APPENDICES

Appendix A

Ms H Sidiropoulos
32 Deutzia Rd.
Primrose Hill
1401

Fax: (011) 453 3177
E-mail: hsidiropoulos@saheti.co.za

Mr. Brown
Superintendent-General: Education
Gauteng Province
PO Box 7710
Johannesburg
2006

Dear Mr. Brown

Permission to conduct research in schools for PhD studies

I am studying towards a PhD in Policy Studies at the University of Pretoria. The focus of my study is implementing policy in a reforming, developing country context such as ours. The specific policy that is the focus of my study is the new Mathematical Literacy policy. As part of the research I need to collect data from schools. The data collection in two schools will involve questionnaires for Grade 10 mathematical literacy educators, interviews with these educators, observing their classrooms and document analysis. The results will inform both policy and practice. I have discussed this with some school principals who have given in-principle support. I therefore seek your permission to collect data from two schools as part of my doctoral studies. I promise to abide by the principles of anonymity and confidentiality.

Saheti School in Senderwood, Gauteng employs me as Head of Department Administration and Subject Head in Mathematics and Additional Mathematics.

Thank you,

Yours sincerely
Appendix B

Ms H Sidiropoulos  
32 Deutzia Rd.  
Primrose Hill  
1401

Fax: (011) 453 3177  
E-mail: hsidropoulos@saheti.co.za

Dr. J. Kruger  
Principal: FET High School  
Gauteng Province

Dear Dr. J.Kruger

Permission to conduct research in schools for PhD studies

I am studying towards a PhD in Policy Studies at the University of Pretoria. The focus of my study is implementing policy in a reforming, developing country context such as ours. The specific policy that is the focus of my study is the new Mathematical Literacy policy. As part of the research I need to collect data from schools. The data collection in your school will involve a Grade 10 mathematical literacy educator answering structured questionnaires, my observing the said educator's classroom and interviewing the said educator. I will also need to look at records/documents of the educator and learners with regard to mathematical literacy. The results of the research will inform both policy and practice.

I therefore seek your permission to collect data from your school and educator from the 31 July to the 25 August 2006, and the week of the 9th of October 2006.I promise to abide by the principles of anonymity and confidentiality.

Thank you,

Yours sincerely

H.Sidiropoulos
DATA COLLECTION INSTRUMENTS

Research Questions:

1. What do teachers understand to be the purposes, problems and possibilities contained in the mathematical literacy curriculum?

2. How do teachers proceed to implement the mathematical literacy curriculum in their classrooms?

3. Why do teachers implement this curriculum in the ways they do? In other words, what explains the implementation pathways followed by the mathematical literacy curriculum in real classroom contexts?
Table of Contents:

Summary of critical research questions, propositions and methods

Summary of the value of the methods to the research questions

Questionnaire I - schedule A

Questionnaire II - schedule B

Interview I- schedule C (pre-classroom observations)

Interview II- schedule D (post-lesson observations)

Classroom observation protocol - schedule E

Document analysis I -schedule F

Document analysis II -schedule G

Document analysis III - schedule H

Contextual information on the school - schedule I

Researchers journal-schedule J
## SUMMARY OF RESEARCH QUESTIONS AND METHODS

The propositions are used as informative lenses for the data collection but may be refined and replaced depending on the data generated during the study. The relationship between the propositions and questions is theoretical and will be tested in this study.

<table>
<thead>
<tr>
<th>RESEARCH QUESTIONS</th>
<th>PROPOSITIONS</th>
<th>METHODS</th>
</tr>
</thead>
</table>
| 1) What do teachers understand to be the purposes, problems and possibilities contained in the mathematical literacy curriculum? | Teachers may not have a deep understanding of the purposes, problems and possibilities contained in the mathematical literacy curriculum. | o Semi-structured interview with classroom teachers before classroom observation (Schedule C)  
o Questionnaire containing both open and closed ended questions (Schedule A)  
o In-depth document analysis of curriculum and related guidelines (Schedule G)  
o Researchers journal (Schedule J)  
o Theoretical analysis |
2) How do teachers proceed to implement the mathematical literacy curriculum in their classrooms?

