THE INFLUENCE OF THE B.E.S.T ENVIRONMENT SCIENCE TEACHING PROGRAMME IN SELECTED PRIMARY SCHOOLS IN ZIMBABWE

by

Charity Chirara

Submitted in partial fulfilment of the requirements for the

MAGISTER TECHNOLOGIAE: EDUCATION

in the

Department of Educational Studies

FACULTY OF HUMANITIES

TSHWANE UNIVERSITY OF TECHNOLOGY

Supervisor : Dr. J.L. Wydeman
Co-supervisor : Prof. C.J. White

2009
DECLARATION

I hereby declare that the dissertation submitted for the degree Mtech: Education at Tshwane University of Technology is my own original work and has not previously been submitted to any other institution of higher education. I further declare that all sources cited or quoted are indicated and acknowledged by means of a comprehensive list of references.

Charity Chirara
DEDICATION

This study is dedicated to all key trainers of the Better Environmental Science Teaching Programme in Manicaland Province in their effort to improve teaching approaches in primary schools.
ABSTRACT

The purpose of this research study was to establish the extent to which the Better Environmental Science Teaching Programme (BEST) influenced the teaching approaches used in the primary schools in Mutare and Mutasa Districts.

This research study investigated the use of child-centred participatory methods by teachers. It was anticipated that the teaching approaches would have improved to include more child-centred participatory methods than traditional methods, such as the lecture method, after going through this study. In fact, BEST held workshops to promote this new teaching approach. Some teachers and heads have also been trained to give in-service training to others at their school (cascading method).

This research study used quantitative and qualitative research techniques. Quantitative techniques included the use of questionnaires and qualitative techniques included interviews and observations. The questionnaires were used to enable the researcher to gather quantitative data. The observations made by the researcher were used to check whether what respondents answered in the questionnaires corresponded with what was happening in the lessons as well as what was put on paper during planning. The total number of respondents who answered the questionnaires is 250, 50 respondents were interviewed and 60 respondents were observed. The data was then represented in tables, figures, graphs and pie charts for easy analysis.

One of the findings of this research study was that a number of teachers were using some of the teaching approaches, but at varied levels, while other teachers still kept to old habits such as teacher-centred lessons. Child-centred teaching methods were being transferred to other subjects but at a very slow rate. Special attention was needed in enlightening teachers on child-centred approaches and how these should be seen or reflected in the schemes under the method/activities column.

It was noted that most teachers, although they did not wholly use the BEST teaching approaches, were generally aware of what they were expected to do. It was recommended that the curriculum development unit of the Ministry of Education, Sport and Culture be
involved in conducting workshops to encourage the use of current teaching approaches for old and new teachers. This becomes more relevant when a new syllabus is introduced. Further research can be carried out to establish the relationship that was created between outdoor lessons and the environment.
ACKNOWLEDGEMENTS

The following people, in one way or the other, helped and encouraged me to conduct this study:

The two District Education Officers of Makoni and Mutasa deserve my appreciation and gratitude for helping me throughout this study.

I am also grateful to the respondents who provided the information which made the study possible.

It would be unfair to forget my family members who forfeited so much as funds and time was shifted from them to this study.
TABLE OF CONTENTS

Chapter 1 Introduction
1.1 Background to the research study 1
1.2 Statement of the research problem 2
1.3 Sub-problems 2
1.4 Hypothesis 3
1.5 Purpose and objectives of the research study 3
1.6 Research design 4
1.7 Assumptions 5
1.8 Limitations 5
1.9 Delimitations of this research study 6
1.10 Definition of terms 6
1.11 Significance/importance of this research study 7

Chapter 2 Literature Review
2.1 Introduction 9
2.2 Why teach primary school Science? 9
2.3 The BEST Programme 11
  2.3.1 The patterns of teaching/learning 11
  2.3.2 The syllabus 11
  2.3.3 Textbooks 12
  2.3.4 Teacher support 12
  2.3.5 Equipment 12
  2.3.6 Assessment 13
2.4 A synopsis of the Environmental Science Syllabus 14
2.5 Some teaching approaches/methodologies 15
  2.5.1 The lecture method 16
  2.5.2 The discussion method 18
  2.5.3 The discovery method 20
  2.5.4 The experiment method 24
  2.5.5 The role-play method 25
  2.5.6 The game method 29
### Chapter 3 Research methodology

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1</td>
<td>Introduction</td>
<td>35</td>
</tr>
<tr>
<td>3.2</td>
<td>Research design</td>
<td>35</td>
</tr>
<tr>
<td>3.3</td>
<td>Population and sample</td>
<td>36</td>
</tr>
<tr>
<td>3.4</td>
<td>The research instruments</td>
<td>37</td>
</tr>
<tr>
<td>3.4.1</td>
<td>Questionnaires</td>
<td>37</td>
</tr>
<tr>
<td>3.4.2</td>
<td>Interviews</td>
<td>38</td>
</tr>
<tr>
<td>3.4.3</td>
<td>Observation</td>
<td>39</td>
</tr>
<tr>
<td>3.5</td>
<td>Data collection procedures</td>
<td>39</td>
</tr>
<tr>
<td>3.6</td>
<td>Data presentation and analysis</td>
<td>40</td>
</tr>
<tr>
<td>3.7</td>
<td>Conclusion</td>
<td>40</td>
</tr>
</tbody>
</table>

### Chapter 4 Data presentation, analysis and interpretation

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1</td>
<td>Introduction</td>
<td>41</td>
</tr>
<tr>
<td>4.2</td>
<td>Background of the respondents</td>
<td>41</td>
</tr>
<tr>
<td>4.3</td>
<td>BEST Programme information</td>
<td>44</td>
</tr>
<tr>
<td>4.3.1</td>
<td>Training</td>
<td>67</td>
</tr>
<tr>
<td>4.3.2</td>
<td>Child-centred approach</td>
<td>67</td>
</tr>
<tr>
<td>4.3.3</td>
<td>Use of the environment</td>
<td>68</td>
</tr>
<tr>
<td>4.3.4</td>
<td>Transfer of methodology to other subjects</td>
<td>68</td>
</tr>
<tr>
<td>4.4</td>
<td>Conclusion</td>
<td>68</td>
</tr>
</tbody>
</table>

### Chapter 5 Summary, conclusions and recommendations

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Introduction</td>
<td>69</td>
</tr>
<tr>
<td>5.2</td>
<td>Summary</td>
<td>69</td>
</tr>
<tr>
<td>5.3</td>
<td>Conclusions</td>
<td>70</td>
</tr>
<tr>
<td>5.4</td>
<td>Recommendations</td>
<td>70</td>
</tr>
</tbody>
</table>
REFERENCES

APPENDIX 1 Questionnaire  73
APPENDIX 2 Interview schedule  77
APPENDIX 3 Lesson observation schedule  79
APPENDIX 4 Schemes and plans assessment schedule  80
List of Tables

| Table 4.1 | Status of the respondents | 43 |
| Table 4.2 | Observing another teacher | 45 |
| Table 4.3 | Pupils’ rate of asking questions | 51 |
| Table 4.4 | Frequency of pupils reading books | 53 |
| Table 4.5 | Frequency of pupils’ group work/discussions | 56 |
| Table 4.6 | Indication of the doer in activities schemed | 61 |
| Table 4.7 | Learning activities taken from syllabus | 64 |
### List of Figures

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>The pupil-centred method</td>
<td>15</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>Teacher-controlled vs student-controlled methods</td>
<td>24</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>Respondents by gender</td>
<td>41</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>Respondents’ teaching experience</td>
<td>42</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>Respondents’ qualifications</td>
<td>42</td>
</tr>
<tr>
<td>Figure 4.4</td>
<td>Location of selected schools</td>
<td>44</td>
</tr>
<tr>
<td>Figure 4.5</td>
<td>BEST workshop attendance</td>
<td>44</td>
</tr>
<tr>
<td>Figure 4.6</td>
<td>Use of demonstration lessons in training</td>
<td>45</td>
</tr>
<tr>
<td>Figure 4.7</td>
<td>Pupils’ involvement in projects</td>
<td>46</td>
</tr>
<tr>
<td>Figure 4.8</td>
<td>Lesson observation by heads</td>
<td>47</td>
</tr>
<tr>
<td>Figure 4.9</td>
<td>Models/apparatus produced in lessons</td>
<td>47</td>
</tr>
<tr>
<td>Figure 4.10</td>
<td>Pupils’ interaction with the environment</td>
<td>48</td>
</tr>
<tr>
<td>Figure 4.11</td>
<td>Frequency of pupils listening to the teacher</td>
<td>49</td>
</tr>
<tr>
<td>Figure 4.12</td>
<td>Pupils’ rate of answering questions</td>
<td>50</td>
</tr>
<tr>
<td>Figure 4.13</td>
<td>Frequency of pupils watching the teacher do something</td>
<td>52</td>
</tr>
<tr>
<td>Figure 4.14</td>
<td>Frequency of pupils copying from chalkboard/book</td>
<td>54</td>
</tr>
<tr>
<td>Figure 4.15</td>
<td>Frequency of pupils doing individual work</td>
<td>55</td>
</tr>
<tr>
<td>Figure 4.16</td>
<td>Frequency of pupils experimenting</td>
<td>57</td>
</tr>
<tr>
<td>Figure 4.17</td>
<td>Frequency of pupils’ outdoor activities</td>
<td>58</td>
</tr>
<tr>
<td>Figure 4.18</td>
<td>Change in teaching approaches</td>
<td>59</td>
</tr>
<tr>
<td>Figure 4.19</td>
<td>Schemes and syllabus topics relationship</td>
<td>59</td>
</tr>
<tr>
<td>Figure 4.20</td>
<td>Skills-based objectives</td>
<td>60</td>
</tr>
<tr>
<td>Figure 4.21</td>
<td>Syllabus skills promotion in schemes</td>
<td>61</td>
</tr>
<tr>
<td>Figure 4.22</td>
<td>Teacher-centred activities</td>
<td>62</td>
</tr>
<tr>
<td>Figure 4.23</td>
<td>Pupil-centred activities</td>
<td>63</td>
</tr>
<tr>
<td>Figure 4.24</td>
<td>Use of methods in syllabus</td>
<td>65</td>
</tr>
<tr>
<td>Figure 4.25</td>
<td>More pupil activities than teacher activities</td>
<td>66</td>
</tr>
<tr>
<td>Figure 4.26</td>
<td>Outdoor activities in schemes</td>
<td>67</td>
</tr>
</tbody>
</table>
CHAPTER 1
INTRODUCTION

1.1 BACKGROUND TO THE RESEARCH STUDY

When one looks at the history of science teaching in primary schools in Zimbabwe, it is clear that from the early 1950s to the late 1970s science teaching was mainly based on the mastery of facts. The science that was taught was referred to as Nature study and pupils were required to master facts about the animals and plants around them.

The thrust in science teaching then shifted from focusing on the mastery of facts to the development of skills. The changes in the thrust of science teaching culminated in the Environmental Science Syllabus, crafted in 1994. This syllabus focused on the development of scientific knowledge, skills and attitudes. It was meant to encourage and develop pupils who were inquisitive and had the skills to come up with creative explorations.

The new Science Syllabus demanded a complete shift in teaching methodologies. The participatory teaching methodologies then took the centre stage. These methods of teaching became necessary in order for pupils to develop the required skills, knowledge and attitudes. This means that all teaching methods that were used had to be pupil-centred.

The teachers were used to using other non-participatory methods such as the lecture method. Therefore, this change in teaching methodology meant that the teachers had to change their teaching approaches and even their attitudes.

The Science Syllabus demanded child-centred methodology and this implied among other things that pupils had to be given practical activities which would enhance the development of their skills. Since most schools had no laboratories, the use of the environment as a source of learning and teaching materials and as a laboratory was emphasised. This required teachers to move beyond the walls of the classroom.
The changes in the teaching of Environmental Science in the primary schools meant that the teachers needed an orientation on the new demands of the syllabus if they were to effectively teach it. Government, through the Ministry of Education, Sport and Culture, realised the need to in-service training for teachers on the thrust of the Science Syllabus. A donor was identified to fund the workshops for primary school teachers in the entire country. The resulting programme became known as the Better Environmental Science Teaching (BEST) Programme.

