusiasm of both learners and educators on the indigenous knowledge of medicinal plants.

CHAPTER FIVE

COLLECTING DATA AND ANALYSING RESPONSES OF COMMUNITY MEMBERS AND ACADEMICIANS

5.1 Introduction

This chapter is about collecting and analysing data from some community members and two university academicians. It will make use of observations and interviews to probe into the knowledge and enthusiasm of some community members who include traditional healers, a herbal practitioner and two parents. The data collected will then be analysed. Lastly it will cover and analyse the views of the two academicians, a professor in pharmacognosy and a taxonomist, on the integration of the indigenous knowledge of medicinal plants into school science.

5.2 Support of the community members

5.2.1 Observations

The observations consisted of attending a therapy at a traditional hospital and collecting medicinal plants with a sangoma. The relevance of attending the therapy was to find out what is done and how medicinal plants are used by some of the informants in this study. Also, observing how plants were collected gave me an insight on where and how these plants can be found.

5.2.1.1 Attending a therapy at a traditional hospital

I once had a chance of attending a therapy locally known as ‘futha’ loosely translated in English as a ‘thermo hydro-chemical’ therapy. It involves sitting around a pot of steaming herbs and is held twice weekly on Wednesday and Saturday only in the presence of ‘ubaba’ a senior foreign traditional healer. The chance came after handing the healer’s brother a

transcript of what I had discussed with him concerning their traditional hospital that was to be included in this study. On a Wednesday evening, while on my observation visit, two male staff members including the healer's brother, whisked me to a consultation room. I was told that staff members including 'ubaba' were uncertain about my motive for carrying out the research. They asked me to clarify why I was working on such a study and who had sent me. Amidst the interrogation, a female staff member brought a message from 'ubaba'. He wanted me to join them in the therapy session that was going on in a tent situated at the back of the hospital block. I was given a towel by a minister of their church and told to undress. I tried to excuse myself but there was no reason good enough for them to accept because the message had come from 'ubaba'.

Next to the tent was a fire used to heat stones that keep herbs in pots simmering during therapy sessions. The tent was flat topped with a height of roughly 1.3m, measuring about 4m in breadth and about 5m in length. On entering, I was seated next to ubaba who was sitting with some participants around a pot of steaming herbs. Other participants also sat around another pot of steaming herbs. The inside was dark with a small light coming from a torch held by ubaba. In front of him was a bucket of cold water that he used once in a while to wash his head and sprinkle onto participants who were chanting Christian songs.

After about 4 minutes of being seated, hot stones were brought in and added to the pots. The heat became so unbearable that I turned around to look for an exit. However, I was told by ubaba not to leave and advised to pray. Another piece of advice came from a person next to me who told me to bow my head. I relaxed after finding what I had been advised to do was helping. My whole body became soaked with vapour and the smell of herbs reminded me of how my grandmother and I used to sit around a calabash containing steaming herbs and cover ourselves with a blanket.

After some time, we were told by ubaba to call out our names one by one. Then he went into silence for a while. Afterwards, he stood up and walked towards the back of the tent where he picked up a young person and brought him to the front. Ubaba told the person that he was in danger of being killed. He put his head against that of the person and prayed for a short while. Ubaba then told everyone inside the tent to go to a hall that is used for church services. Outside I felt good and cool but I had no plans of joining them for prayers. Hence the

observation that day ended in the tent.



Photo 3: *A traditional hospital where the observation was carried out*

5.2.1.2 Collecting medicinal plants with a sangoma

After attending a Sunday service on the 25th June 2000, I set off to meet a sangoma who had promised to take me to places around the township where she collects herbs. I found her attending to patients in a consultation room. I had to wait until she came out of the room. Immediately after coming out, she told other patients who were waiting that she had an appointment that she could not postpone any longer. We then loaded my car with a bag and tools used in uprooting medicinal plants and drove off with two of her employees. I was surprised to find out that the plants were to be picked from two places that I had been passing for the last 8 years.

The first place we went to is a bushy area next to a newly built settlement area. We found the place littered with plastic bags, papers, condoms and human faeces. After uprooting about 5 plants that included *chitibhunga*, the sangoma developed a stomach upset that was so severe that she asked me to drive her to her medical doctor in a nearby town. Thereafter, I drove towards her home, as it was too late to go back to the bush where we had left the other two men.



Photos 4 and 5: Collection of some medicinal plants from a veld by the sangoma and a herbalist

Two weeks later we went with the same group to a second place that is behind one of the institutions for learning in the area. This time around the sangoma carried some little beads, which she threw in the bush so that the ancestors could give us more herbs in our search. We managed to get *intelezi*, *mathunga*, *ntseme*, *uchitibhunga* and *ikhala* (see table 2.3 for the botanical names). Unfortunately, due to another appointment I could not wait for the other two men who had crossed the road in search of more medicinal plants. The next time I checked on the sangoma, she told me that her staff members had come back with a lot of medicinal plants that day.

The table below shows some of the medicinal plants used by sangoma in the psychological healing of her patients:

Table 5 Some medicinal plants used for psychological healing

Application/ Administration	hlamba/ bathing	tshiza/ inhaling	futha/ absorption	cima/ laxative	gqabisa/ vomiting
Botanical name	<i>Rhoicissus digitata</i>	<i>Rhoicissus digitata</i>	<i>Rhoicissus digitata</i>		<i>Schotia latifolia</i>
Xhosa name	uChithibunga	uChithibunga	uChithibunga	Rooiwater	Mapipa
Botanical name	<i>Convolvulus sp.</i>	<i>Cissampelos capensis</i>			
Xhosa name	uBhoqo	uMayisake	Ntseme	Mthuma	
Botanical name	<i>Ledebouria cooperi</i>	<i>Urginea sp.</i>	<i>Senecio deltoides</i>		<i>Gasteria bicolor</i>
Xhosa name	uMreteni	uMqweneba	iTyolo		iNtelezi

5.2.2 Analysing the observations

5.2.2.1 Analysing the therapy session

The attendance of the therapy enriched my study in that I realised how protective people are of their practices when they interrogated me on why I wanted to involve them in my research. I also observed the powers and respect that the senior traditional healer enjoys amongst his patients and staff members during the therapy sessions. Furthermore, I experienced the effect of the therapy and realised why some patients kept on attending it in spite of the heat that builds up inside such a small therapy tent.

I found the addition of hot stones to pots with a solution of medicinal plants that kept them steaming together with the infusion and inhaling of the vapour from the plants as having some scientific explanations. This could constitute the physical healing of some patients who attend it. On the other hand, the calling out of a name of each participant and the healer's pointing out of a patient who was in danger of being killed while others chanted Christian songs constitute some of the manipulations by the healer in the psychological healing of other patients.

5.2.2.2 Analysing the collection of medicinal plants with the sangoma

I felt honoured when the sangoma decided to leave her patients behind and took me to one of the places where she collects medicinal plants. I became suspicious of the unhygienic nature of some medicinal plants on finding the collection site littered. I also realised that all the plants we were collecting, were being uprooted without replacing them. When the healer developed a stomachache, she never thought of using some medicinal plants but requested me to rush her to a medical doctor. I was left to believe that those patients whom we had left behind had come for psychological healing and not the physical healing that took the sangoma to her medical practitioner.

On the second day of collection, the sangoma threw beads in a bush so that we could collect a lot of medicinal plants. Coincidentally a lot of plants were collected on that day. The question left lingering in my mind was how long will this lady would keep on believing in throwing beads without becoming concerned to grow medicinal plants on a large scale.

5.2.3 Interviews

5.2.3.1 An interview with a herbal practitioner

This herbal practitioner is a former clerk, teacher and boxer who turned to healing using medicinal herbs in 1995. Since then he has given treatment to many people including over 520 patients suffering from AIDS who come from different parts of South Africa. These people include professionals such as teachers, traditional healers and medical practitioners themselves.