Teachers implement the mathematical literacy curriculum in their classrooms using beliefs and pedagogies that are already entrenched in their practice.

- Questionnaire containing both open and closed ended questions (Schedule B)
- Analysis of teacher and pupil documents and records (Schedule F)
- Classroom observation protocol (Schedule E)
- Researchers journal (Schedule J)
- Theoretical analysis
3) Why do teachers implement this curriculum in the ways they do? In other words, what explains the implementation pathways followed by the mathematical literacy curriculum in real classroom contexts?

Teachers implement mathematical literacy, as an alternative to mathematics, only because it is a mandatory subject, and in so doing avoid sanctions.

Teachers do not embrace the 'spirit' of the reform.

<p>| Interviews with teachers after the lesson (Schedule D) |
| Document summary form (Schedule H) |
| Questionnaire containing both open and closed ended questions (Schedule B) |
| Researchers journal (Schedule J) |
| Theoretical analysis |</p>
<table>
<thead>
<tr>
<th>CRITICAL QUESTION</th>
<th>METHOD</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) What do teachers understand to be the purposes, problems and possibilities</td>
<td>Questionnaire schedule (survey)</td>
<td>This will provide me with information on how teachers understand the mathematical literacy curriculum, with respect to purposes, problems and possibilities.</td>
</tr>
<tr>
<td>contained in the mathematical literacy curriculum?</td>
<td>Interview schedule</td>
<td>The in-depth interview will enable me to elicit teachers' understanding of the curriculum. The open-ended questions will allow for the flexibility required in pursuing the 'gems' of information they may provide. The information elicited will also provide a basis for further refinement of the data instruments.</td>
</tr>
<tr>
<td></td>
<td>Document analysis schedule (e.g. policy documents)</td>
<td>This information gathered will allow me to establish a comparison between the curriculum intentions and the teachers' understanding thereof.</td>
</tr>
<tr>
<td></td>
<td>Researchers journal</td>
<td>The journal will be used to record my own views, perceptions and feelings, and in so doing provide me with a platform for reflection. It will also be used to capture non-verbal cues and emergent themes that can inform my design for subsequent interviews or observations.</td>
</tr>
<tr>
<td></td>
<td>Theoretical analysis</td>
<td>Validating data by testing it against theoretical perspective.</td>
</tr>
</tbody>
</table>
2) How do teachers proceed to implement the mathematical literacy curriculum in their classrooms?

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire schedule</td>
<td>This will provide me with information on how teachers claim to implement mathematical literacy in their classrooms. It will capture the teacher's instructional practice, beliefs, and changes made.</td>
</tr>
<tr>
<td>Classroom observation protocol</td>
<td>This will provide me with direct evidence on the curriculum enactment in the classroom. This information will allow me to corroborate, refute and augment the evidence from the other sources.</td>
</tr>
<tr>
<td>Document analysis schedule (e.g. lesson plans, learning programme guidelines)</td>
<td>This will allow me to gather evidence on the extent to which changes can be observed in the classroom practices.</td>
</tr>
<tr>
<td>Researchers journal</td>
<td>The journal will be used to capture any critical incidents that occur in the classroom with respect to implementation that are not provided for in the interviews and questionnaires. Furthermore it will provide me with a record of my own bias on which I can reflect.</td>
</tr>
<tr>
<td>Theoretical analysis</td>
<td>Validating data by testing it against theoretical perspective.</td>
</tr>
</tbody>
</table>

3) Why do teachers implement this curriculum in the ways they do? In other words, what explains the implementation pathways followed by the mathematical literacy curriculum in real classroom contexts?