The Better Environmental Science Teaching Programme, referred to as BEST, was a programme introduced to train teachers to shift their focus from teacher-centred methodologies to participatory child-centred methodologies. Thus, BEST was a staff development programme introduced for primary school teachers to give them orientation on the need to use the participatory pupil-centred teaching methodologies.

A school head and teacher from every school attended the staff development workshops. They were then expected to go back and develop other teachers. The programme, therefore, used the cascade model.

It was also emphasised that, while Environmental Science was the focus of these workshops, this was only an entry point and the same teaching approaches were to be used in the other subjects.

1.2 STATEMENT OF THE RESEARCH PROBLEM

This research study sought to examine the extent to which the BEST Programme had influenced the teaching approaches in selected primary schools in the Mutare and Mutasa Districts. The main research question, therefore, is the following:

To what extent had the BEST Programme influenced the teaching approaches in selected primary schools in the Mutare and Mutasa Districts?

1.3 SUB-PROBLEMS
In order to answer the main research question mentioned above, the following sub-problems were investigated:

1. Were the head and a teacher in the school trained at a BEST workshop in the district?
2. How were the teachers at the school developed on BEST teaching approaches?
3. Which teaching approaches did the teacher use?
4. What relationship or link was there between lessons taught outdoors and the environment?
5. Were BEST teaching methodologies being used in the other subjects in the primary schools?

1.4 HYPOTHESIS

The following hypothesis will be investigated in the research study:

*The BEST teaching methodologies had not yet influenced the teaching methods/approaches in the primary school.*

1.5 PURPOSE AND OBJECTIVES OF THE RESEARCH STUDY

Mainly, this research study intended to find out to what extent the BEST had influenced the teaching approaches in the primary schools in the Mutare and Mutasa Districts. Since BEST used Environmental Science only as an entry point from which the methodologies had to be transferred to other subjects, there was need to check whether that desired transfer of teaching methodologies had realised. The research study investigated and accounted for that transfer process.

The research study also intended to find out if the teachers had been staff developed. The staff development check was essential since one would not expect teachers to use the methods advocated by BEST, let alone to transfer them to other subjects, when in fact they had not been exposed to these methods.
Also, this research study intended to investigate whether the teachers were employing the participatory child-centred teaching approaches in Science lessons. This indicated whether the participatory child-centred methodologies were adopted in the initial subject before they were transferred to other subjects. One could not expect the teachers to use the approaches in other subjects before they could apply them in the Science lessons – the area of direct staff development.

This research study investigated if the teachers were using the environment as a source of learning and teaching materials. The use of the environment was strongly recommended by BEST and, hence, it was necessary to ascertain how far the teachers had gone in this respect.

All these investigations were done to investigate what progress was made in the process in terms of changing teaching techniques or methods from staff development to the initial subject (Science) and finally to other subjects.

1.6 RESEARCH DESIGN

A descriptive research design was adopted in this research study because it focuses on salient aspects of a phenomenon or situation. This design allows the researcher to give a factual and accurate picture of a population as it is at a specific time. Another advantage of using this research design is that descriptive words, figures, numbers or statistics can be used. In short, the design describes and interprets what there is. This includes the condition, relationship, practices, trends and processes that are there. In this research study, the researcher concentrated on the extent to which the BEST Programme had influenced the teaching approaches in primary schools in the Mutare and Mutasa Districts.

A pilot study involving ten schools was carried out to test the suitability of the research instruments used.

An element of the study approach was in-depth interviews and was an essential tool in data collection. However, the interviews were limited since only 50 respondents were involved. The interviews were mainly used to validate responses received in the questionnaires. This qualitative method of data collection enabled the researcher to access the respondents’ inner
feelings. Accessing this rather sensitive information would have been more difficult if other designs were used. The use of in-depth interviews allowed the researcher to establish a rapport and so gain the confidence of the interviewees.

An element of the historical research method was also incorporated in this research study. According to Cohen and Manion (1994:45), the historical method is “the systematic and objective location, evaluation and synthesis of evidence in order to establish facts and draw conclusions about past events”. In this study, the researcher analysed old schemes drawn before the BEST Programme and schemes drawn after the programme in order to draw conclusions about methodologies used in the past and present teaching approaches.

1.7 ASSUMPTIONS

In order to give this research study a high degree of validity and reliability, the following assumptions were made:

1. All heads and teachers were aware of the BEST Programme and had institutionalised it in their schools.
2. Teachers were aware that Science was only an entry point and the BEST methodologies needed to be transferred to other subjects.

1.8 LIMITATIONS

The sample size in this research study was 250 respondents. This small sample of primary school heads and teachers in Zimbabwe was a manageable size. However, this reduced the generalisability of the research findings thereby threatening external validity. Some respondents were not forthcoming in their responses and an element of untruthful responses could not be ruled out in some cases. This was, therefore, also a limitation to the generalisability. However, the use of varied instruments to collect more or less similar information helped to remedy this problem.

Lack of time and money on the part of the researcher were limiting factors that inhibited thorough data collection. The researcher did not fully validate all responses through triangulation. Questionnaires, interviews and observations were used to collect data. Direct
observations could have influenced the behaviour of the respondents and hence portrayed unusual behaviour. The direct observations were limited due to extensive movements demanded from the researcher as well as the high travelling costs.

In this research study, it was difficult to define the extent as the conceptual understanding of the extent affected the interpretation of the findings, therefore, it became a limitation.

1.9 DELIMITATIONS OF THIS RESEARCH STUDY

This research study focused on a population of 100 school heads and 150 teachers drawn from selected Mutare and Mutasa District primary schools.

The researcher investigated whether the teachers in these schools were initiated or staff developed into the BEST Programme and whether they used the BEST teaching approaches in Science. This assisted in assessing the process of methodology transfer from Science to other subjects.

1.10 DEFINITION OF TERMS

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approaches</td>
<td>In this research study, this term refers to a way of doing something. It indicated a way of teaching. It includes teaching methods, techniques and strategies.</td>
</tr>
<tr>
<td>BEST</td>
<td>The abbreviation used in this research study for the Better Environmental Science Teaching Programme.</td>
</tr>
<tr>
<td>District workshop</td>
<td>A seminar organised with participants who had been drawn to represent the entire district.</td>
</tr>
<tr>
<td>Environment</td>
<td>This term refers to what surrounds us and it includes the living and non-living. It also refers to the bio-physical aspects which are the life supporting systems.</td>
</tr>
<tr>
<td>Extent</td>
<td>In this research study, the term is used to refer to the level of something and that level is determined by quantities which, if more, implies a larger extent, and if less, a lesser extent.</td>
</tr>
</tbody>
</table>
Head
This term refers to the person in charge of a learning institution, responsible for teachers and pupils, and who supervises the learning processes.

Influence
In the context of this research study, this term refers to the process of affecting the teaching approaches. It is a transfer of teaching approaches from Science to other subjects.

Participatory approaches
This term refers to teaching methods that are child-centred or child activity-centred methods. These methods promote the direct involvement of pupils and the teacher only facilitates while pupils do everything. It entails learning by doing.

Primary school
This refers to an institution – government or private; boarding, day or both – offering instruction to boys, girls or both from Grade 1 to any grade not exceeding Grade 7.

Teacher
This term refers to the person in charge of and responsible for pupils’ learning processes.

Teaching
The term used in this research study to refer to the process of imparting information, knowledge, skills, attitudes and values from one person to another.

Teaching methodology
This term is used in this research study to refer to a way or process of making a pupil acquire relevant knowledge, skills and attitudes.

Traditional approaches
In this research study, this term refers to teaching methods, including the lecture method, and assumes that pupils are vessels into which the teachers pour knowledge. Teacher-centred teaching methods fall into this group.

1.11 SIGNIFICANCE/IMPORTANCE OF THIS RESEARCH STUDY

It was hoped that the results of this study would assist the Curriculum Development Unit of the Ministry of Education, Sport and Culture to check on the effectiveness of the BEST Programme in influencing the teaching approaches in the primary schools.
Some stakeholders likely to benefit from this study include school heads, teachers and pupils. The heads and teachers will improve their teaching methods and ultimately pupils’ learning processes would improve.

It was hoped that the study would provide a body of knowledge which would enable those who carry out staff development and in-service workshops to come up with more effective methods of achieving their objectives. The BEST Programme managers would be appraised on how far the cascade method had achieved its objectives. The extent to which the teaching approaches were used would help the BEST managers to assess their strategies.

This research study exposed to school teachers and heads what was happening against what was expected. Those who were found not using the approaches were compelled to take corrective measures while those who were applying the approaches gained more confidence. This had an beneficial effect on both the pupils and their parents.

The Ministry and government benefited, as they were able to take corrective measures where necessary and hence were credible to the donors of the programme.
CHAPTER 2
LITERATURE REVIEW

2.1 INTRODUCTION

Joyce, Weil Showers (1992:1) point out that “schools and classes are communities of students, brought together to explore the world and to learn how to navigate it productively”. Thus, pupils or students should be afforded the environments in which they explore the world and learn how to productively navigate it. This would imply that the core of the process of teaching is the arrangement of an environment for the students within which the students can interact, thus rendering the teaching methods critical in the learning process (the method determine the learning environment).

The Better Environment Science Teaching (BEST) Programme emphasises the development of some basic scientific knowledge, skills and attitudes within pupils. In order to develop these, BEST advocates the use of selected teaching methods which are child-centred so as to enable the pupils to develop the necessary knowledge, skills and attitudes. The BEST Programme promotes participatory methodologies as highlighted in the 1994 Environmental Science Syllabus. This chapter looks at the general teaching methods as given by various authors so that an understanding of each is reached in order to assess their effectiveness in developing scientific knowledge, skills and attitudes, and in the process justifying the methods encouraged by BEST.

2.2 WHY TEACH PRIMARY SCHOOL SCIENCE?

According to Young (1981:1), “[s]cience can teach children important skills and can also teach them to think in a clear and logical way”. It implicitly follows that science develops skills and at the same time some clear and logical way of thinking which pupils could use to solve simple, practical problems. The development of skills implies some action or activity.

Coombs (1995) stresses that science is a “doing”-subject. Pupils like to do things and if the science lessons emphasise activities, the pupils will enjoy the subject. Young (1981:2)
supports this viewpoint and goes further to emphasise that in the primary school the “know-how” of science rather than the “knowing” should be emphasised. In the past, much science teaching emphasised the ‘facts’ of the subject although very few teachers agree on what the most important facts are. In any case, it can be argued that as our knowledge increases, the ‘facts’ often change. We are living in a time when scientific knowledge is doubling every 10 to 15 years and it is very difficult for teachers to keep up with this pace. This is not to say that teachers will not teach knowledge, for knowledge will inevitably emerge, but if they emphasise “know-how”, science teaching will come to life and pupils would apply the gained skills to keep abreast with the ever-increasing scientific knowledge.

Young (1981:2) further suggests that pupils in later life face many problems and if they have learnt by doing and have developed the ability to think in a clear and logical way, they are more likely to adequately solve these problems. Thus, science helps children develop their physical skills, especially their ability to handle things. All these skills will be useful to the children as they grow up and face various problems.

While some people have expected too much of science, others think that science is a monster which threatens people. For teachers, the truth lies somewhere in-between these views. Science can improve the lives of the pupils, but it can also have many harmful effects. Teachers must try to understand it, to make science work for them, rather than against them. If teachers run away from the subject, they and their pupils will not be able to lead full and happy lives in a scientific age. Teachers must control science rather than let science control them. Implicitly, the development of good or positive attitudes is necessary in the teaching of science.

Young (1981:3) says that science teaching in the primary school is not a new development. Many teachers teach a lot of science even though they would not call it science. In the past, schools taught subjects such as Nature Study and Agriculture. Teachers often assume that these subjects are the same as science. In fact, these subjects have a very different emphasis. For example, Nature Study tended to concentrate on observation of the natural world and pupils were expected to draw flowers and leaves, insects, and other animals.
From the above discussion, three observations can be made. It has emerged that the teaching of science involves:

1. the development of skills (through doing),
2. the acquisition of knowledge (as pupils develop skills they also develop some clear and logical way of thinking) and
3. the development of attitudes (attitudes that promote good management of the environment, i.e. science for the improvement of our lives).