When asked about the efficacy of the medicinal herbs, the herbal practitioner replied that most South African herbs are weak and as a result, he uses a few together with foreign herbs from countries like Germany, China, Spain and India. He further asserted that no single herb could cure an ailment satisfactorily; it requires a combination of different herbs. About AIDS patients, he clarified that his treatment has never turned HIV positive patients negative, but it boosts their immune system and halts opportunistic diseases that arise as a result of the weakening system.

About the difference in efficacy between South African medicinal plants and the foreign imported medicinal herbs he uses, he was not sure of the reason but asserted that a country like Germany has done a lot of research on medicinal herbs, much more than South Africa has accomplished.

On how and where he got the knowledge of healing people, the former teacher stated that he is neither a traditional healer nor a spiritual healer. He just spent sleepless nights reading big volumes of books on medicinal plants and their uses. As a result of this origin, he calls himself a herbal practitioner.

About divulging information on the names and uses of local and imported medicinal herbs that he gives to his patients he was adamant that such information is money and it is expensive because of its value.

When asked about the future of traditional healers in the light of improved health services, he was of the view that their future is bright. He attributed it to the fact that African people like to be told lies. He cited an example where they would approve of a traditional healer who tells an AIDS patient that they are bewitched. He further noted that many a patient after failing to get reasonable treatment either in hospitals or from a traditional healer, use him as a last resort.

When he falls ill, the former boxer revealed that he goes to his General Practitioner (GP) for only a diagnosis as such people have clinics well equipped with instruments that detect diseases. Afterwards, he prescribes and treats himself using his herbs.

On the question of integrating indigenous knowledge of medicinal plants in the learning programme for Grade 9 General Science, he saw it as a good idea. However, he wondered how a teacher who has never been a curriculum designer could go about such a difficult and sophisticated task.

About availing himself to assist in integrating the indigenous knowledge into the science curriculum, he accepted on condition that it would come with some remuneration. He further added that he plans to hold a programme on a local radio station about the need for the

government to put research stations in each and every town where intensive research ought to be carried out on any purported medicinal plant.

Asked about the famous and commonly used medicinal plants such as Cape Aloe and Dagga, the herbal practitioner approved of these plants and cited a case where different medications could not suppress an ailment he had for a long time. When he tried the Cape Aloe as a last resort, the ailment disappeared within a few days. With dagga, he wished that governments could put a clause to its medicinal uses. However, he had no idea of how they would stop people who use it as a hallucinogen from abusing the clause.

On the view of his faith and the use of medicinal plants, the herbal practitioner answered that he was a Christian who treated his patients with three medicinal plants mentioned in the Bible. He went on to say that there is a verse in the Holy book, which states that for every ailment there is a medicinal plant that cures it.

5.2.3.2 An interview with a foreign traditional healer

He is an astrologer and traditional healer in his early thirties who comes from an African country and operates in a feeder town next to the township in which the school is situated. Like any other local traditional healer, he claims to cure several diseases. Although he has been operating in this town for barely a year, he is becoming popular due to his combination of African, European and Asian medicinal herbs. Before interviewing him, I recommended two ladies who had suffered from menstrual problems for over two years to try him. After taking his free treatment for some time, both of them told me that his medicinal herbs were effective. I then interviewed him in his clinic that is furnished with modern technology but has a consultation room where no one can enter with shoes on.

I started by finding out how he became a healer. He answered that one healer identified him in his homeland as one who had been touched by ancestors. He then spent about a year training to become a healer. I then asked him whether the medicinal herbs he uses were different from those used by local traditional healers. His response was that at first his prescriptions used to be dominated by South African medicinal plants, which some patients could easily identify. Later on, he found out that most patients who visited him expected an

alternative treatment different from what the local healers or medical practitioners could provide. Then he embarked on dispensing medicinal herbs from oversea countries such as Germany and his home country.

I informed him about a similar interview I held with the herbal practitioner who was also using medicinal herbs from Germany and from some other countries in Asia. Afterwards, I asked him his view on what was said by the practitioner concerning the poor quality of most South African medicinal herbs. He responded that it was a fact most African medicinal plants were not efficient. However, he noted that the few good local medicinal plants he used included 'umNga' (*Acacia karoo*) that also grows and is used as a medicinal plant in his home country and 'African potato' (*Hypoxis argentea*) capsules, which he has found to be more effective than the 'African potato' solution.

About the probable cause of the difference in efficacy between our African medicinal herbs and the medicinal herbs that come from outside the continent, the traditional healer did not have a good explanation. However, he attributed it to the fact that European countries and some Asian countries are more developed in dispensing herbal medicines than African countries.

On the issue of where he gets treatment when he falls sick, the healer gave a similar response to that given by the herbal practitioner (refer to 5.2.3.1), of being diagnosed by a medical doctor and then prescribing and treating himself.

About his view on integrating indigenous knowledge of medicinal plants into the General Science for Grade 9 learners, he admitted that it was a good idea. However, he wondered how the different indigenous knowledge of medicinal plants for the different cultures in South Africa could be amalgamated.

5.2.3.3 An interview with a second foreign traditional healer's brother

The second traditional healer and his brother are foreigners in their late thirties, running three traditional hospitals; one in their home country, another is in the second largest township in South Africa. The third, which is the focus of this interview, is found in a township next to

my school. Due to the busy schedule of the 'doctor', I only managed to interview his young brother, who also has command of the names and uses of several medicinal plants. The interview took place after several visits to the 'hospital'. In all the visits prior to the interview, I kept checking on them, weekly for two months, to find out the convenient day I would be taken to a forest and see for myself the locality of some medicinal plants and how they are collected. During one of the visits, I attended and observed their twice weekly therapy (refer to 5.2.1.1).

When asked why they referred to their workplace as a hospital, the healer's brother answered that they are a staff of twelve members with wards where patients can be admitted. About whether all staff members can diagnose and prescribe medicine to patients, he disagreed. He explained that they are only three people: 'ubaba' (doctor), an old man who puts on a red overcoat and himself that can treat patients. In fact, the seniors put on red overcoats whereas others put on green ones. About the jobs done by others, he answered that they have one security guard, two secretaries, one driver, one cleaner and four nurses.

When asked about the locality of the medicinal herbs used to treat their patients in the light of being a foreigner operating among Xhosa people, he responded that they use a few medicinal plants from around. However, they preferred using plants from their home country that he alleged to be more efficant than the ones that grow locally. About what causes the difference, his explanation was that the soil of this area has a lot of salt because of being near the ocean. He further asserted that medicinal plants suck in this salt, which reduces their healing powers. When asked where they learnt about the uses of these plants, his response was that though they come from a family of traditional healers, they received some further training at a traditional school.

About how they could be of assistance and what problems schools might face when they embark on teaching about uses of these medicinal plants, the brother answered that the medicinal herbs they stock are in such a processed form that they cannot be identified with the plants they are processed from in nature. It needed some time to take one to places where they are collected and be shown the different types and their uses explained. However, he could not imagine how teachers would go about diagnosing illnesses, a job done by well-trained and experienced traditional healers. He further asserted that traditionally, I ought to understand that there is some knowledge which cannot be divulged to other people.

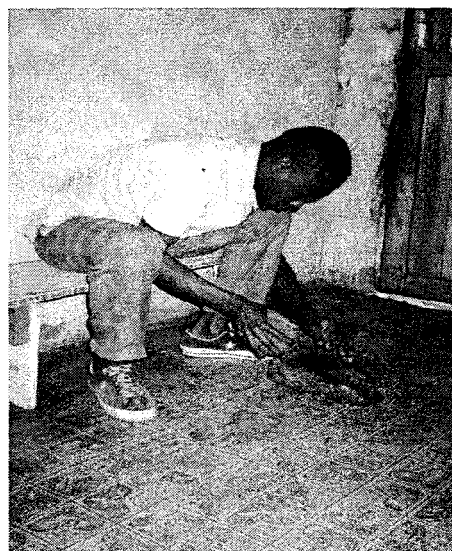
5.2.3.4 An interview with the sangoma

This lady healer who is about 32 years old demanded that her name should not be disclosed in the study. Hence throughout this interview, I shall refer to her as ‘Sangoma’, a name given to a Zulu traditional lady healer. The interview took place after she had taken me to two of the sites where she collects medicinal plants (refer to 5.2.1.2).