<table>
<thead>
<tr>
<th>Method</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview schedule</td>
<td>To gather information on why teachers pursue particular modes of curriculum implementation, and the 'spirit' of their instruction. This will be used to inform the explanation of the curriculum implementation pathway in the classroom.</td>
</tr>
<tr>
<td>Document summary</td>
<td>These documents will reveal the discussions that took place prior to implementation. The information will reflect the decisions made and the reasons for these.</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Questionnaire schedule</td>
<td>This will allow me to gather evidence in order to establish why implementation occurred, and if these reason impact on the pathway followed by mathematical literacy in the context of the classroom.</td>
</tr>
<tr>
<td>Researchers journal</td>
<td>To capture my perceptions of the 'spirit' of the lesson and the subject as enacted in the classroom.</td>
</tr>
<tr>
<td>Theoretical analysis</td>
<td>Validating data by testing it against theoretical perspective.</td>
</tr>
</tbody>
</table>
SCHEDULE A

Questionnaire I

The purpose of this questionnaire is to collect information about teachers' understanding of the Mathematical Literacy curriculum and some background information. The information you supply will be treated with absolute confidentiality and will be used for research purposes only.

PART A

EDUCATOR INFORMATION

PLEASE FILL IN OR CROSS (X) THE APPROPRIATE OPTION

1. Designation of educator

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Head of Department</th>
<th>Deputy principal</th>
<th>Principal</th>
<th>Other (specify)</th>
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<tbody>
<tr>
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</tbody>
</table>

2. Teaching subject area

<table>
<thead>
<tr>
<th>Mathematics</th>
<th>Mathematical Literacy</th>
<th>Additional Mathematics</th>
<th>Other (specify)</th>
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<tbody>
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</table>

3. List any other academic responsibilities

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

4. List duties other than academic

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________
5. Age

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Count</th>
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<tbody>
<tr>
<td>Under 25</td>
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<td>25-29</td>
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<td>30-34</td>
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<td>35-40</td>
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<tr>
<td>40-49</td>
<td></td>
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<tr>
<td>50-59</td>
<td></td>
</tr>
</tbody>
</table>

6. Teaching experience in years

<table>
<thead>
<tr>
<th>Experience</th>
<th>Count</th>
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<tbody>
<tr>
<td>0-5</td>
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<tr>
<td>6-10</td>
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<tr>
<td>11-15</td>
<td></td>
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<tr>
<td>16-20</td>
<td></td>
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<tr>
<td>20 or more</td>
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</table>

7. Gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
</tr>
</tbody>
</table>

8. Formal qualifications

<table>
<thead>
<tr>
<th>Qualification</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 year diploma</td>
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<tr>
<td>3 year diploma</td>
<td></td>
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<tr>
<td>Degree only</td>
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<tr>
<td>Degree and diploma</td>
<td></td>
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<tr>
<td>More than one degree</td>
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<tr>
<td>Other (Specify)</td>
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</table>

9. Type of school

<table>
<thead>
<tr>
<th>Type</th>
<th>Count</th>
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</thead>
<tbody>
<tr>
<td>Primary</td>
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<tr>
<td>Secondary</td>
<td></td>
</tr>
<tr>
<td>Combined</td>
<td></td>
</tr>
</tbody>
</table>

11. Description of the school

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td></td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
</tr>
</tbody>
</table>

11. Does streaming (differentiation according to ability) occur in Mathematics classes?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
</table>

12. Explain

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
The Mathematical Literacy curriculum in the Further Education and Training Band, Grade 10 came into effect in 2006.

The questions that follow inquire about the information available to you about the Mathematical Literacy curriculum, and two other related documents.