2.3 THE BEST PROGRAMME

The BEST Programme is a response to an evaluation of the teaching and learning of Environmental and Agricultural Science which was done by Bajar and Lewin in 1990. In this evaluation, one of the criticisms was that the full implementation of science learning and teaching in primary schools was not maximised. The BEST handout on the aims of this programme highlighted some of the concerns raised. These are discussed in the following sections.

2.3.1 The patterns of teaching/learning

There was a general tendency to emphasise acquisition of factual knowledge at the expense of developing scientific skills and attitudes. In response to this concern, the new syllabus document had an introductory part which, among the other issues, identified the methods to be used in teaching of Environmental Science.

The nature of these methods is such that they promote the development of skills and attitudes in addition to the question of knowledge.

2.3.2 The syllabus

Another concern raised by the evaluation was that the syllabus document was inaccessible as material for Grades 1 up to Grade 7 was contained in one document. Hence, teacher from all grades were after one document which was limited in quantities. In addition, some topics were considered difficult to teach by most teachers and, as a result, these were not taught.
As a response to these concerns, a new syllabus was produced and was presented in three separate documents as a way of improving accessibility. Some topics which were perceived as difficult to teach were also deleted. Workshops on syllabus interpretation were also planned to assist teachers with interpreting topics still perceived to be difficult.

### 2.3.3 Textbooks

During the evaluation, it was observed that textbooks were few and content-based. Teachers tended to follow textbooks instead of the syllabus or Curriculum Development Unit (CDU) materials.

To address this problem, the new syllabus for Environmental Science provided suggested learning activities which were carefully selected to address the requirements of the specific topic. The suggested learning activities encompassed the methods advocated by the syllabus and the activities promoted the development of skills and attitudes as well as the acquisition of knowledge.

### 2.3.4 Teacher support

Supervisory support for teachers was found to be lacking. This was worsened by the lack of workshops for Environmental Science. Hence, teachers were neither given adequate support nor given or provided with forums/workshops to share their experiences.

The BEST Programme involves presenting workshops at district, cluster and school levels where both the teachers and the school heads share their experiences. These workshops intended to help school heads to be in a better position to provide supervisory support to their teachers, and also to help the teachers provide peer support to fellow teachers at their schools.

### 2.3.5 Equipment
The lack of equipment for teaching/learning Environmental Science was also cited as a major problem (Bajar and Lewin 1990). Where equipment was available, it was found that storage was a problem.

Lack of equipment also partly contributed to limited pupil activity in the Science lessons. BEST initially donated a science kit to each and every primary school in an effort to ensure that at least some equipment was available in schools. Realising that the science kit was inadequate, BEST workshops presented a component which dealt with the use of the environment as a laboratory and source of materials for making apparatus. In addition to these initiatives by BEST, the syllabus was redesigned to include a section on suggested learning resources in order to assist the teachers.

2.3.6 Assessment

Another concern that was raised was that the most common methods of assessment used by teachers were the use of sentence completion and multiple choice items. Thus, product assessment was prevalent. The focus on product assessment limited the records produced by the pupils.

In BEST workshops, both process and product assessments are looked at and it is highlighted that the process affects the product, hence process assessment becomes crucial. In addition, varied records are explored in order to expose the teachers to a variety so that in turn, they do not over use one category of records with their pupils.

The BEST Programme emerged as a response to the concerns raised by the Bajar and Lewin evaluation report of 1990 on the teaching of Science in Zimbabwe primary schools.

The aims of the BEST programme as outlined in handouts were as follows:
1. To improve the teaching and learning of Environmental Science in primary schools. This objective could be achieved through the direct intervention of the project/programme.
2. To improve teaching and learning in all subjects in primary schools. This objective could only be achieved as teachers transfer methodologies learnt in Environmental
Science to other subjects in the curriculum. It could only be realised when there was an improvement in the teaching/learning of Environmental Science (rippling effect).

3. To enhance sustainable management of the environment. This was a super goal, which could only be realised when positive attitudes had fully developed in the pupils.

The BEST Programme addressed the first objective by trying to respond to and correct the concerns raised in the Bajar and Lewin evaluation report of 1990. Apart from the concerns discussed above and the corrective measures taken by BEST, it was of importance to this research study to briefly look at the Environmental Science Syllabus that emerged after the evaluation in the light of Science teaching expectations discussed earlier.

2.4 A SYNOPSIS OF THE ENVIRONMENTAL SCIENCE SYLLABUS

The Environmental Science Syllabus (Curriculum Development Unit 1994:1), in its preamble, stressed that the syllabus’ main purpose was to develop some basic scientific knowledge, skills and attitudes, and provide opportunities to explore the world through simple scientific enquiry. This view was supported by Young (1981:2) who extrapolated it further by saying that the clear logical way of thinking developed in pupils, coupled with acquired knowledge and skills, was valuable in their later life.

The syllabus further pointed out that it was important that pupils be provided with activities which develop a basic understanding of the environmental issues and develop positive attitudes towards the environment. This tallied well with the BEST Programme’s super goal of developing enhanced sustainable management of the environment. Thus, science should be utilised to improve our lives and to manage our resources well.

According to the Environmental Science Syllabus (Curriculum Development Unit 1994:v), a pupil-centred approach or methodology was essential. It added that the pupil-centred approach which is the hands-on process approach involved problem identification and problem-solving using the environment. The hands-on approach encourages curiosity which leads to logical and systematic questioning by pupils. The hands-on process also promotes the development of skills and the use of knowledge already gained in identifying and solving
problems. Also, the development of clear and logical thinking would be promoted as the pupils analysed the problems, possible solutions and manipulated their environment.

In an effort to emphasise the need for the use of the hands-on mind-on approach in the teaching/learning of Science, the syllabus gives examples of pupil-centred approaches which the teachers should employ in their lessons.

![Diagram of pupil-centred methods](image)

**Figure 2.1** The pupil-centred method

*Source: Adapted from Primary Environmental Science Syllabus (Curriculum Development Unit 1994:v)*
By employing the above teaching methods (as represented in Figure 2.1) in science lessons, the teachers are assured of developing scientific skills in their pupils in addition to knowledge and attitudes.

### 2.5 SOME TEACHING APPROACHES/METHODOLOGIES

Siyakwazi and Siyakwazi (1999:45) argue that the general consensus is that effective teachers are those who employ outstanding teaching methods. They go further to point out that an effective teacher, in the eyes of the professionals, is a teacher who plans, prepares, executes and exhibits a high degree of knowledge in effective strategic teaching methods and learning skills.

Siyakwazi and Siyakwazi (1999:45) describes an effective teacher as follows:

“The exceptional teacher is aware of learning needs and displays unusual appropriate treatment of teaching/learning experiences. He shows a distinctive sensitivity to children and their learning. In addition, he exhibits marked adaptability to learning needs and is highly imaginative to learning needs. An effective teacher is capable of handling teaching documentation and displays an in depth knowledge of subject content.”

From the above, one can infer that a good teacher should be able to display and use unusual skills, and apply appropriate teaching methods as required. This implies that if the quality of education is to improve, teachers must be knowledgeable in effective teaching and learning methods.

According to Joyce, Weil and Showers (1992:1), teachers help students acquire information, ideas, skills, values and ways of thinking, and means of expressing themselves. For the teacher to successfully do this, the teacher has to carefully select teaching/learning strategies or approaches which would ensure the realisation thereof. Thus, how the teaching is conducted has a significant impact on the students’ abilities to educate themselves.

Brown (1978:30) listed four main pedagogical strategies or methods of teaching and argues that these are used at all levels of education from nursery school up to graduate level.
These are:

a) lecturing,
b) discussion,
c) guided discovery, and
d) open discovery.

2.5.1 The lecture method

Siyakwazi and Siyakwazi (1999:57) point out that the lecture method is perhaps one of the oldest instruction methods and it is still widely used in schools, colleges and universities. The lecture method has been humorously described as the art of transferring information from the lecturer’s notebook to the students’ notebook without passing through the head of either. Brown (1978:30) says that lecturing consists of narrative, describing and explaining. These processes are teacher-centred and interaction is minimal. They are also predominantly oral and may include writing on the board or overhead projector. This method is classified under traditional methods.

According to Brown (1978:30) experiments by McCleish (1968), McKeachie (1963) and Beard (1973) indicated that immediate recall of information from formal lectures by university and college students is usually 30–40%. This finding contributes to the fashionable ideology of dismissing lecturing and formal teaching as old-fashioned and therefore bad and inefficient.

While the lecture method can teach skills, concepts, facts and values, the formal lecture is not renowned for its effectiveness in teaching psycho-motor skills or promoting attitude change. Siyakwazi and Siyakwazi (1999:57) indicated the following four basic parts of a good lecture:

1. An attention getting introduction.
2. A well-organised development of the major points.
3. A group or class discussion.
4. A brief summary to clinch the major points.
The lecturer’s own attitudes and enthusiasm have an important effect on student motivation when using the lecture method. Research on student ratings of teaching as well as student learning indicates that the enthusiasm of the lecturer is an important factor in effective student learning and motivation. The lecturer is not only a model in terms of motivation and curiosity, but also models ways of approaching problems, portraying a scholar in action in ways that are difficult in other media or methods of instruction to achieve. Thus, the instructor’s expertise and interest play a crucial role in the successful use of the lecture method.

For an effective use of the lecture method, the teacher should consider some of the following points:

- Choose the occasion for a lecture with care. In almost all lessons or learning sequences, the teacher has to present information and ideas. The teacher has to introduce topics, summarise the main points of the learning activity and stimulate further learning. All these activities require the use of the lecture technique at various points in the learning sequence.

- Prepare the content carefully. The teacher is apt to be carried away by his or her own eloquence as they are tempted to talk too much or give too much if the content is not carefully prepared before the lecture.

- Provide an outline for the class to follow. Perrot (1986:19) states that lecturing without any pupil participation should not usually exceed 10–20% of the lesson for younger pupils and 20% for older pupils. The outline has to consider that pupils have a limited attention span and, thus, teachers have to frequently use techniques which ensure that pupils do not sit passively through an entire lecture sequence.

- Blend the lecture method with other learning activities. It is argued that better teaching results are obtained when the lecture method is judiciously blended with methods that call for active response from students. Variety in the lecture can be introduced by using learning aids during the lesson which help to keep alive the interest of the class and relieve the monotony of the lecture method.

The BEST Programme promotes pupil-centred methods. The lecture method is teacher-centred and, hence, not encouraged by the programme. However, this does not mean that the method has no place in teaching of science in primary schools. It can be used sparingly and
also in conjunction with other methods. The lecture method promotes skills such as listening but it is not ideal for promoting manipulative skills which are crucial in science. This method can also help pupils to acquire knowledge and attitudes but since science is a doing subject, the lecture method is mostly discouraged. It does not promote problem-solving skills or creativity which is part of the reasons for teaching science. Thus, pupil-centred methods are preferred above the lecture method in the teaching of science in primary schools.

2.5.2 The discussion method

A discussion normally requires two or more participants and is essentially a social practice. Perrott (1986:19) points out that a discussion consists of questions, answers and comments by both the teacher and the pupils. An element of open-mindedness is a necessary condition for discussion since ideas float around, and it must at least be possible that a change in the person’s thinking can take place. Siyakwazi and Siyakwazi (1999:60) stress that it is important to note that persons entering into a discussion must, in principle, be prepared to abandon their positions.

Discussions can take different forms and have different purposes. Discussions can be aimed at problem-solving, arriving at consensus, and changing attitudes and behaviour. It is one critical method of enquiry and is connected with rationality. It is indeed significant that one’s willingness to discuss an issue is taken as an indication of one’s willingness to be reasonable. By engaging in a discussion, one should be willing to make a paradigm shift and so engage with open mind.

Brown (1978:31) points out that, since discussion involves feedback and pupil participation, one would expect it to be an effective method of learning. This method is useful in helping pupils to solve complex problems, can be used as preliminary or follow-up to any independent learning event to clarify cloudy areas.