When asked how she became a sangoma, she replied that she had been sickly for a long time. One day her relatives took her to a traditional healer who diagnosed the sickness as a ‘call’ to heal people. She then started training towards becoming a sangoma for a period of one year.

Asked about her view on teaching indigenous knowledge of medicinal plants to Grade 9 learners, Sangoma retorted that it was a good idea, but she could not imagine how someone taught such knowledge at school could be as good as the one chosen by ancestors.

On the question of which common plants cure certain diseases, she replied that no single plant could heal an ailment efficaciously. It requires a combination of different plants. She further explained that even the application differs, some herbs are used as ointments, and others are mixed with water for either drinking or bathing, whereas others are inhaled.



**Photo 6: Preparation of some medicinal plants by
a traditional healer assistant**

About the time she spends with a patient, she explained that it depends on the type of sickness;

a simple ailment can take about half of an hour in diagnosing and prescribing herbs, whereas a complicated illness can take some hours followed by daily checkups until a patient attains a satisfactory condition.

On the question of the efficacy of 'uMhlonyane', a herb that is known by many as a remedy for flu, Sangoma replied that it is good but there is a better one known as 'ngxina' when mixed with 'uMhlonyane'. However, if the flu persists, she advised that one has to visit a medical clinic for an injection.

When asked about her popularity as a sangoma who recovers stolen goods and helps people to win court cases, she broke into laughter. She then narrated one incident when one man whose car had been stolen came to her for assistance. She gave him a route map of where he would find the car together with some herbs for bathing and burning. The map led him to a backyard where the car had been hidden. Without asking questions, he shot dead the owner of the house. Since then, she does not give people route maps, sometimes she resorts to informing the police who usually arrest the culprits.

5.2.3.5 An interview with a parent, Mr. R

The parent who is in his early sixties was chosen for interviewing because of his fluency in English, the language used for interviewing and because of his age that reflected someone who could have used medicinal plants before in his lifetime.

When I asked the parent why medicinal plants are no longer used by everyone, his response was that with the advancement of technology in all scientific sectors, people eat tinned foods that used not to be eaten. Coincidentally or as a result, such foods come along with diseases that can be treated more easily by synthetic medicinal drugs than with the local medicinal plants.

About African potato, which is manufactured from a popular medicinal plant known in the Xhosa language as 'iLabateka', with disbelief the parent indicated that he has been seeing advertisements of the medicine without knowing that it is processed from a plant that he knew.

When asked if he grew up using medicinal plants and whether he was still using them, he

agreed noting that a medicinal plant like ‘Umhlonyane’, with a botanical name *Cotula anthemoides*, which cures flu and fever is much better than the cough mixtures that are obtained from health clinics. About the future of using medicinal plants despite increased health care services, he was of the view that it was bright in that when people fail to get healed in hospitals they turn to medicinal plants as a last resort.

On the issue of some good medicinal plants and what they cure, he mentioned ‘mathunga’ that heals broken bones and wound-stabs. He also pointed out ‘ikhala’ known as *Aloe ferox* that is a good remedy for stomachache.

About whether he belonged to any religious denomination, he responded that he was a Christian. On the view of his denomination about the indigenous uses of medicinal plants, he said that it did not approve of such uses as followers had to believe in Jesus and not in plants.

Asked if he saw any need for the young generation to learn in a formal way about the indigenous uses of these medicinal plants, his response was that even the trusted traditional healers on these uses sometimes do not know the right plant for an ailment. Hence he was of the opinion that it would empower the young ones with skills of identifying the right plants and stop relying on only dreams to cure ailments.

About his availability to assist in integrating the indigenous knowledge of medicinal plants in the science curriculum, he had no immediate answer but rather pointed out that their children were not motivated to learn.

When asked about what problems teachers are likely to face in the light of teaching knowledge that is supposed to be known by only people who have been ‘touched’, he was of the view that if the indigenous knowledge is taught in schools even the ‘touched’ ones would benefit by learning what they do not know from the teachers or even their children after learning about it at school.

5.2.3.6 An interview with a second parent, Mr. K

When Mr. K was asked if he grew up using medicinal plants and whether he still uses them, he admitted that he used to rely on these plants for all his health-care. However, he attributed

his partial reliance these days to plant pollution.

On the question of whether some people will still use medicinal plants despite increased health services, he was positive and attributed it to lack of health facilities in remote areas. About some of the good medicinal plants, he gave an example of 'mathunga' that is drunk to cure broken bones and heal stab wounds.

When asked how his church views the indigenous uses of medicinal plants, he responded that it supports anything created by God including medicinal plants used for the well being of mankind. On the question of any need for the young generation to learn in a formal way about the indigenous uses of these medicinal plants, he was positive. His explanation was that young ones have to be taught about the effective traditional ways of healing involving plants that can no longer be learnt at home.

On his availability to assist in the light of the Department of Education plans to integrate indigenous knowledge of medicinal plants into the science curriculum, the parent accepted. About problems that educators are likely to incur during the integration process, he predicted lack of co-operation from learners due to their poor indigenous knowledge background and the non-availability of these plants.

5.3 Analysing interviews with the community members

The analysis of the interviews that took place between community members who included a herbal practitioner, a sangoma, two foreign traditional healers and two parents follows below:

5.3.1 Training of healers

All the healers in this study indicated that they received some training in the use of medicinal plants. The herbal practitioner spent sleepless training himself by reading volumes of books on medicinal plants whereas experienced traditional healers trained other healers. It leads one to believe that even those who receive a 'call' have to undergo some formal training. Furthermore the concern of the parent Mr. R that sometimes even a trusted traditional healer cannot identify the right medicinal plant to cure an ailment, indicates that training is an on-

going process that has to continue throughout one's career. This information gathered on the training of healers is a relief to science educators who could have reservations on teaching knowledge that is purported to be held by those who have been touched.

5.3.2 Common medicinal plants that can cure diseases

Although the herbal practitioner and the two foreign traditional healers noted that most South African medicinal plants are not as effective as foreign imported medicinal herbs, they recommended some good ones that included; 'ikhala', 'uMnga' and 'ilabateka' (refer to table 2.3 for botanical names and their medicinal uses). Furthermore both parents, Mr. R and Mr. K cited 'mathunga' as a plant that can heal broken bones and wound-stabs.

Some teachers in the focus group and most learners in their artifacts noted that 'uMhlonyane' is an effective remedy for flu. However, the sangoma (refer to 5.2.3.4) revealed that it is only effective when mixed with 'ngxina'. She further advised that if it persists then one has to visit a clinic.

About the difference in efficacy between South African medicinal plants and the imported medicinal herbs, the herbal practitioner and the first foreign traditional healer attributed it to a lack of research by South Africans on their medicinal plants. However, the second foreign traditional healer had a different view from the other two. He was adamant that the healing powers of South African medicinal plants were reduced by the presence of a lot of salt in the South African soil found near the Indian Ocean. This explanation leaves one wondering whether South African medicinal plants that grow inland could be as efficient as those he brings from his home country, which is land-locked.

5.3.3 Views on introducing indigenous knowledge of medicinal plants into the science curriculum

All the community members seemed to support the idea of introducing medicinal plants into the grade 9 General Science learning programme. The parent, Mr. R pointed out that the integration could empower their children with skills of identifying the right medicinal plants and not only rely on the dreams of most traditional healers.