PLEASE FILL IN OR CROSS (X) THE APPROPRIATE OPTION

1. Are you aware of the Mathematical Literacy curriculum?

   Yes  No

2. Was the document made available to your school?

   Yes  No

3. If yes, please state how?

   Workshop  Circular  Conference  Other (specify)

4. Do you have a personal copy of this curriculum statement?

   Yes  No

5. How did you first become aware of the Mathematical Literacy curriculum?

   I read the curriculum document
   I was informed about it by my Head of Department
   I was told by the principal
   I was invited to a workshop
   It was discussed at a staff meeting
   Other (specify)

6. To what extent do you understand the Mathematical Literacy curriculum?

   Not familiar  To some extent  To a large extent  Totally familiar

7. Does it provide guidelines for implementation?

   Yes  No  Not sure
8. Does it allow for flexible implementation?
   Yes | No | Not sure

9. Are you aware of the Learning Programme Guidelines for Mathematical Literacy?
   Yes | No

10. Do you have a personal copy of this document?
    Yes | No

11. To what extent do you understand the Learning Programme Guidelines for Mathematical Literacy?
    Not familiar | To some extent | To a large extent | Totally familiar

12. Does it provide guidelines for implementation?
    Yes | No | Not sure

13. Does it allow for flexible implementation?
    Yes | No | Not sure

14. Are you aware of the Assessment Guidelines for Mathematical Literacy?
    Yes | No

15. Do you have a personal copy of this document?
    Yes | No

16. To what extent do you understand the Assessment Guidelines for Mathematical Literacy?
    Not familiar | To some extent | To a large extent | Totally familiar

17. Does it provide guidelines for implementation?
    Yes | No | Not sure

18. Does it allow for flexible implementation?
    Yes | No | Not sure
PART C

What are your views about each of the following statements with regard to the Mathematical Literacy curriculum?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Not sure</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The curriculum must be viewed in relation to the larger agenda of transformation</td>
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<tr>
<td>2. The curriculum is mandatory because of political reasons</td>
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<tr>
<td>3. The curriculum is mandatory because of the low levels of numeracy in the country</td>
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<td>4. It is a 'watered down' version of the more abstract Mathematics curriculum</td>
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<tr>
<td>5. Is similar to the previous Standard Grade Mathematics curriculum in nature</td>
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<tr>
<td>6. Is similar to the previous Standard Grade Mathematics curriculum in level of difficulty</td>
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<tr>
<td>7. Is similar to the previous Standard Grade Mathematics curriculum in teaching</td>
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<tr>
<td>8. Provides learners with an awareness and understanding of the role that mathematics plays in the modern world</td>
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<td>9. Allows for life-related applications of mathematics</td>
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<tr>
<td>10. Enables learners to become numerically self-managing persons</td>
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<td>11. Enables learners to become contributing workers to society.</td>
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<td>12. Empowers learners with democratic participation</td>
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<td>13. Supports critical thinking</td>
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<tr>
<td>14. Supports creative thinking</td>
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<tr>
<td></td>
<td>Strongly agree</td>
<td>Agree</td>
<td>Not sure</td>
<td>Disagree</td>
<td>Strongly disagree</td>
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<tr>
<td>15. Delays formal methods (algorithms) in favor of extended opportunities to engage mathematics in diverse contexts</td>
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<td>16. Is suited to dealing with issues related to human rights, environmental and social justice</td>
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<td>17. Values indigenous knowledge systems</td>
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<td>18. Is credible in quality</td>
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<td>19. Supports only low order skills and knowledge</td>
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<tr>
<td>20. Allows for no real abstract thinking only practical application</td>
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<tr>
<td>21. Encourages team work in problem solving</td>
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<td>22. Respectfully considers and allows for diversity</td>
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<tr>
<td>23. Favours process and context over content</td>
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<tr>
<td>24. Conceptual knowledge is minimum</td>
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<tr>
<td>25. The outcomes are of central importance to the attainment of the Critical and Developmental outcomes</td>
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<tr>
<td>26. Is easy to implement</td>
<td></td>
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<tr>
<td>27. Has resulted in anxiety and stress for you</td>
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<tr>
<td>28. It is an opportunity for you to re-define your thinking about the nature and teaching of mathematics</td>
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<tr>
<td>29. Informs and improves your teaching</td>
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<tr>
<td>30. Allows for the development of knowledge, skills, values and attitudes</td>
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</tbody>
</table>
PART D

How often do you use the following methods, tools and techniques in the teaching of Mathematical Literacy?