According to Siyakwazi and Siyakwazi (1999:59), it appears that the discussion method gives the opportunity for a good deal of student activity and feedback and it may theoretically be more effective than the lecture method in developing key concepts and problem-solving skills.
However, some of the advantages of the discussion method include:

- Developing the willingness to talk about individual ideas openly and to listen and respond to other ideas.
- Building on each other’s ideas in such a way as to increase their motivation.
- Training pupils to think well. Its function is to weigh and consider, to determine the importance of facts with reference to a certain purpose, and to organise these facts in relation to a problem.

The BEST Programme promotes child-centred methodologies and the discussion method is one such a technique. It promotes pupil-to-pupil and pupil-to-teacher interaction and, in the process, pupils find ways of solving problems. Discussion helps to promote problem-solving skills, which is one of the critical targets of science teaching.

**2.5.3 The discovery method**

According to Siyakwazi and Siyakwazi (1999:83), one of the educational principles currently being promoted is that learning should become an active process of discovery and application. Sometimes the discovery is by trial and error. They further point out that in educational psychology it is recognised that pupils have a portfolio of experience with which they come to school and which could be opened up so that psychological, sociological and philosophical ideas may be understood.

It is excellent to have children learning through their own experiences, activities and discoveries, whether they do it alone, in pairs or groups, or involving the whole class including the teacher engaged in learning activities. Therefore, discovery learning implicitly plays an important role in the learning process. In teacher-centred (didactic) teaching, learners have the concepts, principles or techniques explained to them and they are then expected to use and remember these. In discovery learning, however, the learners are expected to discover the principles or techniques, usually with some guidance or special preparation.
Petty (1993:222) argues that when well-devised and managed, the discovery method offers active learning and an achievement challenge which engages interest. Consequently, discovery activities motivate all but the most apathetic students and are also very effective in developing the learners’ understanding. Siyakwazi and Siyakwazi (1999:83) also points out that in a true discovery lesson, instead of expressing in detail all the principles or information the teacher wants students to learn, the teacher carefully structures the learning environment so that students themselves derive the generalisation or obtain information from available sources.

**Considerations when using the discovery method**

According to Petty (1993:222), for the discovery method to be effective, some considerations have to be made when putting it into practice. These are as follows:

- The learners must have any essential background knowledge and techniques they need in order to be successful in the discovery activity. The background knowledge and techniques affect how one approaches the new discovery activity.
- Learners must understand exactly what is expected of them. It usually helps to have the task precisely and concisely written on the board. The learners remain focused if it is clear what is expected of them.
- The majority, if not all, the learners must be able to make a success of the activity. This effectively means that guidance must be given where necessary. Too much guidance may make the learners feel cheated of the chance to make their own discovery. However, if given too little guidance, the learners will be floundering in frustration. Therefore, the teacher must know the students’ capabilities before using this teaching method. Often some groups need more guidance than others, but teachers should not leap in with guidance until the learners have had a chance to think things through for themselves. In practice, nearly all discoveries are guided; it is just a matter of how much guidance is given.
- Learners’ work must be carefully monitored. Usually, if learners lack an understanding at the start of the activity they can spend hours on fruitless activity if they are entirely on their own.
- It sometimes it helps if students bring their ideas to the teacher before implementing them. This gives the teacher an opportunity to check that the methods are feasible
and to ensure vital steps or data are included. Alternatively, the teacher can visit each group in the first few minutes of the activity to check that the group is on the right track. Sometimes students also learn a good deal by being left to see the consequences of their own errors, but this can be counter-productive. Guidance is often the safest option.

- Choose a topic where students are unlikely to know the answer already. It is gallimg to outline a discovery activity, only to have one or two students shout out the answer even if the activity may still be useful in consolidating and confirming their prior knowledge. If you suspect that some students do have such knowledge ask them to keep their ideas to themselves for the sake of others. If you can, develop a stretching activity for those who finish quickly.

- Leave plenty of time. The teacher should give about twice as much time as the teacher expects is necessary. This method should therefore be used when the teacher has enough time to allow students to explore and reconcile their views.

- Summarise what students should have learnt at the end. This is critical as some discoveries made will lack clarity and others may be entirely wrong. It, therefore, becomes crucial that the teacher summarise the main teaching points of the activity and explaining it fully by referencing the learners’ findings.

If the teacher wants students to write their own summaries, then the teacher must ask the pupils to tell him/her their agreed conclusion before the students write it up.

Advantages of the discovery method include the following:

- It is active, involving, motivating and fun.
- It develops a sound understanding of the subject matter in terms of earlier learning and experience.
- It involves the students in high-order thinking, evaluation, creative thinking, problem solving and analysis. By contrast, teacher-centred methods often only involve the learner in low-order skills such as attending and comprehending.
- As with other pupil-centred teaching methods, students are encouraged to see learning as something they do themselves, rather than something that experts do to them. Some teachers believe that the hidden curriculum is the methods’ most important attribute.
• It allows students to enjoy the fun of puzzling things out for themselves, and so arguably it develops their intrinsic as opposed to extrinsic motivation.

Disadvantages of the discovery method include the following:
• The discovery method may lead students to discover the wrong thing and may leave learners confused. (This is more of a criticism of the way the method is implemented than of the method itself.)
• This method is slow and time-consuming.
• The discovery method is never adequate in itself. After discovering the students will need to find out what they are expected to do with the new learning, to practise the use, and to have that practice checked and corrected. (It is one thing to discover and another to use it.)
• It is not practical to use the method for some simple, fact-based topics.

Analysis of the discovery method

It is generally agreed that a good student studies on his or her own initiative because he or she wants to, not because he or she is directed to do so. The discovery method assumes that students like learning, finding out, discovering things, acquiring or improving skills. In the process, the teachers should provide new, interesting and safe things for them to touch. Through such an approach, students learn to use their hands and to control their fingers and it is through such activities that learners are able to discover new things. The learners must be encouraged to examine things and learn to observe accurately. By encouraging good observation, learners are taught to compare things and look for ways in which things are different. Siyakwazi and Siyakwazi (1999:83) points out that looking for similarities and differences is the first step towards scientific observation.

The discovery method encourages pupils to think for themselves resulting in the building of confidence and self-reliance, provided that they are touching things, looking at things, making things and recording what they discover. The discovery method is closely linked to the experiment method and exploratory learning.
In the discovery method it is generally accepted that the learners should be led to make their own discoveries. In learning by finding out, the instinct of curiosity is one of the strongest urges in all young life. The learner becomes a self-educator, and an explorer into the vast field of knowledge. Siyakwazi and Siyakwazi (1999:85) emphasise that when teaching, one must avoid telling students anything that they can find out because this means taking away from them the joy of discovery which will be theirs if they find out for themselves.

Thus, in the discovery method the teacher’s role initially is to act as a consultant when students are working on a problem. The teacher should structure the learning environment so that students are led to discover what they are supposed to discover and should avoid telling them what to do next.

The discovery method is still very popular among learning theorists. According to Petty (1993:225), these theorists believe that new learning requires appropriate background knowledge, must be organised by the learner and then integrated into his or her existing knowledge. Learning theories see discovery learning as an excellent method of producing this integrated learning. Petty (1993:85) further argues that knowledge gained from discovery may well be better retained and more easily transferred.

Although Siyakwazi and Siyakwazi (1999:83) warn educators that a learner may be active without discovering anything and at times may discover something without realising its significance. Petty (1993:229) points out that the discovery method is more student-controlled than teacher-controlled, as shown in Figure 2.2 below:
2.5.4 The experiment method

Siyakwazi and Siyakwazi (1999:84) point out that the experiment method is a method about the discovery of reality by means of examples. They further indicate that experiments also make generalised statements based on the findings thereof. Thus, the learners directly experience of the structure of knowledge.

According to Siyakwazi and Siyakwazi (1999:84), the experiment method is closely linked to the discovery method. In experimentation, there can be guided experiments which are linked to guided discovery. In guided experiments, the pupil is given guidelines to follow and this puts limitations on the pupil. In experiments which are not guided, however, the pupil is left to try out or find out for themselves.

The experiment method is a student-controlled method and, hence, it is more child-centred than teacher-centred. In the teaching and learning of science it is one of the recommended methods because of its child-centeredness which promotes the development of skills, attitudes and knowledge within the pupils.

2.5.5 The role-play method

In role-play, pupils explore human relations by enacting problem situations, attitudes, values and problem-solving strategies. Siyakwazi and Siyakwazi (1999:63) state that role-play refers to the “spontaneous acting of a situation by two or more persons who show the emotional reactions of the people in the situations as they perceive them”. Joyce, Weil and Showers (1992:58) identify nine steps or phases of role-playing activity and they are as follows:

Phase one: warm up the group
• Identify or introduce the problem
• Make the problem explicit or clear
• Interpret problem story and explore issues
• Explain role-playing

Phase two: select participants
• Analyse roles
• Select role-players

Phase three: set the stage
• Set line of action
• Restate roles
• Get inside the problem situation

Phase four: prepare the observers
• Decide what to look for
• Assign observation tasks

Phase five: enact
• Begin role-play
• Maintain role-play
• Break role-play

Phase six: discuss and evaluate
• Review actions of the role-play (events, position, realism)
• Discuss major focus
• Develop next enactment

Phase seven: re-enact
• Play revised roles
• Suggest next steps or behavioural alternatives

Phase eight: discuss and evaluate
• Same steps as in phase six

Phase nine: share experiences and generalise
• Relate problem situation to real experience and current problems
• Explore general principles of behaviour

The use of role-play in the classroom provides students with creative opportunities not otherwise readily available. The informal play can persuade students to participate and contribute ideas and actions more easily than the usual question-and-answer situation. As with other methods, role-play must be planned by the teacher and must have meaning, relevance and purpose for the learners. Play is a very educational activity and it embodies those qualities that are essential for the development of the child.

By using role-play in classrooms, children are motivated to learn with interest and pleasure, giving the same attention, energy and purposeful activity to their school work as they give to play. It should be noted that the urge to play is normally present in the nature of every child. Gibbins, as cited in Siyakwazi and Siyakwazi (1999:63), advises that if learners’ urge to play is not directed into useful channels, it will find an outlet in restlessness and inattention. It has been proved that the introduction of play methods into the learning environment leads to greater interest and attention to work. Thus, the proper use of a child’s love of play is a basic principle in education since the desire to play is quite evident and visible in all young life.

Role-play promotes good communication skills, co-operation and socialisation. Siyakwazi and Siyakwazi (1999:64) point out that Tudor-Hart views role-play as being necessary so that the children can get to know their own world through their five senses and practise skills such as holding, feeling, listening, observing and coordination of hand and brain. Normally, children develop these skills at a greater speed if they are given the opportunity to practise a learning episode through role-play (multi-sensory learning). The purpose of role-play is to help students learn through activities. Through these activities, they also develop their imagination and thinking skills, and widen and deepen their experiences. The use of activities that develop skills and thinking in students is emphasised by the 1994 Environmental Science Syllabus (Curriculum Development Unit 1994).

Siyakwazi and Siyakwazi (1999:66) outline the purpose of role-play as follows:
• To develop an insight into some human relations problem that is difficult to obtain in any other way.
• To handle a situation that might otherwise be heavily charged with emotions.
• To help students look objectively at their behaviour.
• To create common experiences that the class can talk about.
• To give students practice in using what they have learned.
• To illustrate principles from the course content through exciting motivation in the learning process.
• To maintain and arouse interest.
• To develop increased awareness of their own and other’s feelings.
• To provide a concrete basis for discussion and help students see ways of applying principles studied in abstract terms.
• To give participants an opportunity to express themselves.
• To foster group co-operation.
• To develop initiative on the part of participants.