However, the community members had different reservations on the process of implementing

indigenous knowledge of medicinal plants and the effectiveness of teaching such knowledge. The herbal practitioner who was a teacher before could not imagine how a teacher who has never been a curriculum designer can go about such a difficult and sophisticated task. Also, the first traditional healer wondered how curriculum designers could combine the indigenous knowledge of the different cultures in South Africa. Both Sangoma and the brother of the second traditional healer were concerned with the expertise that learners can get from teachers who are neither well trained nor touched by ancestors. Such a concern could be linked to what Thorpe (1993) noted about the training of a traditional healer (refer to 2.10).

5.4 Support of professionals at a University

5.4.1 An interview with a professor of pharmacognosy

The interview with a professor of pharmacognosy took place in the faculty of pharmacy at a university in the Eastern Cape province. Pharmacy is a field that includes the subject pharmacognosy, which deals with the identification of medicinal plants, their uses and geographical locations together with the analysis of natural products and a study of the biogenesis of secondary metabolites. The discussion of the interview that took place after several visits to the department follows below:

When the professor was asked if there was any need of integrating indigenous knowledge of medicinal plants into the science curriculum of Grade 9, she answered that there was an enormous need to learn about indigenous knowledge of medicinal plants because researchers in the discovery of a new medicinal drug can use it. She added that the more we know about the natural value of such plants, the more we respect nature.

She admitted that this would mean conserving these plants and nature at large. She further suggested that the other need would be to identify some toxic plants, which are unknowingly used as remedies.

Asked if the structure of the pharmacy curriculum included a section on medicinal plants, she replied that indigenous knowledge of medicinal plants used to dominate the curriculum. However, it has been phased out gradually and presently little is covered in the second and

fourth year of the course. She assured me that they intend reintroducing it.

About the cause of such a trend, the Professor explained that before pharmaceutical industries, the world relied on medicinal plants. As the industries increased, manufacturing synthetic medicinal drugs became easier than looking for medicinal plants. These days, some diseases are so resistant to synthetic drugs that pharmacists are turning to mother nature for its medicinal plants. They replicate natural ingredients obtained from these plants.

About problems the professor is likely to encounter in reintroducing indigenous knowledge of medicinal plant into the pharmacy curriculum, a noble job similar to mine, she admitted that although she had not started, getting information from traditional healers was going to be a major problem.

When asked about how knowledgeable traditional healers were on the uses of medicinal plants, she answered honestly that some of the medicinal herbs they use are good but others are useless.

5.4.2 An interview with a taxonomist

This gentleman classifies and identifies plants at a museum in the Eastern Cape province. I decided to interview him after realising that he had an interest in identifying medicinal plants and sometimes making this information available to the public.

When asked if there was any similarity in the naming of plants in Xhosa and Latin, the taxonomist revealed that the difference was not very big. He explained that in both languages, sometimes plants are named after their geographical locations or after their colour. However, he noted that in the Xhosa language some plants are named after their uses and cited an example of *iNtelezi* plants that are used for bathing, whereas in Latin they are named according to the plant taxonomy.

About how much people knew about the indigenous uses of medicinal plants, his response was that in Glennmore, a rural area where he carried out research, about 90% of the population knew the uses of at least 3-4 plants. This finding led him to believe that such knowledge was common. It surprised him to hear that in the study I was carrying out in the sub-urban area, only about 30% of the population knew about uses of 3-4 plants.

On the integration of indigenous knowledge of medicinal plants into the science curriculum, the taxonomist was of the view that what seems to be common knowledge could be taught but had a strong feeling that knowledge involving preparations of different plants to cure an ailment, which might only be known by traditional healers, should not be integrated. When asked for the reason, he answered that such knowledge constitutes one's intellectual rights on which they survive and it would be unfair to make such knowledge available to everyone.

When asked if he thinks that people know how to conserve these medicinal plants that are becoming increasingly popular, he replied that it was a problem and noted that in the olden days, there used to be few people collecting medicinal plants. Under the guidance of their chiefs, the collectors knew the right place to collect the plants at a certain time in the year. These days, there are so many people involved in the business that the first person to reach a site collect all, leaving nothing for the next person to come. He maintained that greed has taken over the natural conservation.



Photos 7 and 8: Uprooting of medicinal plants by herbal assistants

About South African medicinal plants being less effective than imported medicinal plants, the taxonomist had a different view. He cited an example of a plant in Tanzania with healing powers that are not known by the local people. The same plant is exported to Israel where it is treated and brought back to the local people as an effective remedy for curing malaria. He was of the view that the same could apply to some South African medicinal plants.

5.5 Analysing the support of the professionals

Both academicians supported the idea of integrating indigenous knowledge into the science curriculum. Among the reasons for integration, the professor indicated that students who may become researchers in the discovery of a new drug could use indigenous knowledge. She also noted that knowledge of the natural value of plants could lead to conserving these plants and nature at large. She added that the other need would be to identify some toxic plants like those appearing in table 2.5 (refer to 2.11) that are unknowingly used as remedies.

On which indigenous knowledge of medicinal plants to include in the science curriculum, the taxonomist was of the view that what seems to be common knowledge could be taught. However, he had a strong feeling that sophisticated knowledge involving preparations of different plants to cure an ailment, which might only be known by traditional healers, should not be integrated.

About how much people knew about the indigenous uses of medicinal plants, the taxonomist was led to believe in the research he carried out in a rural area that such knowledge was common. This belief was in contrast with the data I gathered from a sub-urban area in this study where only 30% of the population knew about the uses of 3-4 plants.

On the effectiveness of South African medicinal plants, the professor noted that some of the plants used are good but others are useless. However, the taxonomist seemed to be of the view that even those that appear to be useless can become effective after undergoing treatment. This view calls for a need to carry out more research on all South African plants that are purported to be effective.

5.6 Summary

This chapter has explained the data collected in observations and interviews conducted with some community members and with two academicians. The data gathered during observations have been analysed separately from that gathered using interviews. Also the data gathered on views of the academicians have been analysed together. The analysis has revealed a general trend of support amongst the informants to integrate indigenous knowledge of medicinal plants into the science curriculum.

CHAPTER SIX

DISCUSSION

6.1 Introduction

This chapter puts pieces from the previous chapters together in the form of a discussion. It makes use of the literature review as a springboard to reflect on the positive and negative aspects of the data collected and analysed. These aspects constitute factors that could influence the integration of indigenous knowledge of medicinal plants into the General Science learning programme for grade 9.

6.2 Discussion of the learner questionnaire

The statements in the learner questionnaire sought either the opinion or attitude of a learner towards indigenous knowledge of medicinal plants and its probable integration into the science curriculum. Findings from the current study, in which over 70% of learners and all the community members interviewed in this piece of work reported using medicinal plants, reinforce trends reported elsewhere in the literature review (van Wyk 1998).

Results from the focus group of learners, in which they indicated that learning about medicinal plants would help them differentiate between toxic and non-toxic herbs, support concern in the literature on the toxicity of some medicinal plants (Louw 1999). Furthermore, one of the reasons for integrating indigenous knowledge of medicinal plants into the grade 9 learning programme that were cited by the professor of pharmacognosy (refer to 5.4.1) was the need to identify toxic plants that are unknowingly used as remedies.

6.3 Discussion of the teacher questionnaire

The study has indicated that over 80% of teachers who answered the questionnaire admitted that they knew very little about OBE. Also, it has also been found out that all the educators agreed that the integration of indigenous knowledge could motivate learners and probably

improve on their poor performance in the science subjects. Yet, the integration of this knowledge has been proposed in the new curriculum that is based on the unfamiliar OBE. It is feared that this could have serious implications for the implementation of any new curriculum based on OBE in general and the integration of indigenous knowledge of medicinal plants in particular.

Furthermore, teachers who took part in the focus group did not seem to have a good command of the indigenous knowledge of medicinal plants. Integration of such knowledge could require them to attend in-service training, make consultations with the custodians of this knowledge in their area and look for the scarce resources on medicinal plants.