PLACE A CROSS (X) IN THE APPROPRIATE BLOCK

<table>
<thead>
<tr>
<th>Method/Tool/Technique</th>
<th>Always</th>
<th>Often</th>
<th>Sometimes</th>
<th>Seldom</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Charts</td>
<td></td>
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</tr>
<tr>
<td>2. Tables</td>
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<tr>
<td>3. Data from media</td>
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<tr>
<td>4. Textbooks</td>
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<tr>
<td>5. Scientific calculators</td>
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<tr>
<td>6. Spread sheets</td>
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<tr>
<td>7. Newspaper articles</td>
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<tr>
<td>8. Computer software:</td>
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<tr>
<td>▪ Autograph</td>
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<tr>
<td>▪ Geometers Sketchpad</td>
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<tr>
<td>▪ Other (specify)</td>
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<tr>
<td>9. Debates</td>
<td></td>
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<tr>
<td>10. Reflection</td>
<td></td>
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<tr>
<td>11. Learner chosen contexts</td>
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</tbody>
</table>

PART E

It is claimed that effective Mathematical Literacy teachers possess the following traits and behavior.

PLACE A CROSS (X) ON THE RESPONSE YOU CONSIDER MOST APPROPRIATE

<table>
<thead>
<tr>
<th>Trait Description</th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Have high but realistic expectations of all learners</td>
<td></td>
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</tr>
<tr>
<td>2. Promote and value learner effort</td>
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<tr>
<td>3. Focus on key mathematical ideas</td>
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</tbody>
</table>
PLACE A CROSS (X) ON THE RESPONSE YOU CONSIDER MOST APPROPRIATE

<table>
<thead>
<tr>
<th></th>
<th>Strongly agree</th>
<th>Agree</th>
<th>Uncertain</th>
<th>Disagree</th>
<th>Strongly disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Modify teaching as a result of lesson reflection</td>
<td></td>
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<tr>
<td>5. Believe that mathematics teaching and learning should be enjoyable</td>
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<tr>
<td>6. Are confident in their own knowledge of mathematics</td>
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<td>7. Vary their roles as teachers</td>
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<tr>
<td>8. Connect mathematics ideas to various contexts</td>
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<tr>
<td>9. Make the mathematical focus clear to the learners</td>
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<tr>
<td>10. Use teachable moments as they occur</td>
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</table>

PART F

WHAT DO YOU THINK ARE THE MAIN REASONS WHY THE MATHEMATICAL LITERACY CURRICULUM HAS BEEN INTRODUCED IN OUR SCHOOLS?

Please write clearly.
PART G

WHAT IS YOUR UNDERSTANDING OF THE TERM MATHEMATICAL LITERACY?

Please write clearly.

________________________________________________________________________
________________________________________________________________________
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PART H

DO YOU BELIEVE THAT TEACHING MATHEMATICAL LITERACY IS DIFFERENT TO TEACHING MATHEMATICS?

Please write clearly.

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PART I

WHO DO YOU BELIEVE SHOULD BE TEACHING MATHEMATICAL LITERACY?

Please write clearly.

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PART J

WHAT DO YOU BELIEVE TO BE THE 'SPIRIT' OF THIS NEW REFORM IN MATHEMATICS? THAT IS WHAT ITS BROADER PURPOSE IS?

Please write clearly.

________________________________________________________________________
________________________________________________________________________
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________________________________________________________________________
The purpose of this questionnaire is to collect information about how teachers practice Mathematical Literacy in their classrooms.