Joyce, Weil and Showers (1992:67) emphasise that role-playing can focus on some of the following:

• Feelings
  o Exploring one’s own feelings
  o Exploring others’ feelings
  o Acting out or releasing feelings
  o Experiencing high-status roles in order to change the perceptions of oneself and others

• Attitudes, values and perception
  o Identifying values of culture and sub-culture
  o Clarifying and evaluating one’s own values and value-conflicts

• Problem-solving, attitudes and skills
  o Openness to possible solutions
  o Ability to identify a problem
• Ability to identify the consequences to oneself and others of alternative solutions to problems
• Experiencing consequences and making final decisions in light of those consequences
• Analysing criteria and assumptions behind alternatives
• Acquiring new behaviours

Subject matter
• Feelings of participants
• Historical realities, historical crises, dilemmas and decisions

Siyakwazi and Siyakwazi (1999:66) summarise role-play as aiming at stimulating participation and involvement. It adds a dimension of realism and promotes a variety of teaching activities. It is the variety of activities which makes the method important as a teaching method. Variety of activities promotes the development of varied skills and learning experiences which are critical in the learning and teaching process.

2.5.6 The game method

Petty (1993:182) emphasises that games can produce intense involvement and a quality of concentration matched by no other teaching method. Children by nature enjoy play and games as a type of play. It then follows that any learning which is introduced through play or games easily gets through to the children.

Petty (1993:182) further points out that the increase in interest and motivation produced by a short session of game-playing can produce positive feelings towards the subject which lasts for weeks. This could imply that the subject in which games are used becomes a favourite subject since it avails to pupils the opportunity to relax and be nearer to their normal situations while at the same time learning will be taking place. It can, therefore, be argued that learning and enjoyment are not mutually exclusive.

2.5.7 Drama as a method
This is another method that includes some form of play. It involves the pupils in preparing and presenting short dramatic briefs to others. Petty (1993:189) states that the drama method gives the students an opportunity to prepare a short dramatic piece in groups to present to the rest of the class. Petty (1993:189) further points out that this is a very popular activity and can be used effectively in exploring emotive issues.

Like all other methods that involve some form of play, this method can be time-consuming if not managed well. Its strength is that it allows pupils to relax and portray what they perceive and in the process some learning takes place.

2.5.8 The simulation method

Petty (1993:189) simply explains simulation as an elaborate role-play activity. An example of this method is micro-teaching where trainee teachers deliver a short lesson to their peers. Simulations can introduce an element of realism into teaching, perhaps giving the student experiences without which it would be impossible for them to develop necessary skills.

By considering the available time and by eliminating non-essential distractions, this method often provides powerful tools for teachers. Simulations are now widely used in teaching and training in business studies, economics and medical diagnosis. Simulations can be made or obtained commercially. It inevitably simplifies a situation and students need to be reminded of this.

2.5.9 Individualised instruction

There is a general consensus among educators that every child differs in some way from other children in the class. Providing for the learning needs of individual children is important and, to do so, flexibility or multiple learning options are required.

Individualised teaching refers to educational situations in which teachers and students interact on a one-to-one basis. Some of the most effective teaching may occur when students come to the teacher with a problem with which they want some help. Apart from assistance by the teacher, peers can also help one another.
Siyakwazi and Siyakwazi (1999:77) list the following as advantages of individualised teaching:

- It offers an opportunity for teachers to study and understand each student in their class. A record of individual progress and difficulties must be maintained and should also reflect possible strategies for remedial work.
- It allows pupils to work individually and take their own time. The slow student is not hurried unduly and the more able pupils are not held back. Children working on their own learn to think for and depend upon themselves. They foster the feeling of independence and responsibility for their own development and doing things rather than having things done for them or done to them.
- It helps each child to develop a well-balanced personality and not as carbon copies of each other since they are different in looks, body, mind, behaviour and the rate of learning.
- It meets the varying needs and interests of students.
- It helps students acquire individual skills.
- It gives guidance to students in both academic and social work.
- It helps the teachers’ teaching skills by tailoring instructional approaches to the needs and interests of the individual learners.

2.5.10 The group work method

The group work method is defined by Siyakwazi and Siyakwazi (1999:68) as organising pupils into small groups to work on a class assignment or project. It is argued that this approach allows the bright pupils to help the slower ones, particularly in heterogeneous groups. It is equally argued that in heterogeneous groups, the bright tend to dominate instead of assist the slower pupils and they do the tasks for them so that in the end the slower pupils learn nothing and even lose confidence in themselves.

The group work method is a learning situation that takes place when two or more pupils participate in a discussion of a particular matter and this approach is becoming increasingly important as a component of the didactic event in the classroom. The use of group work is a progressive teaching approach which is student-centred.
Siyakwazi and Siyakwazi (1999:70) gave the following as functions of groups:

- They permit a greater degree of student activity and involvement.
- They encourage learning in an atmosphere of co-operation and social harmony.
- They provide an opportunity for individuals to practice co-operative behaviour, tolerance of different opinions, and respect and appreciation of the opinion of others.
- They promote competitive activities on an inter-group and intra-group basis.
- They permit maximum use of limited resources.
- They give learners a chance to expand their talents and abilities.
- They develop qualities such as responsibility and leadership in learners.
- They develop the learner’s ability and skills to communicate, argue, debate and convince others.
- They enable members to learn from one another. Each learner has more helping hands than in a structure that generates isolation.
- They promote member interaction. Interaction with one another produces cognitive as well as social complexity, creating more intellectual activity that increases learning when contrasted with solitary study.
- They promote co-operation which then increases positive feelings towards one another, reducing alienation and loneliness, building relationships, and providing affirmative views of other people. Co-operation increases self-esteem not only through increased learning but also through the feeling of being respected and cared for by the others in the environment or group.

Joyce, Weil and Showers (1992:36) point out that when students co-operate in learning tasks they become more interested in learning for its own sake rather than for external rewards. Thus, students engage in learning for intrinsic satisfaction and become less dependent on praise from teachers or other authorities. This internal motivation is more powerful than the external, resulting in increased learning rates and retention of information and skills.

2.5.11 The assignment and project method

According to Petty (1993:208), the time taken or given to an activity affects or influences what it can be referred to as. The following is a common classification:
• 0–2 hours is an exercise
• 2–12 hours is an assignment
• 12–60 hours is a project
• Over 60 hours is a dissertation or thesis

The assignment and project method will be the centre of focus in this section.

Petty (1993:208) argues that projects and assignments are the big guns in the educator’s arsenal. They can have a powerful effect if correctly aimed. Few teaching methods enable the teacher to develop a greater range of skills and few offer greater opportunity to waste time in ill-directed activity. If students are involved in an activity that takes for example 10 hours, then it should be well-thought out assignments and projects.

Projects and assignments are very fashionable at the moment, according to Petty (1993:208), but they need not be over-used. A project or an assignment is a task or set of tasks for students to complete, usually individually but sometimes in groups. Usually students can exercise a considerable amount of autonomy over how, where, when and in what order the tasks are carried out. Projects are usually more open-ended than assignments.

Assignments and projects give students an opportunity to use, practise and apply their skills and knowledge, often in a fairly realistic context. Petty (1993:209) points out that projects and assignments, unlike other many learning activities, give the students an opportunity to use higher-order intellectual skills such as self-management, study skills, problem-solving skills and other common skills.

Doing a project or assignment is a creative process. Petty (1993:209) points out that it is not possible to be precise or prescriptive but the process usually involves the following aspects:

1. Deciding on resources
   Do the students know what to achieve and the best way of achieving the objectives?

2. Considering skills needed
   Do the students know how to research in a library and how to approach a project or assignment?

3. Considering the resources
The resources include time and equipment.

4. Devising the activities
The activities should achieve the objectives.

5. Interesting to students
Is the activity genuinely useful, related to their interests, and intriguing or unusual?

6. Offering an opportunity to practice skills in real-life or work-related circumstances
Develop realistic scenarios or case studies, give student roles, get students out of the classroom into the real world, and involve them with visits or in having visitors.

7. Active and varied projects/assignments
Nobody wants to spend three weeks researching in a library. Aim for a number of contrasting tasks in a long project/assignment.

8. Define the project/assignment
The students should be confident that they know what is expected.

9. Set achievable targets
The teacher should set an achievable target which is rewarding to meet.

Visits are another method which can be built-in into assignments or projects. The project or assignment teaching method promotes the development and application of varied skills by the learners. Thus, the skills are learnt and immediately applied as encouraged by the BEST Programme.

2.6 CONCLUSION

While it should be appreciated that there are several methods or approaches to teaching, it is important to note that the topic of the lesson to some extent affect the selection of the approach. It should be equally noted that no single method can be effective without being complimented by another. Current teaching strategies are encouraging the use of methods which involve more of the learners with minimum involvement of the teacher. This is encouraged by the BEST Programme. It, therefore, follows that methods which promote the direct development of skills by the learners are currently encouraged.
CHAPTER 3
RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter outlines how the research was conducted. It looks at the research design methods that were employed, as well as data presentation and analysis. It also gives an overview of the population from which the samples were drawn and describes the instruments used, outlining their advantages and disadvantages.

3.2 RESEARCH DESIGN

The descriptive research design was adopted in this research study because it accurately follows the salient aspects of a phenomenon or situation. It gives a factual and accurate picture of a population as it was at the specific time. An advantage of using this design is that descriptive words, figures, numbers or statistics are used. In short, the design describes and interprets what is there. This includes the condition, relationship, practices, trends and processes that are there. In this research study, the researcher concentrated on the extent to which the BEST Programme had influenced the teaching approaches in primary schools in the Mutare and Mutasa districts.

First, a pilot study involving ten schools was carried out to test the suitability of the research instruments used. The pilot study was used to assess weaknesses and uncertainties.

An element of this research study approach were in-depth interviews and this was an essential tool in data collection. However, the interviews were limited since only 50 respondents were involved and were mainly used to validate responses received from the questionnaires. This qualitative method of data collection enabled the researcher to access the respondents’ inner feelings. Accessing this rather sensitive information would have been more difficult when using other designs. The use of in-depth interviews allowed the researcher to establish a rapport and so gain the confidence of the interviewees.
An element of the historical research method was incorporated in this research study. According to Cohen and Manion (1994:45), the historical method is “the systematic and objective location, evaluation and synthesis of evidence in order to establish facts and draw conclusions about past events”. In this research study, the researcher analysed old schemes drawn before the BEST Programme and those drawn after in order to establish facts about methodologies used and to draw some conclusions about the past and present teaching approaches at that time.

### 3.3 POPULATION AND SAMPLE

This research study focused on the school heads and teachers of primary schools in Mutare and Mutasa districts of Manicaland and included urban and rural schools. A total of 100 heads and 150 teachers were respondents to the questionnaire (a total of 250 respondents), 20 heads and 30 teachers were interviewed (a total of 50 interviewees), 20 lessons were observed, and 60 schemes were done before and after the BEST Programme (a total of 60 observations were used in the study). Interviewees were selected from the questionnaire respondents.

The random sampling method was used to select the 250 respondents to the questionnaires, the 50 interviewees and the 60 observations. The schools from the two districts were divided into the following three (3) groups:

- **Group 1** Mutare Urban Schools
- **Group 2** Mutare Rural Schools
- **Group 3** Mutasa District Schools

<table>
<thead>
<tr>
<th>Group of schools</th>
<th>Questionnaires</th>
<th>Interviews</th>
<th>Observations</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Heads Trs Total</td>
<td>Heads Trs Total</td>
<td>Heads Trs</td>
<td></td>
</tr>
<tr>
<td>Mutare Urban</td>
<td>10 30 40</td>
<td>4 6 10</td>
<td>15</td>
<td>65</td>
</tr>
<tr>
<td>Mutare Rural</td>
<td>45 60 105</td>
<td>8 12 20</td>
<td>21</td>
<td>146</td>
</tr>
</tbody>
</table>
Respondents, interviewees and observations were drawn from the groups of schools as follows:

The names of the schools in each category were placed in a hat and, according to the number of schools wanted for the sample, were drawn out of the hat. The school heads of the drawn became questionnaire respondents. From these respondents in each group, the first to be drawn, up to the number of interviewees wanted, became the interviewees. For example, out of the Mutare Urban Schools, the researcher wanted 10 heads as questionnaire respondents and 4 as interviewees. For the first four schools drawn out of the hat, the heads became both interviewees and respondents to questionnaire while those drawn out fifth to tenth were respondents to questionnaire only.