6.4 Discussion of the principal's interview

The school principal's responses in the interview reflected an awareness of Outcomes Based Education. By noting that OBE is based on democratic principles, he concurs with Kahn (1995) in the literature review (refer to 2.4.3). Kahn (*ibid.*) maintained that this type of education would include the core values of democracy characterised by equity, non-racism and non-sexism. Also some of the characteristics of OBE mentioned in 2.4.2 that refer to the assistance of each learner and accommodation of each learner's needs emphasise these core values.

6.5 Discussion of the interviews conducted amongst community members

The ages of the three traditional healers interviewed in this study were in the range of 30-40 years. This age range contradicts the findings by Ngwane (1999) that it was only the elderly who had a good indigenous knowledge of medicinal plants. Furthermore, although the two parents interviewed were above 60 years of age, they seemed not know much about the indigenous knowledge of medicinal plants.

The manipulation of western religions, by two out of the three traditional healers interviewed, in treating their patients agree with the literature review in which Thorpe (1993) noted that the demarcation between traditional healing and Christian religions is at times thin. Also the claim made by the herbal practitioner that there is a verse in the Bible stating that for each and

every disease there is a plant, which cures it, throws some light on the manipulation.

The traditional healers' interviews and the literature review in this study indicated that in most cases, a cure of an ailment involves a combination of several medicinal plants including those that inhibit side effects. However, the taxonomist suggested that such sophisticated knowledge should not be integrated into the grade 9 learning programme, as it constitutes one's intellectual rights. This suggestion leaves one with a limited scope of indigenous knowledge of medicinal plants that can be included into the programme.

6.6 Discussion of interviews conducted amongst professionals at university

The support of the two academicians to integrate indigenous knowledge of medicinal plants into the grade 9 General Science learning programme is the same as that of other informants elsewhere in the study. Also Mtshali (1994) and Masuku (1999) echoed the same support in the literature review.

The taxonomist noted that natural conservation in which medicinal plants used to be collected in different places at specific periods of the year is no longer possible due to lots of people collecting them from limited resources. Also the professor of pharmacognosy indicated that learning about the indigenous knowledge of medicinal plants would enable us to respect nature, which could lead to conserving these plants. The concern of these two academicians is in line with what was stated by Ngwane (1999) and Best (1994) in the literature review about the conservation of these plants. Unfortunately, it may not be easy at school level to reach out to the people who gather medicinal plants and inform them about the dangers of not conserving these plants.

6.7 General discussion

Kuiper (1999) in the literature review noted that there was a need to close the gap between African science and Western Science. Also in the interview with the principal of X. SSS (refer to 4.4.4), I asked him about his views on the possibility of including African traditions and beliefs that have a bearing on science in the new curriculum. His response that it was a good

move where African education and Western education could be fused together is similar to the need advocated by Kuiper (*ibid.*). However, Gumede (1990) as quoted by Hutchings (1996) dismissed the notion of having a gap between the two disciplines. He maintained that where one discipline fails another one takes over. Probably Gumede's view can be well illustrated by the data collected in this study where the herbal practitioner, the first traditional healer and Sangoma admitted to visiting medical practitioners for their ailments that could not be treated by their herbal medicine.

The brother of the second traditional healer (refer to 5.2.3.2) noted that most of the medicinal plants that grow in the Eastern Cape province are not as effective as the ones that grow in his landlocked home country. His explanation was that the soil of the province contains a lot of salt due to being situated next to the coast. Plants suck in this salt resulting in a loss of their healing powers. Although this study could not compare soil in a landlocked country with the soil found next to the coast, the traditional healer's explanation sounded similar to an explanation that may be given by a western scientist.

6.8 Summary

There is general support from teachers, parents, learners, traditional healers, herbal practitioner and professionals in this study to integrate indigenous knowledge of medicinal plants into the Grade 9 learning programme. The following are some of the reasons given for their support:

- ◆ Learners' familiarity with some indigenous knowledge of medicinal plants and their interest in the integration process could probably improve on their poor performance in the science subjects.
- ◆ Sometimes, traditional healers rely on dreams for a cure. However, not every dream comes true. Studying about the indigenous knowledge of medicinal plants at school could reduce reliance on such dreams (Mr. R, one of the parents interviewed).
- ◆ It would be one of the ways of providing tuition based on democratic principles where African education is taught side by side with Western education (Principal of X SSS).
- ◆ Learning about medicinal plants is knowing about nature. The more we know about nature the more it can be respected (Professor of pharmacognosy).

However, the following factors identified in the study could hinder the integration process:

- ◆ Educators' lack of enough knowledge of OBE, a vehicle through which indigenous knowledge of medicinal plants might be integrated.
- ◆ Educators' limited knowledge about the indigenous uses of medicinal plants.
- ◆ Schools' lack of enough resource material on the indigenous knowledge of medicinal plants.
- ◆ Ignorance of conservation skills that has led to a scarcity of some medicinal plants.
- ◆ The reluctance of traditional healers to part with indigenous knowledge of medicinal plants that they consider to constitute their intellectual rights.
- ◆ Some learners come from religious backgrounds against the use of medicinal plants.

CHAPTER SEVEN

CONCLUSION AND RECOMMENDATIONS

7.1 Conclusion

According to Stake (1995:85), results from a case study are not generalisable because of the sample that is a small percentage of the population. However, results have showed close similarities with factors that affect science learning in Curriculum 2005 that were found by earlier researchers such as Wilkinson (1998), Muwanga-Zake (1999), Ngwane (1999) and the recent Review report on Curriculum 2005 submitted to the Minister of Education, Prof. Kadel Asmal. Some findings also agree with my science teaching experience of 16 years.

The study was carried out in a semi-urban area. Hence the findings do not lead to conclusive evidence regarding factors that can influence integrating indigenous knowledge of medicinal plants into the Grade 9 General Science Learning Programme at schools found either in urban areas or in rural areas. Valid comparisons with urban schools and rural schools could be obtained by replicating this study.

Triangulation between questionnaires, interviews, class artifacts and observations provided reliable results and could be tried again in a similar combination. Interviewing the informants after establishing a rapport through regular visits paved the way for openness, which was crucial in the study.

7.2 Recommendations

The study found interest among some learners to integrate indigenous knowledge of medicinal plants into the new science curriculum based on OBE. However, the curriculum designers who have to include teachers, ought to first identify the factors, which influence the integration process. In this study, I have tried to identify such factors, and feel obliged at this stage to recommend the following:

The custodians of indigenous knowledge of medicinal plants are mostly traditional healers,

who command respect among their communities but are not officially recognized and subsidized by the government. Knowledge about the indigenous uses of medicinal plants constitutes one's intellectual property rights. When this knowledge is gathered from its custodians, sometimes it is exchanged for free. The allegation is that it is pirated to the western scientists who are recognized and sponsored by their government. Hence there is a need for the South African government and in particular the Department of Education to bring on board these healers and other herbal practitioners who have become knowledgeable through experience. They could assist in drafting written resource materials on medicinal plants.

Teachers at the school where the research was based were surprised to hear that such knowledge could be integrated in the science curriculum. This view could be the same with other teachers at other schools. Hence there is a need to orientate them in the form of workshops on the science involved in the indigenous knowledge of medicinal plants. Furthermore, in-service training has to be carried out at community level, on the knowledge of some popular medicinal plants and how it can be integrated into the science curriculum.

Most medicinal plants are herbs (refer to Fako *et al.* 1990) that are uprooted by herbal practitioners and unfortunately are not replaced. More research has to be carried out on how seedlings can be planted and how the plants can be conserved.

Some of the respondents in the learner questionnaire came from religious backgrounds that discouraged use of medicinal plants. Science educators have a task of guiding such learners about the misconceptions they have about these plants. They have also to make learners aware of the dangers involved in abusing some medicinal plants like 'dagga'.

In the learner focus group, some learners indicated that medicinal plants neither grow in kraals nor in sandy soils. More research could be carried out on where and how learners get such ideas.