PART A

Please read each of the following statements below with regard to your current teaching practice with respect to Mathematical Literacy and place a cross on the number of the response you consider most appropriate.

How does your current teaching practice match each of the following statements?

<table>
<thead>
<tr>
<th>Statement</th>
<th>Mirrors the statement</th>
<th>Room for improvement</th>
<th>Does not mirror the statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Teaching is sensitive to indigenous knowledge systems</td>
<td></td>
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<tr>
<td>2. Engages with real-world problems</td>
<td></td>
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<tr>
<td>3. Various contexts are used</td>
<td></td>
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<tr>
<td>4. Integrate lessons with other disciplines (subject areas)</td>
<td></td>
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<tr>
<td>5. Entrepreneurial skills are targeted and developed</td>
<td></td>
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<tr>
<td>6. Lessons engage learners critically</td>
<td></td>
<td></td>
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<tr>
<td>7. Lessons engage learners creatively</td>
<td></td>
<td></td>
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<tr>
<td>8. Basic mathematical skills are extended</td>
<td></td>
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<tr>
<td>9. High levels of numerical skills are afforded</td>
<td></td>
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<tr>
<td>10. Addresses issues of social justice</td>
<td></td>
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<tr>
<td>11. Attitudes and values are developed</td>
<td></td>
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<tr>
<td>12. Use technology</td>
<td></td>
<td></td>
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<tr>
<td>13. Calculators used</td>
<td></td>
<td></td>
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<tr>
<td>13. Reflection takes place (educator &amp; learner)</td>
<td></td>
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<td></td>
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<tr>
<td>14. Pupils work in groups or pairs</td>
<td></td>
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</tbody>
</table>
How does your current teaching practice match each of the following statements?

<table>
<thead>
<tr>
<th></th>
<th>Mirrors the statement</th>
<th>Room for improvement</th>
<th>Does not mirror the statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. Outcomes are linked to the Critical Outcomes</td>
<td></td>
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<tr>
<td>16. Outcomes are linked to the Developmental outcomes</td>
<td></td>
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<tr>
<td>17. Outcomes are the main objective of the lesson</td>
<td></td>
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<tr>
<td>18. Outcomes overlap</td>
<td></td>
<td></td>
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<tr>
<td>19. Process and context are the main elements of the lesson</td>
<td></td>
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<tr>
<td>20. Content is the focus of the lesson</td>
<td></td>
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<tr>
<td>21. Educator is confident</td>
<td></td>
<td></td>
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<tr>
<td>22. Educator is motivated</td>
<td></td>
<td></td>
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<tr>
<td>23. Assessment is integrated with teaching</td>
<td></td>
<td></td>
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<tr>
<td>24. Feedback is integrated with teaching</td>
<td></td>
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</tbody>
</table>

PART B

DO YOU THINK YOU HAVE THE NECESSARY KNOWLEDGE AND SKILLS TO IMPLEMENT THE MATHEMATICAL LITERACY CURRICULUM? PLEASE GIVE REASONS.

Please write clearly.

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PART C

ARE RESOURCES IN TERMS OF TIME, MATERIALS AND HUMAN CAPACITY SUFFICIENT AT YOUR SCHOOL TO IMPLEMENT THE CURRICULUM? PLEASE EXPLAIN.

Please write clearly.

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PART D

WHAT CHANGES WITH RESPECT TO YOUR TEACHING METHODS DID YOU MAKE IN IMPLEMENTING THE NEW CURRICULUM?

Please write clearly.

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PART E

HAS YOUR UNDERSTANDING OF THE NATURE OF TEACHING MATHEMATICS CHANGED SINCE IMPLEMENTING THE NEW CURRICULUM?

Please write clearly.

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PART F

HAVE YOUR BELIEFS WITH RESPECT TO WHO CAN DO MATHEMATICS CHANGED AS A RESULT OF MATHEMATICAL LITERACY?