Only teachers from schools drawn out of the hat were considered as respondents. An equal number of teachers were drawn from the selected schools. For example, Mutare Urban’s ten schools drawn out of the hat each provided 3 teachers who were randomly selected to be the respondents to the questionnaires. The first 3 teachers to be drawn out of the hat per school were the respondents for questionnaires. Only the first teacher to be drawn out of the hat for each school up to the sixth school, were selected as interviewees. The same would apply in each group of schools.

The observations were of teachers drawn from the schools and who were not respondents to either the questionnaires or interviews. They were randomly selected according to the method as described above from the remaining schools so that each randomly selected school provided three teachers. Thus, three teachers from each of the selected 5, 7 and 8 schools in Mutare Urban, Mutare Rural and Mutasa District, respectively, were observed. The researcher observed the three teachers selected from each school while teaching a lesson as well as their schemes before and after the BEST Programme.

### 3.4 THE RESEARCH INSTRUMENTS
Three research instruments were used during this research study, namely questionnaires, interviews and observations.

### 3.4.1 Questionnaires

Owing to limited time, questionnaires were extensively used during this research study. Questionnaires were used more than the other instruments because of the advantages inherent to them. The researcher relied upon questionnaires because of the need to maintain anonymity of the respondents. The questionnaires also covered a wide area at an affordable cost in terms of money and effort. Since the questionnaires were anonymous, they generally allowed the researcher to elicit candid responses from the teachers. They could especially give considered answers free from the pressure that is often generated by the presence of the researcher. Questionnaires also made it possible for the researcher to convert data gathered into quantifiable data that was easy to analyse.

Questionnaires, however, have disadvantages. Some of the questionnaires were not fully completed as some of the respondents left questions unanswered. Some of the questionnaires were also not returned. Tuckman (1994:196) observes that respondents needed to be co-operative when completing questionnaires. It was also not possible to establish that the questionnaires were answered by the intended respondents.

Another disadvantage of the questionnaires was that the respondents may have discussed the questionnaires with colleagues thereby compromising their responses. The responses would then generally reflect the views expressed during the discussions and not of the individual respondent. Related to this disadvantage was that some respondents may have attempted to anticipate what the researcher wanted to find out and gave responses to suit the researcher or even just to go against the researcher.

### 3.4.2 Interviews

The in-depth interviews were used to validate information given on the questionnaires. The interviews were based on the questions in the questionnaires and the questions were answered in full.
The interview had its advantages. One advantage was that the researcher was able to get more explanations on issues that were not clear. Another advantage was that the face-to-face interviews ensured a high response rate as all questions were responded to. The researcher could also repeat and/or rephrase the question for the benefit of the respondent if responses were not forthcoming. One other advantage of the interview situation was that the interviewer heard not only what the respondents said but also how they said it. The interviewer could note non-verbal behaviour during the interviews. Since some people find it boring to write or respond to questionnaires, they prefer to talk to the interviewer. It was usually difficult to lie during direct interviews.

3.4.3 Observation

Observations were used to gather and complete information collected using the other instruments. Observations had the advantage of bringing the researcher in direct contact with the reality and, hence, the researcher got firsthand information. During this research study, the researcher observed the teachers conducting lessons and observed the method(s) used directly. The researcher also observed and assessed schemes before and after the BEST Programme and gained insight into the methods planned by the teachers.

The disadvantages of observations included that the teachers taught or behaved in a different manner as they were aware that they were being observed. Thus, the lessons taught did not always reflect what normally happened. Regarding the schemes, some teachers had a tendency of preparing good schemes which were not translated into good lessons, with the reverse also true where some teachers taught good lessons which were not properly schemed on paper.

3.5 DATA COLLECTION PROCEDURES

After the respondents were identified, questionnaires were given to the respondents to complete independently and then submit to one of them. This was done to ensure that the researcher did not attach a name to the questionnaires. To reduce interaction, the researcher waited for the questionnaires as respondents worked on them.
For the lesson observations, the teachers were requested to teach the lessons as per their normal timetable. This was done in order to reduce tailoring lessons to suite the researcher. The researcher sat in the class and took notes as per the observation schedule while the lessons were being taught.

For the observation of the schemes, the researcher requested the schemes and went through them individually guided by a prepared schedule. Apart from the questionnaire, where respondents wrote information, the researcher personally collected the data.

### 3.6 DATA PRESENTATION AND ANALYSIS

All the data collected was quantified and converted to percentages for easy analysis. This enabled the use of tables, pie charts and graphs as ways of data presentation. These tables, pie charts and graphs were numbered and given headings related to the data which they represent.

The use of varied ways of presenting data enables the research to appeal to a variety of readers with different tastes. Apart from appealing to different readers, the different ways of data presentation reduced the over-use of one method. Thus, different tastes were catered for by different ways of data presentation and it gave flavour to the project.

Data related to each of the sub-problems was logically sequenced and analysed to come up with an opinion as reflected by the related data collected.

### 3.7 CONCLUSION

In this chapter, the researcher explained the research methodology employed during this research study. Questionnaires, interviews and observation were the methods of data collection used. However, the questionnaire method was used more extensively than the others. The interview method was more reliable because of the cross-examination which was done. Observations helped to assess what was on the ground. The respondents were randomly selected and their anonymity was assured. The sampling procedures were
explained, and ways of presenting and analysing data were articulated. Chapter 4 focuses on the data presentation, analysis and interpretation.
CHAPTER 4
DATA PRESENTATION, ANALYSIS AND INTERPRETATION

4.1 INTRODUCTION

This chapter focuses on putting together the responses given by the respondents in order to provide the researcher with answers to the sub-problems and finally the research problem. Thus, the researcher presented the data, analysed it and came up with answers to the research problem.

4.2 BACKGROUND OF THE RESPONDENTS

The researcher drew the respondents from urban, peri-urban and rural primary schools. The respondents selected from the schools were as analysed below:

![Respondents by gender](image)

**Figure 4.1** Respondents by gender

Figure 4.1 shows that the majority (70% of the total) of the respondents were females. Thus, only 30% of the respondents were males. This could imply that there are more female than male teachers in the selected schools. Upon follow-up through the interviews, it was confirmed that there were more female than male teachers in the Mutare and Mutasa districts from where the sample was drawn.
The bar graph in Figure 4.2 shows that the bulk of the respondents (40%) were had between 11 and 20 years’ teaching experience, followed by those who were had between 0 and 10 years’ teaching experience (30%). Only 20% of the respondents had more than 30 years’ teaching experience.

This could imply that the majority of the respondents were still ‘young’ in the teaching profession. It could be argued that they were likely to be adaptive, flexible and easy to accommodate new ideas. Thus, it may be argued that the respondents were either young enough in the profession not to feel threatened or not too old in the profession to take up any challenges such as those suggested by BEST.
Figure 4.3 indicates that 80% of the respondents had at least ‘O’ level training and teacher education. Only 20% of the respondents did not have ‘O’ level training.

Most of the respondents met the minimum qualifications required at the time of this research study. Since 80% met the then-current qualifications acceptable in the teaching profession, one could argue that the respondents reflected the then-current character and views of the teaching profession.

Table 4.1  Status of the respondents

<table>
<thead>
<tr>
<th>Status</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Teachers</td>
<td>47</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Senior teachers</td>
<td>68</td>
<td>27</td>
<td>20</td>
</tr>
<tr>
<td>Deputy heads</td>
<td>23</td>
<td>9</td>
<td>32</td>
</tr>
<tr>
<td>Heads</td>
<td>13</td>
<td>5</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>151</strong></td>
<td><strong>60</strong></td>
<td><strong>99</strong></td>
</tr>
</tbody>
</table>

From Table 4.1 it can be seen that 60% of the respondents were classroom practitioners and 40% were administrators or supervisors. Of the female respondents, who constituted 60%, 46% were classroom practitioners and only 14% were administrators or supervisors. Of the male respondents, who constituted 40% of the respondents, 14% were classroom practitioners and 26% were administrators or supervisors.

Since the majority of the respondents were classroom practitioners, it would implicitly mean that the results of the research most likely reflected classroom practitioners’ views more than those of the supervisors. However, though the supervisors were fewer their inclusion brought to light views of their colleagues and helped to counter check or balance out views especially during interviews.
Of the schools selected, 30% were urban-based and the remaining 70% were rural-based. It was also noted that, of the 70% rural schools, some were peri-urban schools.

Since the schools reflected urban, peri-urban and rural settings, it would imply that they fairly represented or reflected the general setting of most schools. Thus, views from urban, peri-urban and rural teachers were captured.

### 4.3 BEST PROGRAMME INFORMATION

The information that follows links directly to the research topic and, hence, was essential in answering the research question.
Figure 4.5 shows that 60% of the respondents attended a school-based BEST workshop while 30% of the respondents attended a district-based workshop. Thus, a total of 90% of the respondents had been exposed to BEST workshops while 10% had not.

This implies that the majority of the respondents had been oriented on BEST teaching approaches and, therefore, the evaluation was done with people who had been exposed to the BEST Programme. A fairly accurate evaluation result was therefore likely. It also implied that the 10% who had not attended any BEST workshops responded using their own understanding and not from an informed position. The 10% could have been indicative of a gap in coverage by the BEST Programme.

![Pie chart showing 90% and 10%](image)

**Figure 4.6** Use of demonstration lessons in training

A total of 90% of the respondents confirmed that demonstration lessons were carried out during the BEST workshops. This implied that 90% of the respondents were aware of what was expected of them by BEST and any deviation was not because of ignorance. The 10% who indicated “not applicable” could have been those respondents who had not attended any BEST workshops.

<table>
<thead>
<tr>
<th>Table 4.2</th>
<th>Observing another teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency</strong></td>
<td><strong>Respondents</strong></td>
</tr>
<tr>
<td>Number</td>
<td>Percentage</td>
</tr>
<tr>
<td>Very often</td>
<td>0</td>
</tr>
<tr>
<td>Rarely</td>
<td>25</td>
</tr>
<tr>
<td>Not at all</td>
<td>225</td>
</tr>
</tbody>
</table>
Table 4.2 shows that most of the respondents (90%) indicated that teachers did not observe each other teaching for the purpose of improving teaching approaches. Only 10% of the respondents indicated that teachers rarely observed each other teaching.

Implicitly, it means that the teachers in the schools were not sharing experiences in teaching methods through lesson observations. Thus, lesson observation between and among teachers was not a popular staff development activity in the schools.

According to Figure 4.7, 70% of the respondents indicated that pupils were not being involved in projects during any lessons in Science in the schools. Only 30% of the respondents indicated that pupils were rarely engaged in projects.

It would appear that the project method was rarely used in 30% of the schools and was not at all used in 70% of the schools.

**Figure 4.7**  Pupils’ involvement in projects
Figure 4.8  Lesson observation by heads

Figure 4.8 reveals that only 10% of the respondents indicated that school heads observed their teaching approaches. A total of 60% indicated that heads of schools rarely observed lessons to check on teaching approaches and 30% indicated that heads did not observe lessons to check on teaching methods at all. When the researcher asked what heads did, most respondents replied that the heads did not focus on teaching methods used when observing lessons but on the general flow of a lesson. During the interviews, some heads indicated that they addressed the issue of teaching methods during staff development meetings and they used lesson observations just to assess weaknesses.

From the above, it was clear that the school heads did not check on teaching approaches during lesson observation. It appeared that there was no monitoring of teaching methods in schools.

Figure 4.9  Models/apparatus produced in lessons
From Figure 4.9 it can be seen that 60% of the respondents indicated that models or apparatus were rarely produced during lessons, 40% indicated that no models or apparatus were being produced during lessons and none indicated that models or apparatus were being produced.

It appears that the skills related to modelling were rarely or never being developed in most schools.

![Pie chart showing the distribution of responses regarding the production of models or apparatus during lessons.]

**a) In Science Lessons**

- 50% rarely
- 30% no
- 20% very often

**b) In Other Subjects**

- 90% rarely
- 10% no

**Figure 4.10**  Pupils’ interaction with the environment

According to Figure 4.10, in Science, 20% of the respondents indicated that the lessons were carried out outside the classroom very often, 50% indicated that lessons were rarely carried out outside and 30% indicated that no lessons were carried out outside. In other subjects, 10% of the respondents indicated that no lessons were being carried out outdoors and 90% indicated that lessons were rarely taught outside the classroom.