The identification of factors that could influence the integration of indigenous knowledge of medicinal plants side by side with the grade 9 science on anatomy of plants has not received much attention in this study. It would form a study on its own.

7.3 Reflections of the study

As a novice researcher, I feel that the structure of this half-thesis would have been different if done by a more experienced researcher. Furthermore, investigating factors that could influence integrating indigenous knowledge of medicinal plants into the science curriculum more especially in the Eastern Cape province, is a field that according to my knowledge has not received any attention from researchers. Hence moving from one part of the study to another has been like walking on thin ice.

I started this study with a quotation by Dechamp (1999), who acknowledges that there is no continent that can claim never to have used some plants as medicines to cure various diseases. More searches through the literature could not disagree or agree with Dechamp. Nevertheless, it revealed enough evidence that several countries use different medicinal plants to cure different ailments.

The literal meaning of the word 'herb' is a soft-stemmed plant. However, in the literature review as well as in some interviews, often I came across the word 'herb' used synonymously with the words 'herbal medicine', 'medicinal herb' and 'medicinal plant'. To avoid confusion of the reader, I have used only the three terms interchangeably.

This piece of work has brought me closer to some community members who include parents that took part in the research and those I found in the research sites. It has left some of my colleagues with a debate on whether indigenous knowledge of medicinal plants can be of value to our learners, something to which many had never given a thought. Furthermore, it has enabled me to hear, analyse and discuss the views of some of my grade 9C learners concerning the integration of indigenous knowledge of medicinal plants into their General Science learning programme.

When I look back, I feel that the following have contributed to my strengths throughout the research process:

My supervisor, Mrs. Gill Boltt, who became fascinated by my topic the first time she heard about it and since then she became supportive all the way throughout the research process. My principal, who from experience, was positive about the usefulness of medicinal plants, which

he found to be better in healing ailments than synthetic drugs. He also gave me permission to involve grade 9 learners in the study.

Learning about the indigenous knowledge of medicinal plants, some of it unknown to some indigenous South Africans, made me feel a sense of belonging to a country where I became a citizen by naturalisation.

Last but not least is my grandmother. Though she died more than 26 years ago, this space in time has not affected my sweet memories of how she used to treat my ailments with medicinal plants, some of which are recommended by both traditional healers in the interviews and authors in the literature review.

On the other hand, some of my weaknesses included a failure to have detailed references for some quotations in the literature review, which led to their exclusion. Another weakness was in translating the learners' discussions that were conducted in both Xhosa and broken English into intelligible English. Some important information could have been left out in the process.

I would like to end the reflections with a frustration note. I have taken a year working on this study about identifying factors that could influence the integration of indigenous knowledge of medicinal plants into grade 9 Natural Science learning program. These factors could be used by curriculum designers this year in preparation for the implementation of curriculum 2005 in grade 9 next year in 2002. However, three weeks today in the new 2001 academic year, the grade 8 educators at X. SSS are still teaching in the traditional way using the old textbooks. It is not a problem of their own making. Though they received copies of grade 8 textbooks based on OBE last year from publishers, there are still waiting for workshops and in service training on OBE.

The question that I leave hanging is: Apart from getting another qualification, would this work ever be recognised at a national level let alone in the academic circles?

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APPENDIX 1: GRADE 9C MEDICINAL PLANT ASSIGNMENT

INSTRUCTION: Copy and complete the following table by filling in name of a plant, part of plant used, what it cures, where it is found and how it is prepared.

Name of plant	Part of plant used	What it cures	Where it is found	How it is prepared

APPENDIX 2: A MEMORANDUM OF THE MEDICINAL PLANT ASSIGNMENT

Name of plant	Part of plant used	What it cures	Where it is found	How it is prepared
Umhlonyane mixed with Ingxina	leaves	fever	Umhlonyane is sometimes grown in home gardens. Ingxina is picked up from bushes around locations.	mixture is boiled in water and drunk after cooling
Inongwe	roots	cleans blood; reduces the opportunistic diseases in the AIDS sufferers	all over the Eastern Cape province	boiled in water and drunk after cooling
Ikhala	leaves	relieves stomachaches	common	boiled in water and drunk after cooling
Mathunga	leaves	heals broken bones	common	
Dagga	leaves	unblocks chest	common	boiled in water and drunk after cooling
Uchitibhunga	stem	used in psychological healing	common	added to water for bathing
Intelezi	leaves	used in psychological healing	common	added to water for bathing

APPENDIX 3:

LEARNER ARTIFACT OF THE MEDICINAL PLANT ASSIGNMENT

Location

Istigieshu Nokomusaba, 7th live at

Name of Plant	What it cures	How it Prepared	Where it is found
Umpungana	Fever	Take mungana mixed with water after boil drink	Kwalini location
Umentzi	Pimples	You take a cipice and put water and fruit	Bonke location
Intsingu	HEADACHE	you fire the legnes and smell it	Sweet waters.
Nongkinga	Sores	You boil the water and mix it with jongkwa and suga and drink	In the CiciDeni
Nathungu	When you are Broken	Direct cipice of Nathungu and put in the bottle with half of cold water and shake after drink	NEAR THE RIVER

APPENDIX 4: LEARNER QUESTIONNAIRE

INSTRUCTIONS

➤ You may not write down your name.

➤ Answer all the questions by putting a cross in the slot of your correct choice

		Strongly agree	Agree	Neutral	Disagree	Strongly disagree
1.	Knowledge of medicinal plants in my area is important.					
2.	At University, one can study about medicinal plants					
3.	Some witch doctors use toxic medicinal plants to harm or kill people.					
4.	General Science would be more interesting if a topic on how we use some plants for healing is included.					
5.	Studying about indigenous knowledge of medicinal plants is only useful to learners in rural schools.					
6.	Traditional healers are the only people who have knowledge of medicinal plants.					
7.	Learning about medicinal plants used in my area, helps to know my culture.					
8.	Some medicinal plants perform better than drugs bought from pharmacies.					
9.	Medicinal plants can grow anywhere.					
10.	My church does not want me to use medicinal plants.					
11.	Bathing water with some plants brings good luck.					
12.	The preparation of plants for a cure involves too many stages to be known by every one.					
13.	I enjoyed learning about plants in Grade 8.					
14.	My parents do not want me to use medicinal plants.					
15.	Some people grow medicinal plants in their gardens.					
16.	It is not easy to differentiate between toxic and non-toxic medicinal plants.					
17.	Older people know more about the uses of medicinal plants than the young ones.					
18.	Evil spirits can be chased away by using some medicinal plants.					
19.	Some medicines sold at pharmacies are made from medicinal plants.					
20.	Some medicinal plants are dangerous.					

APPENDIX 5: TEACHER QUESTIONNAIRE

INSTRUCTIONS

You do not have to write down your name

Answer all the questions by either indicating agree /yes or disagree/no

Please back up each answer with a reason and be sincere.