Please write clearly.

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PART G

WHAT DIFFICULTIES HAVE YOU EXPERIENCED IN THE IMPLEMENTING OF MATHEMATICAL LITERACY?

Please write clearly.

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PART H

IN YOUR OPINION HOW CAN THESE BE OVERCOME?

Please write clearly.

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PART I

HAVE YOU RECEIVED ANY TRAINING OR SUPPORT IN IMPLEMENTING MATHEMATICAL LITERACY? EXPLAIN.

Please write clearly.

________________________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________________________
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PART J

IS MATHEMATICAL LITERACY ABOUT GAINING ACCESS TO MATHEMATICS OR ABOUT ACCESSING MATHEMATICS? EXPLAIN.

Please write clearly.

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________________________________________________________________________________________________________________________________________________
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________________________________________________________________________________________________________________________________________________
SCHEDULE C

Interview I (Pre-classroom observations)

1. What is your understanding of the Mathematical Literacy curriculum?
2. Why do you believe this subject was introduced?
3. Why do you think it was made compulsory?
4. Which of your students do Mathematical Literacy?
   - How was this decided upon?
   - Describe these pupils with respect to mathematical proficiency.
5. In your opinion can all learners do Mathematical Literacy?
6. What do you think is the status of the subject with respect to mathematics?
   - Do the pupils of the school share this view?
   - Do the parents of the school share this view?
   - Do your colleagues share this view?
7. What is your definition of mathematical literacy?
   - How did you arrive at the definition?
8. What in your opinion are the essential elements of mathematical literacy?
   - Why?
9. What do you think are the goals of the Mathematical Literacy curriculum?
10. How is your definition of mathematical literacy consistent with these goals?
11. What do you believe that being numerate requires?
12. What do you understand by the following terms:
    - acquiring mathematical methods
    - establishing mathematical understanding
    - establishing mathematical connections?
13. Do you think you have a role to play in this mathematics reform?
    - What role?
14. What are the advantages of offering Mathematical Literacy?
15. What are the disadvantages of offering Mathematical Literacy?
16. Why did you introduce Mathematical Literacy at your school?
17. How does the Mathematical Literacy curriculum differ from the new Mathematics curriculum?
18. How does the Mathematical Literacy curriculum differ from the old Standard Grade Mathematics curriculum?
19. How does teaching the Mathematical Literacy curriculum differ from teaching the new Mathematics curriculum?
20. How does teaching the Mathematical Literacy curriculum differ from teaching the old Standard Grade Mathematics curriculum?
21. Do you believe that Mathematical Literacy will improve numeracy levels in your school?
    - Why?
22. Do you believe that Mathematical Literacy will improve numeracy levels in the country?
    - Why?
23. Do you feel confident with respect to teaching Mathematical Literacy?
   ▪ Why?

24. Are you motivated to teach this subject?

25. How did you go about implementing this new curriculum?
   ▪ Did you have any support?
   ▪ Did you receive training?

26. What difficulties have you experienced with the implementation process?

27. What difficulties do you think teachers nation wide have experienced in the implementation process?

28. Have you had to change any of the following:
   ▪ teaching style
   ▪ teaching methods
   ▪ beliefs with respect to the nature of mathematics?

29. What are your short-term goals with respect to teaching Mathematical Literacy?

30. What are your long-term goals with respect to teaching Mathematical Literacy?
The purpose of this questionnaire is to briefly collect information about how teachers perceive the nature of the lesson they have just delivered.