The above information implies that the use of a classroom was less important in Science than in other subjects.
From Figure 4.11 it is evident that 50% of the respondents to the questionnaire indicated that pupils listened to their teachers in most lessons and 30% indicated that pupils listened to their teachers in some lessons.

On the other hand, in 70% of the lessons observed, pupils listened to their teachers about half of the time and in 20% of the lessons, pupils listened to their teachers for most of the time.

In general, the responses from the questionnaires agreed with observations made by the researcher during lesson observations that in most lessons pupils listened to their teachers.
seemed to imply that in most lessons the teachers spoke while the pupils listened and, thus, teachers dominated the lessons or rather the lessons were teacher-centred.

![Figure 4.12](image)

**a) Questionnaire Results**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>40%</td>
<td>In most Lessons</td>
</tr>
<tr>
<td>30%</td>
<td>In some Lessons</td>
</tr>
<tr>
<td>30%</td>
<td>In very Few Lessons</td>
</tr>
</tbody>
</table>

**b) Lesson Observation Results**

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>60%</td>
<td>Only for short Intervals</td>
</tr>
<tr>
<td>20%</td>
<td>Most of the Time</td>
</tr>
<tr>
<td>10%</td>
<td>About half the Time</td>
</tr>
<tr>
<td>10%</td>
<td>Never</td>
</tr>
</tbody>
</table>

**Figure 4.12** Pupils’ rate of answering questions

Figure 4.12 indicates that 40% of the questionnaire respondents indicated that in most lessons pupils answered questions, 30% indicated that in some lessons pupils answered questions and another 30% indicated that in very few lessons pupils answered questions.

In 60% of the lessons observed, pupils answered questions only for short intervals, in 20% of the lessons observed pupils answered questions for about half the time and in 10% pupils never answered questions.
The questionnaire and lesson observation results seemed to generally agree that teachers asked questions to the pupils. It seemed to imply that the questioning method was being used by the teachers.

**Table 4.3**  Pupils’ rate of asking questions

<table>
<thead>
<tr>
<th>a) Questionnaire Results</th>
<th>b) Lesson Observation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most lessons</td>
<td>0%</td>
</tr>
<tr>
<td>In some lessons</td>
<td>10%</td>
</tr>
<tr>
<td>In very few lessons</td>
<td>40%</td>
</tr>
<tr>
<td>Not in any lesson</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>Most of the time</td>
</tr>
<tr>
<td></td>
<td>About half the time</td>
</tr>
<tr>
<td></td>
<td>Only for short intervals</td>
</tr>
<tr>
<td></td>
<td>Never</td>
</tr>
</tbody>
</table>

|                          | 0%                           |
|                          | 0%                           |
|                          | 0%                           |
|                          | 30%                          |
|                          | 70%                          |

The questionnaire results, represented in Table 4.3, revealed that 50% of the respondents indicated that pupils did not ask questions in any of the lessons, 40% indicated that pupils asked questions in very few lessons and none indicated that pupils asked questions in most lessons.

On the other hand, the lesson observation revealed that in 70% of the lessons observed pupils never asked questions and in 30% of the lessons observed pupils asked questions only for short intervals.

The questionnaire responses and lesson observation both revealed that pupils did not ask questions and that if they did it was in very few lessons and only for short intervals. It implicitly meant that pupils’ questioning skills were not being developed and that pupils were not being encouraged to be inquisitive.
A total of 50% of the questionnaire respondents indicated that pupils watched the teachers doing something in most lessons, 30% indicated that pupils watched the teacher doing something in some lessons and 20% indicated that pupils watched the teacher doing something in very few lessons.

In contrast, in 40% of the lessons observed pupils watched the teachers doing something most of the time, in another 40% of the lessons observed pupils watched the teacher doing something for about half the time, and in 20% of the lessons pupils never watched the teacher doing something.

These findings are represented in Figure 4.13.
Both the questionnaire responses and the lesson observation showed that teachers were doing something while the pupils watched in most lessons or for most of the time during lessons. This implies that teachers took centre stage while pupils were passive listeners or observers and, therefore, that the lessons were teacher-centred.

Table 4.4  Frequency of pupils reading books

<table>
<thead>
<tr>
<th>a) Questionnaire Results</th>
<th>b) Lesson Observation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most lessons</td>
<td>10%</td>
</tr>
<tr>
<td>In some lessons</td>
<td>30%</td>
</tr>
<tr>
<td>In very few lessons</td>
<td>40%</td>
</tr>
<tr>
<td>Not in any lesson</td>
<td>20%</td>
</tr>
</tbody>
</table>

As seen in Table 4.4, 40% of the questionnaire respondents indicated that pupils read from books in very few lessons, 30% indicated that pupils read from books in some lessons and 20% indicated that pupils did not read from books in any lesson.

In 50% of the lessons observed, pupils read from books for short intervals only, in 30% of the lessons pupils never read from books and in 20% of the lessons pupils read books for about half the time.

From the above, it appears that the teachers and pupils were becoming less dependent on books during lessons and, therefore, that lessons were less dependent on textbooks.
As seen in Figure 4.14, 60% of the respondents to the questionnaires indicated that pupils copied from the chalkboard or books in some lessons, 20% indicated that pupils copied in most lessons and another 20% indicated that pupils copied from the chalkboard or books in very few lessons.

In 60% of the lessons observed, pupils copied from the chalkboard or books only for short intervals and in 40% of the lessons pupils copied from the chalkboard or books for about half of the time.

From the above, it seems that there was still heavy reliance on copying information from the board or books into pupils’ books and implicitly means that written work did not reflect individual work.
As depicted in Figure 4.15, 60% of the questionnaire respondents indicated that pupils did not do individual work in any lesson, 30% indicated that pupils did individual work in very few lessons and 10% indicated that pupils did individual work in some lessons.

In lessons observed, in 60% of the lessons pupils did individual work only for short intervals, in 30% of the lessons pupils never did individual work and in 10% of the lessons pupils did individual work for about half the time.

The above findings imply that pupils were not given opportunities in the lessons to do or produce their own work. It appears as if individual initiatives and creativity were not
promoted. These findings also supported and agreed with the earlier findings that pupils

copied from the chalkboard or books in most lessons.

**Table 4.5**  Frequency of pupils’ group work/discussions

<table>
<thead>
<tr>
<th>a) Questionnaire Results</th>
<th>b) Lesson Observation Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>In most lessons</td>
<td>30%</td>
</tr>
<tr>
<td>In some lessons</td>
<td>40%</td>
</tr>
<tr>
<td>In very few lessons</td>
<td>30%</td>
</tr>
<tr>
<td>Not in any lesson</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Most of the time</td>
</tr>
<tr>
<td></td>
<td>About half the time</td>
</tr>
<tr>
<td></td>
<td>Only for short intervals</td>
</tr>
<tr>
<td></td>
<td>Never</td>
</tr>
</tbody>
</table>

From the questionnaire, 40% of the respondents indicated that pupils worked and discussed
in groups in some lessons, 30% indicated that pupils worked and discussed in groups in most
lessons and 30% indicated that pupils worked and discussed in groups in very few lessons.

From the lessons observed, in 70% of the lessons pupils worked and discussed in groups
only for short intervals and in 30% of the lessons observed pupils worked and discussed in
groups for about half the time.

These results are presented in Table 4.5.

The above information indicates that pupils were being given time to work and discuss in
groups.

![a) Questionnaire Results](chart.png)
As seen in Figure 4.16, 60% of the questionnaire respondents indicated that pupils experimented in very few lessons, 30% indicated that pupils experimented in some lessons and 10% indicated that pupils did not experiment in any lesson.

In 70% of the lessons observed pupils experimented only for short intervals, in 30% of the lessons observed pupils never experimented and in 30% of the lessons pupils experimented for about half the time.

From the above, it appears that pupils generally experimented in very few lessons and only for short intervals.
Figure 4.17  Frequency of pupils’ outdoor activities

Figure 4.17(a) shows that 50% of the respondents indicated that pupils went out for activities in very few lessons, 30% indicated that pupils went out for activities in some lessons and 20% indicated that pupils did not go out for activities in any lesson.

Figure 4.17(b) shows that in 50% of the lessons observed pupils went out for activities only for short intervals, in 40% of the lessons pupils never went out for activities and in 10% of the lessons pupils went out for activities for about half the time.

This implies that, in general, pupils went out for activities in very few lessons and only for short intervals. It implicitly reveals that the teachers were mostly aware of the need to use the environment during the lessons.
Both bar graphs in Figure 4.18 shows that 80% of the respondents indicated that there were changes in the teaching of Science as well as other subjects. The remaining 20% indicated that there were no changes in the teaching of Science or other subjects.

This seems to imply that the BEST Programme had an impact in the way Science and other subjects were being taught.

According to Figure 4.19, 20% of the schemes before BEST training showed little coverage of topics as per the syllabus whereas after BEST training 40% and 60% of the schemes observed showed much and very much syllabus topic coverage respectively.
It would appear as if there was much to very much syllabus topic coverage in teachers’ schemes after attending the BEST workshops. It would implicitly mean that the BEST Programme improved on the syllabus topic coverage as depicted in teachers’ schemes.

From Figure 4.20, the schemes before BEST reflected objectives that ranged from no specified skills to little specification of skills. After BEST the schemes reflected objectives that ranged in the inclusion of specific skills from little to very much.

Implicitly this means that, after BEST workshops, objectives in schemes drawn up by the teachers included specific skills to be achieved, unlike schemes drawn up before BEST workshops. Thus, it appears as if BEST workshops brought about a positive change in the way objectives were stated by teachers in their schemes.
Before the BEST Programme, the schemes ranged from not at all to little in as far as the promotion of skills in the syllabus was concerned. After the BEST Programme, the schemes promotion of syllabus ranged from little to very much. These findings are represented in Figure 4.21.

This implies that the BEST Programme enabled or facilitated the teachers in drawing up schemes for skills which were reflected in the syllabus.

**Table 4.6**  
Indication of the doer in activities schemed

<table>
<thead>
<tr>
<th></th>
<th>Before BEST</th>
<th></th>
<th>After BEST</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>% age</td>
<td>No.</td>
<td>% age</td>
</tr>
<tr>
<td>Not at all</td>
<td>30</td>
<td>50</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Very little</td>
<td>12</td>
<td>20</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Little</td>
<td>12</td>
<td>20</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td>Much</td>
<td>6</td>
<td>10</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Very much</td>
<td></td>
<td></td>
<td></td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>60</strong></td>
<td><strong>100</strong></td>
<td>60</td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Before the BEST Programme, 50% of the schemes observed showed activities which did not show or indicate the doer. After the BEST Programme, 60% of the schemes observed fell in
the range from little to very much indication of the doer in the activities in the schemes. These findings are represented in Table 4.6.

It appeared that there was not much change in the way teachers stated activities in schemes. Generally, it appears as if teachers did not show or indicate the doer in the activities. Although a slight change was noted after BEST, the stating of the doer in activities still remained a problem.

As seen in Figure 4.22, 70% of the schemes done before BEST showed that the activities in the schemes centred on what the teachers did (50% much and 20% very much). However,
only 20% of the schemes done after BEST showed that the activities in the schemes centred on what the teachers did.

From the above, it appears as if activities in the schemes were teacher-centred before BEST and the activities in the schemes were no longer teacher-centred after BEST. It can, therefore, be argued that BEST had an impact on the selection and statement of activities during scheming.

As seen in Figure 4.23, 40% of the schemes before BEST showed that no activities centred on what pupils did and 60% of the schemes centred very little activities on what pupils did.

After BEST, however, 60% of the schemes showed little activities centred on what pupils did, 40% of the schemes showed very little activities centred on what pupils did and 10% showed that much activity centred on what pupils did.

The above information implies that activities were pupil-centred after BEST, unlike before BEST. However, the 40% indicated under very little in schemes after BEST appears to reflect that there were still some schemes which did not have pupil-centred activities.