1. I have knowledge of the principles on which OBE is based.
Agree -----
Disagree -----
2. I have read through some of the new Grade 8 OBE books.
Yes -----
No -----
3. The contents of these OBE books are not so much different from those in the old books that we have been using.
Agree -----
Disagree -----
4. I need a lot of in-service training as well as workshops in order to base my teaching methods on OBE principles.
Agree -----
Disagree -----
5. The proposed curriculum 21, which is also based on OBE principles as curriculum 2005, is likely to include African traditions and beliefs that have a bearing to school science.
Agree -----
Disagree -----
6. Indigenous knowledge of medicinal plants is part of one's culture.
Agree -----
Disagree -----
7. The cultural background of our learners could contribute to their poor performance in science.
Agree -----
Disagree -----

8. The integration of indigenous knowledge of medicinal plants into the science curriculum could motivate our learners and probably improve on their performance.
Agree -----
Disagree -----
9. Whatever changes are made in the curriculum, a teacher remains the major factor in the success of his/her learners.
Agree -----
Disagree -----
10. The lack of responsibility of learners to their learning can frustrate even the best teacher.
Agree -----
Disagree -----
11. Traditional healers, herbal practitioners and people who grew up on farms are the only ones with a good knowledge of medicinal plants.
Agree -----
Disagree-----
12. Medicinal plants are not as efficant as synthetic medicinal drugs.
Agree -----
Disagree -----

STRENGTHS

1. DEDICATED TEACHERS, GOVERNING BODY, MGT AND SRC. QUANTIFIED TEACHERS
2. MUSIC, SPORT
3. RESOURCES THAT WE GET FROM ALL SAINTS COLLEGE
4. ~~TEAM~~ STAFFS ON THE ~~STH~~ ~~STDS~~ 1911
4. TEAM WORK SOCIALLY
5. EXEMPTIONS FROM PREVIOUS RESULTS
6. TRANSPARENCY
7. QUANTIFIED AND EXPERIENCED TEACHERS
8. EXCELLENT IDEAS
9. STUDY SESSIONS CAN BE USED EFFECTIVELY

WEAKNESSES

1. LACK OF CONSISTENCY WHAT IS SAID IS NOT IMPLEMENTED
2. COMMUNICATION IS A PROBLEM FROM INGT STAFF AND PUPILS
3. LATE COMING AND INABILITY OF TEACHERS TO MEET THEIR PERIODS
4. TEAMWORK ACADEMICALLY IS VERY POOR
5. LACK OF DISCIPLINE DUE TO POOR CLASS CONTROL OR ABSENTEEISM.
6. GUIDANCE NOT GIVEN ON STUDY SKILLS
7. NO CO-OPERATION FROM PARENTS, PARENTS NOT PAYING FEES NOT ATTENDING MEETINGS
8. PUPILS ^{THAT ARE} NOT MOTIVATED TO LEARN, THEY DON'T WRITE HOMEWORKS AND TESTS.

9. DEMOTIVATED TEACHERS BY GOVT AND PUPILS
10. MGT CONTROLLING SUBJECTS THAT HAS NO KNOWLEDGE OF THEM.
11. MGT NOT MONITORING WORK OF THE TEACHERS
CONTROL TAKES PLACE DURING EXAMS
12. SCIENCE KIT NOT USED
- 13.

OPPORTUNITIES

1. OFFICES MEET TO US FOR ANY INFORMATION THAT WE NEED
2. COMMUNITY LIBRARY TO BE USED BY OUR STUDENTS
3. EDUCATIONAL VISITS / EXCURSION
4. SUPPORT PROGRAMMES, WORKSHOPS, AFTERNOON CLASSES, SUBJECT ASSOCIATIONS, PHOTOCOPIER AND MATERIAL FROM ALL STAFFS
5. SCHOOL POLICY IN PLACE

THREATS

1. LACK OF RESOURCES E.G. TEXT BOOKS
OVERHEAD PROJECTORS COMPUTERS ECTS
2. CARING OF DANGEROUS WEAPONS AT SCHOOL
(GASTERISM, VANDALISM)
3. ABSENCE OF PUNISHMENTS DUE TO ACT
IMPOSED BY GOVT
4. NEED OF FENCING AROUND THE SCHOOL
5. SHORTAGE OF TEACHERS ESPECIALLY TO
SENSITIVE / CAUTION SUBJECTS LIKE MATHS / SCIENCE

APPENDIX 7: A TRANSCRIPT INTERVIEW WITH AN HERBAL PRACTITIONER

Q. How effective are the medicinal plants that you use?

A. Most South African medicinal plants are weak and as a result, I use a few together with foreign medicinal plants from countries like Germany, China, Spain and India. However, no single medicinal plant can cure an ailment satisfactorily, it needs a combination of different medicinal plants.

Q. Does the treatment you give to AIDS patients cure them of AIDS?

A. My treatment has never turned HIV positive patients negative, but it boosts their immune system and halts opportunistic diseases that arise as a result of the weakening system.

Q. What could be causing the difference in efficacy between South African medicinal plants and the foreign imported medicinal herbs that you use?

A. I am not sure of the reason. However, a country such as Germany has done a lot of research on medicinal plants much more than what South Africa has accomplished.

Q. How and where did you get knowledge of healing people?

A. I am neither a traditional healer nor a spiritual healer. I just spent sleepless nights reading big volumes of books on medicinal plants and their uses. As a result of this origin, I prefer to be called an herbal practitioner.

Q. Would you please divulge to me information on the names and uses of local and imported herbs that you give to your patients?

A. Such information is money and it is expensive because of its value. As for the combinations that I make to cure ailments, it is my knowledge that is not even known by the people who supply these medicinal herbs.

Q. What is the future of traditional healers in the light of improved healthy services?

A. Their future is bright because African people like to be told lies. They would approve of a traditional healer who tells an AIDS patient that they are bewitched. Many a

patient after failing to get a reasonable treatment either at hospitals or from a traditional healer, they use me as a last resort.

Q. Do you treat yourself on falling sick?

A. I go to my General Practitioner (GP) for only a diagnosis as such people have clinics well equipped with instruments that detect diseases. I then prescribe and treat myself using my medicinal herbs.

Q. What is your view on integrating indigenous knowledge of medicinal plants into the learning programme for Grade 9 General Science?

A. It is a good idea. However, I cannot imagine a teacher who has never been a curriculum designer can go about such a difficult and sophisticated task.

Q. Would you avail yourself to assist in integrating the indigenous knowledge of medicinal plants into the science curriculum?

A. I have no problem on condition that it comes with some remuneration. Right now, I am planning to host a programme on a local radio station about a need for the government to put up research stations in each and every town where intensive research should be carried out on purported medicinal plants.

Q. How efficant are the famous and commonly used medicinal plants such as Cape Aloe and dagga?

A. They are quite effective. One time I had an ailment that could not be suppressed by different medications. When I tried the Cape Aloe as a last resort, the ailment disappeared within a few days. With dagga, I wish that governments could put a clause to its medicinal uses. However, I have no idea of how they would stop people who use it as a hallucinogen from abusing the clause.

Q. Do you belong to any religious denomination?

A. Yes, I am a Christian.

Q. Does your church accept use of medicinal plants to cure ailments?

A. It does not have a problem, because there is a verse in the Bible, which states that for

every ailment there is a medicinal plant that cures it. There are three medicinal plants that I use on my patients, which are mentioned in the Holy book.

Thank you so much Mr. Herbal practitioner.

APPENDIX 8: A TRANSCRIPT INTERVIEW WITH A SANGOMA

Q. 'Mhlekezzi,' how did you become a sangoma?

A. I was sickly for a long time. One day my relatives took me to a traditional healer who diagnosed the sickness as a 'call' to heal people. I then started training towards becoming a sangoma for a period of one year.

Q. What is your view on introducing indigenous knowledge of medicinal plants to grade 9 learners?

A. It is a good idea, but I cannot imagine how someone taught such knowledge at school could be as good as one chosen by ancestors.

Q. What common medicinal plants cure diseases?

A. No single medicinal plant can heal an ailment efficiently. It requires a combination of different plants. Even the application differs, some medicinal plants are used as ointments, and others are mixed with water for either drinking or bathing, whereas others are inhaled.

Q. How long does it take you to diagnose and treat an ailment?

A. It depends on the type of sickness, a simple ailment can take about half of an hour in diagnosing and prescribing medicinal herbs, whereas a complicated illness can take some hours followed by daily checkups until a patient attains a satisfactory condition.

Q. How efficacious is 'uMhlonyane,' a medicinal plant that is known by many as a remedy for influenza?

A. It is good but there is a better one known as *ngxina* when it is mixed with *uMhlonyane*. However, if the flu persists, it is advisable that one visits a medical clinic for an injection.

Q. I am told that you are popular in recovering stolen goods and helping people to win court cases. Do you use medicinal plants or supernatural powers?