**Figure 4.23**  Pupil-centred activities

As seen in Figure 4.23, 40% of the schemes before BEST showed that no activities centred on what pupils did and 60% of the schemes centred very little activities on what pupils did.
Table 4.7 Learning activities taken from syllabus

<table>
<thead>
<tr>
<th></th>
<th>Before BEST</th>
<th></th>
<th>After BEST</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>% age</td>
<td>No.</td>
<td>% age</td>
</tr>
<tr>
<td>Not at all</td>
<td>30</td>
<td>50</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Very little</td>
<td>24</td>
<td>40</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>Little</td>
<td>6</td>
<td>10</td>
<td>18</td>
<td>30</td>
</tr>
<tr>
<td>Much</td>
<td>0</td>
<td>0</td>
<td>24</td>
<td>40</td>
</tr>
<tr>
<td>Very much</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

As indicated in Table 4.7, 50% of the schemes before BEST showed that the learning activities were taken from the syllabus and 40% showed that little learning activities were taken from the syllabus. After BEST, 40% of the schemes showed that much of the learning activities were taken from the syllabus and 30% showed that little learning activities were taken from the syllabus.

It appears that, after BEST, teachers were incorporating more learning activities from the syllabus in their schemes than before BEST. It could be argued that by taking learning activities from the syllabus, creativity was being stifled.
As shown in Figure 4.24, 40% of the schemes done before BEST workshops had no evidence of the use of methods given in the syllabus and 40% showed very little indications of the use of methods contained in the syllabus.

However, 50% of the schemes done after BEST had little evidence of the use of methods given in the syllabus and 20% of the schemes showed much of the use of the methods in the syllabus.

From the above, it appears as if the methods given in the syllabus were made use of in the schemes more after BEST than before BEST.
Figure 4.25  More pupil activities than teacher activities

Figure 4.25 indicates that 60% of the schemes done before BEST did not show that pupils’ activities were done more than the teachers’ and 50% of the schemes after BEST did not show that pupils’ activities were done more than the teachers’.

From the above data, it can be seen that teachers’ activities dominated pupils’ activities both before and after BEST. This implies that BEST had had no impact in this area.
Before BEST, 90% of the schemes did not incorporate outdoor activities and 10% of the schemes had little outdoor activities. The post-BEST schemes showed that 60% had very little outdoor activities and 20% showed little outdoor activities. These findings are depicted in Figure 4.26.

It appears as if there was an effort after BEST to indicate outdoor activities in schemes.

A run down of the above-mentioned findings of this research study raises some interesting observations.

### 4.3.1 Training

Information presented in Figure 4.5 shows that 30% of the respondents were trained at district level and 60% at school level. Thus, 90% of the teachers were aware of BEST teaching approaches and 10% were ignorant.

### 4.3.2 Child-centred approach

From the schemes and lessons observed as well as the responses from the participants, it is clear that most teachers were incorporating some aspects of the approaches advocated by BEST. Child-centred approaches were generally being used. These included not only methods encouraged by BEST but also methods encouraged in the reviewed literature as
discussed in Chapter 2. However, some elements of traditional approaches were still surfacing in the lessons and schemes such as the teachers’ tendency to take more time either talking or doing something else, instead of engaging the pupils. Pupils also still did not appear to have been encouraged to ask questions or be inquisitive.

4.3.3 Use of the environment

The available literature and the BEST Programme encouraged outdoor lessons as it brings life and meaning to the lessons. However, while an increase in outdoor activities was noted, some teachers still stuck to the four walls of their classrooms for their lessons.

4.3.4 Transfer of methodology to other subjects

The BEST approaches were also intended to be used in other subjects apart from Science lessons. Figure 4.18 shows that 80% of the respondents felt that the approaches were being used in other subjects. Thus, the BEST teaching approaches in general were being used in the other subjects apart from Science.

4.4 CONCLUSION

In this chapter, all the data collected have been presented, discussed and analysed. Tables and figures were used in data presentation. For easier analysis, numbers were converted to percentages. From the responses given and observations made, all sub-problems were answered.
CHAPTER 5
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

This chapter gives a summary of what was investigated, the conclusions drawn from the research and, subsequently, the recommendations made.

5.2 SUMMARY

The research problem that was under investigation was as follows:

An investigation into the extent to which the Better Environmental Science Teaching (BEST) Programme influenced the teaching approaches in selected primary schools in the Mutare and Mutasa districts.

A sample of 250 respondents were used in this research study (175 females and 75 males). These respondents were drawn from the primary schools in the Mutare and Mutasa districts. Questionnaires, interviews and observations were used to gather information. Gaining the interviewees’ confidence and accessing genuine and true reflections of the respondents’ views was a bit problematic at times. This was evident through inconsistent replies to questions of more or less the same nature. These inconsistencies were corrected by the use of varied instruments which collected similar or related information. Time and funds were not readily available but the researcher had to make follow-up visits to respondents to ensure all information was collected in a one-day visit.

The research findings indicated that 90% of the heads and the teachers had received training in child-centred teaching approaches. The schemes and lessons observed and the responses from the respondents indicated that most teachers were incorporating some aspects of these child-centred teaching approaches. However, some elements of traditional approaches were still surfacing in the lessons as teachers at times tended to take time either talking or doing
something instead of engaging the pupils. One of the findings was that there was a general increase in the number of outdoor lessons. Also the use of child-centred participatory approaches in other subjects apart from Science became evident in the findings.

5.3 CONCLUSIONS

From the research findings, it can be concluded that most of the heads and teachers in primary schools (90%) have been trained or exposed to the child-centred participatory approaches. This gives them an advantage in that the current focus in teaching approaches is on the child-centred participatory approaches.

Generally, the majority of the schemes drawn up and lessons taught by the teachers incorporated the various aspects of the child-centred approaches. The teachers were moving towards child-centred teaching approaches. However, some teachers still showed elements of the traditional approaches such as talking for too long or doing most of the things instead of giving it to the pupils.

Teachers were taking their pupils outdoors for activities and lessons. The frequency of the use of the environment in the lessons taught outdoors needed to improve, and the relevance and link between the lessons and environment was not yet established.

The teaching approaches used in the teaching of Science were not consistently being applied in the other subjects. The degree or level of using these approaches in other subjects varied from one person to the other.

Thus, the null hypothesis that the BEST teaching approaches have not yet influenced the teaching approaches in Mutare and Mutasa districts can be accepted. The rippling effect of methodology from Science to other subjects still had to be felt.

5.4 RECOMMENDATIONS

The following recommendation can be made and are intended to try and improve the teaching approaches which centre on the child and are participatory in nature:
1. The curriculum development section of the Ministry of Education, Sport and Culture needs to have constant and regular induction sessions and in-service workshops for teachers on teaching approaches from the Environmental Science Syllabus. It is pointed out that teaching approaches should totally involve the child through the 'hands on, minds on' approach. This implies that the teacher have to move away from the traditional approaches such as lecturing and giving out notes. Siyakwazi and Siyakwazi (1999) admit that it had to become fashionable to use approaches that involve the teacher less but the pupils more. The Ministry of Education, Sport and Culture has old teachers who need constant updating as well as new teachers joining each year who need orientation, hence, workshops should always be carried out.

2. The researcher realised that, regarding the outdoor lessons, information gathered did not reflect the purpose for which the lessons were carried outdoors. There could be a further study to examine whether the outdoor lessons used the environment, indicated relevance and links between the lesson content and use of the environment, as well as if there was appreciation and respect of the environment by the pupils as a result of these outdoor lessons. If the pupils had to solve environmental problems, the attitude had to be cultivated during these outdoor lessons.
REFERENCES

APPENDIX 1
Questionnaire

INSTRUCTIONS
a. Please answer all questions as truthfully as you can.
b. Tick one correct or most suitable response per questioning the box provided against the response.
c. Please do not write your name or your school name anywhere on the questionnaire.

1. Sex:
   Male  Female

2. Teaching experience in years:
   5 and below  6–10  11–15
   16 – 20  21–25  26–30

3. Professional and academic qualifications:
   STD/J.C. + Training  ‘O’ level + Training
   ‘A’ level + Training  Degreed

4. Professional status:
   Teacher  Senior Teacher
   Deputy Head  Head
5. Location of school:

Mutare Urban

Mutare Rural

Mutasa District

6. Have you attended any BEST workshop at:

Yes at District level

None

Yes at school level

No

7. Were demonstration lessons carried out during your BEST training?

Yes

No

8. How often do teachers in your school observe each other’s lessons to check on the improvement of teaching approaches?

Very frequently

Rarely

Not at all

9. How frequently does the school head observe to check on the improvement of teaching approaches?

Very frequently

Rarely

Not at all

10. Do the pupils carry out projects in the school?

Yes

Rarely

No

11. During lessons, do the teachers produce apparatus or models with their pupils?

Yes

Rarely

No

12. Do the teachers take the pupils outside for lessons?
a. In Science?

Yes, very often  [ ]  Yes, but rarely  [ ]  Not at all  [ ]

b. In other subjects?

Yes, very often  [ ]  Yes, but rarely  [ ]  Not at all  [ ]

Use the following for your responses in question 15 to 25.

A. In most lessons  [ ]  B. In some lessons  [ ]

C. In very few Lessons  [ ]  D. Not in any lesson.  [ ]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>13. Pupils listen to the teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14. Pupils answer questions from the teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15. Pupils ask questions to the teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Pupils build or make something</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Pupils read from the books</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Pupils write notes given by the teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. Pupils write their own notes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. Pupils work and talk in groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21. Pupils experiment to see what happens</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. Pupils go outside to look at things</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23. After the B.E.S.T. training at your school, do you observe any changes in the teaching methods in

a) Science lessons?
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>

b) Lessons in other subjects?

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td>No</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 2

Interview schedule

1. Sex
2. How long have you been teaching?
3. What are your academic and professional qualifications?
4. What is your professional status?
5. In which district is your school located?
6. Have you attended a B.E.S.T workshop at
   a. District level
   b. School level
7. Were demonstration lessons carried out during your BEST training?
8. How often do teachers in your school observe each other’s lessons to check on the improvement of teaching approaches?
9. How frequently does the school head observe to check on the improvement of teaching approaches?
10. Do the pupils carry out projects in the school?
11. During lessons, do the teachers produce apparatus or models with their pupils?
12. Do the teachers take the pupils outside for lessons?
   a. Science
   b. Other subjects

What would you say about the frequency of the occurrence of the following in lessons?
13. Pupils listening to the teacher
14. Pupils answering questions from the teacher
15. Pupils asking questions to the teacher
16. Pupils building or make something
17. Pupils reading from the books
18. Pupils writing notes given by the teacher
19. Pupils writing their own notes
20. Pupils working and talking in groups
21. Pupils experimenting to see what happens
22. Pupils going outside to look at things
23. After the B.E.S.T training at your school, do you observe any changes in the teaching methods in
   a. Science lessons?
   b. Lessons in other subjects?
APPENDIX 3
Lesson observation schedule

What did the pupils do and for how long? Please tick the approximate time for each of the activities listed below.

<table>
<thead>
<tr>
<th></th>
<th>Most of the time</th>
<th>About half the time</th>
<th>Only for short intervals</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pupils listen to teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Pupils listen and answer questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Pupils ask questions to teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Pupils watch the teacher do something</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Pupils read from a book</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Pupils copy from the chalkboard or book</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Pupils work and discuss</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Pupils work in groups and discuss.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Pupils experiment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>Pupils go out for activity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX 4  
Schemes and plans assessment schedule

Please tick the most appropriate response.

<table>
<thead>
<tr>
<th>ASSESSMENT CRITERIA</th>
<th>Not at all</th>
<th>Very little</th>
<th>Little</th>
<th>Much</th>
<th>Very much</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Topics schemed for based on syllabus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Objectives specify the skills to be achieved</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Skills called for in the syllabus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Activities show the doer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Activities centre on what the teacher will do</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Activities centre on what the pupils will do</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. Learning activities are taken from the syllabus</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. Methods suggested in the syllabus are used (Participatory)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. Pupils activities are more than the teacher’s</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. Activities showed outdoor activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>