A. Hhhhhh! Hhhhh! (Laughter). Once upon a time, a man whose car had been stolen came here for assistance. I gave him a route map of where he would find the car

together with some medicinal plants for bathing and burning. The map led him to a backyard where the car had been hidden. Without asking questions, he shot dead the owner of the house. Since then, I do not give people route maps. Sometimes I resort to informing the police who usually arrest the culprits. About court cases, sometimes I have to sit in a courtroom during the hearing.

**APPENDIX 9: A TRANSCRIPT INTERVIEW WITH A FOREIGN
TRADITIONAL HEALER**

Q. 'Musawo', how did you become a healer?

A. I was identified by one healer at home as someone who had been touched by ancestors. I then trained for about one year.

Q. I have heard from some of your patients that the medicinal plants you use are effective. Are they different from the medicinal plants used by local traditional healers?

A. I have to be honest with you. At first my prescriptions used to be dominated by South African medicinal plants, which some patients could easily identify. Later on, I found out that most patients, who visit me, expect an alternative treatment with medicinal plants different from what the local healers or medical practitioners can provide.

Q. Sometime back I carried out a similar interview with an herbal practitioner who also uses medicinal plants from Germany and some countries in Asia. He asserted that only a few South African medicinal plants are efficant. What is your view on such a statement?

A. It is a fact. Some of the good local medicinal plants I use include **umNga** (*Acacia karoo*) popularly known at home as **Ejirikiti** and **African potato** capsules that are more effective than the **African potato** solution.

Q. What could be the cause of the difference in efficacy between our African medicinal plants and the medicinal plants that come from overseas?

A. I do not have a good explanation. However, it is a fact that some countries in Europe and Asia are more developed in herbal medicines than our African countries.

Q. I am told that some patients get better treatment from traditional healers like you than they get from medical practitioners. What causes the difference?

A. I think it has to do with 'psychological comfort', which they get from traditional healers that they may not be getting from medical general practitioners. The 'psychological comfort' involves finding out from a patient the history of their ailments, general conversations and assuring the patient that they will get better.

Although the process takes time, it makes a difference.

- Q.** What is your view on introducing indigenous knowledge of medicinal plants into the General Science for grade 9 learners?
- A.** It is a good idea. However, the problem could be in amalgamating the different indigenous knowledge of medicinal plants for the different cultures in South Africa and present it as a lesson.

Thank you so much musawo.

APPENDIX 10: A TRANSCRIPT INTERVIEW WITH A SECOND FOREIGN TRADITIONAL HEALER'S BROTHER

Q. Bhuti, why do you call this place a hospital?

A. We are a staff of twelve members with wards where patients can be admitted.

Q. Can all the staff members diagnose and prescribe medicine for patients?

A. No, we are only three people, 'ubaba' (doctor), the old man who puts on a red overcoat and myself that can treat patients. In fact the seniors put on red overcoats, whereas others put on green ones.

Q. What jobs do others do?

A. We have one security guard, two secretaries, one driver, one cleaner and four nurses.

Q. I am told you are foreigners practicing among Xhosa people. Do you treat your patients with medicinal plants from around or you collect them from your homeland?

A. We use a few medicinal plants from around. Even then, they are not as efficant as the ones that we bring from Swaziland.

Q. What causes the difference?

A. The soil of this area has a lot of salt because of being near the ocean. The medicinal plants suck in this salt, which reduces their healing powers.

Q. How did you learn about the uses of these medicinal plants?

A. Although we come from a family of traditional healers, we received some further training at a traditional school in our country.

Q. Schools may start teaching about uses of these medicinal plants, how can you be of some assistance and what problems are they likely to face?

A. The medicinal plants we stock are in such a processed form that they cannot be identified in nature. It needs spaces of time to take you to places were we collect them show you the different types and explain their uses. However, I cannot imagine how

teachers can go about diagnosing illnesses, a job done by well-trained and experienced traditional healers. Traditionally, there is some knowledge that we, healers, cannot divulge to other people.

APPENDIX 11: A TRANSCRIPT INTERVIEW WITH A PROFESSOR IN PHARMACOGNOSY

Q. Professor, the introduction of Outcomes Based Education in South African schools could lead to the integration of indigenous knowledge of medicinal plants into the science curriculum of Grade 9. Do you see any need of learning about such knowledge in science?

A. Yes, there is an enormous need to learn about indigenous knowledge of medicinal plants. Researchers in the discovery of a new medicinal drug can use it. Also the more we know about the natural value of such plants, the more we respect nature.

Q. Does that mean conserving these plants and nature at large?

A. Absolutely. The other need would be to identify some toxic plants, which are unknowingly used as remedies.

Q. Does the structure of your curriculum include a section on medicinal plants?

A. Indigenous knowledge of medicinal plants used to dominate the pharmacy curriculum. With time, it has been phased out gradually. Presently little is covered in the second and fourth year of the course. However, we intend reintroducing it.

Q. What has been the cause of such a trend?

A. Before pharmaceutical industries, the world relied on medicinal plants. As the industries increased, manufacturing synthetic medicinal drugs became easier than looking for medicinal plants. This time around, some diseases are so resistant to synthetic drugs that pharmacists are turning to mother nature for a replication of the natural ingredients in its medicinal plants.

Q. Professor, now that you are planning to reintroduce indigenous knowledge of medicinal plant into your curriculum, a noble job similar to mine, what problems are you likely to encounter?

A. I have not started off but definitely getting information from traditional healers is going to be a major problem.

- Q. How knowledgeable are traditional healers on the uses of medicinal plants.
- A. Some of the herbs that they use are good but I must be honest with you, others are useless.
- Q. Thank you so much Professor.
- A. My pleasure.

APPENDIX 12: A TRANSCRIPT INTERVIEW WITH A TAXONOMIST

Q. I am seeing plants around you. What is your involvement with these plants?

A. I am a taxonomist involved in identifying and classifying plants.

Q. As a taxonomist, do you see any similarity in the naming of plants in Xhosa and Latin languages?

A. The difference is not very big. In both languages, sometimes plants are named after their geographical locations or after their colour. However, in the Xhosa language some plants are named after their uses, for example plants that are used for bathing are called *iNtelezi*, whereas in Latin plants are named according to the plant kingdom.

Q. Do you think people know much about the indigenous uses of medicinal plants?

A. In Glennmore, a rural area where I carried out a research on medicinal plants, about 90% of the population knew at least the uses of 3-4 plants. This finding led me to believe that such knowledge is common.

Q. What would you say about a finding in the study I am carrying out in a sub-urban area, where only about 30% of the population knew about uses of 3-4 plants?

A. It is surprising!

Q. Do you think people know how to conserve these medicinal plants that are becoming increasingly on demand?

A. That is a problem. In the olden days, there used to be few people collecting medicinal plants. Under the guidance of their chiefs, the collectors knew the right place to collect the plants at a certain time in the year. These days, there are so many people involved in the business that the first person to reach a site collect all, leaving nothing for the next person to come. Greed has taken over the natural conservation.

Q. What is your view on integrating indigenous knowledge of medicinal plants into the science curriculum with an aim of making it available to all?

A. What seems to be common knowledge can be taught to all but I strongly feel that knowledge involving preparations of different plants to cure an ailment, which might

only be known by traditional healers, should not be integrated.

Q. Would you please back up your view?

A. Such knowledge constitutes one's intellectual rights on which they survive and it would be unfair to make such knowledge available to everyone.

Q. Some of my informants who include traditional healers and an herbal practitioner have indicated that most South African medicinal plants are less effective than imported medicinal plants. What is your view?

A. It may not necessarily be true. An example I would give is that of a plant in Tanzania with healing powers that are not known by the local people. The same plant is exported to Israel where it is treated and brought back to the local people as an effective remedy for curing malaria. The same could apply to some South African medicinal plants that are said to be less effective.

Thank you for your time and information Mr. taxonomist.