1. What was the purpose of this lesson?
2. In your view was this a successful lesson? Why?
3. Do you believe that the pupils acquired the knowledge and skills you expected of them before the lesson? Explain.
**SCHEDULE E**

**Classroom Observation Protocol**

(4 weeks continuously of 1-hour lessons followed by one more week after 6 weeks)

**Teacher:**

**School:**

**Date:**

<table>
<thead>
<tr>
<th></th>
<th>Lesson ___</th>
<th>Lesson ___</th>
<th>Nature of use/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Purpose of lesson explained to learners</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>2. Pre-knowledge determined</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>3. Teaching supports learners to take ownership of mathematics</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>4. Context obscures mathematics</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>5. Use of authentic contexts</td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>6. Context familiar to learners</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>7. Contexts used are a priori</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>8. Contexts used are inductive</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>9. Guided discovery of algorithms</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>10. Learners encouraged to seek mathematical understanding</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>11. Solution process varied and rich</td>
<td>Yes</td>
<td>No</td>
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<td>12. Mathematical 'life skills' taught</td>
<td>Yes</td>
<td>No</td>
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<td>13. Mathematical reasoning (justification) encouraged</td>
<td>Yes</td>
<td>No</td>
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<td>14. Reflect on solutions - awareness only</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>15. Reflect on solutions - consensus generation</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>16. Adaptive/differentiated instruction</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>17. Instructional expectations of learners high</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>18. Development of attitudes and values</td>
<td>Yes</td>
<td>No</td>
<td></td>
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<tr>
<td>Lesson ___</td>
<td>Lesson ___</td>
<td>Nature of use/Comments</td>
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<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>19. Teaching practice (pedagogy) promotes self-regulated learning</td>
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<td>20. Consolidate basic skills</td>
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<tr>
<td>21. Extend basic skills</td>
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<tr>
<td>22. Critical analysis of problems</td>
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<tr>
<td>23. Critical engagement with regard to mathematical arguments</td>
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<td>24. Creativity in solving allowed for</td>
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<td>26. Lessons afford depth</td>
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<td>26. Lessons afford breadth</td>
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<td>27. Indigenous mathematics problems/examples used</td>
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<td>28. Communicates using various methods</td>
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<tr>
<td>29. Variety of teaching resources used</td>
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<tr>
<td>30. Multiple forms of representation (e.g. tables, diagrams)</td>
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<tr>
<td>31. Computational tools used</td>
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<tr>
<td>32. Space, shape &amp; measurement using design/art/geography/other</td>
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<tr>
<td>33. Functional relationships (rate of change)</td>
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<tr>
<td>34. Numbers &amp; operations in various contexts</td>
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<tr>
<td>35. Data handling-awareness of data manipulation</td>
<td></td>
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<tr>
<td>36. Data handling-critical analyses</td>
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<tr>
<td>37. Learners pose/identify problems</td>
<td></td>
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<tr>
<td>38. Recognition provided</td>
<td></td>
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<tr>
<td>39. Reinforcement given</td>
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<tr>
<td>40. Motivational strategies used</td>
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<td>41. Positive attitude towards all learners</td>
<td></td>
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<tr>
<td></td>
<td>Lesson ___</td>
<td>Lesson ___</td>
<td>Nature of use/Comments</td>
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<tr>
<td>42.</td>
<td>Informed feedback given</td>
<td>Yes</td>
<td>No</td>
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<td>43.</td>
<td>Outcomes focused</td>
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<td>44.</td>
<td>Content focused</td>
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<td>45.</td>
<td>Teacher-centered</td>
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<tr>
<td>46.</td>
<td>Learner-centered</td>
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<tr>
<td>47.</td>
<td>Collaborative problem solving</td>
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<td>48.</td>
<td>Instructional match (needs to instruction matched)</td>
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<tr>
<td>49.</td>
<td>Order of lesson-review previous material, demonstrate how to solve problems for the day, practice similar problems</td>
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<td>50.</td>
<td>Responsibility/sensitivity to broader societal concerns</td>
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<tr>
<td>51.</td>
<td>Career opportunities discussed</td>
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<tr>
<td>52.</td>
<td>Entrepreneurial success discussed</td>
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<tr>
<td>53.</td>
<td>Learners reflect on lesson</td>
<td></td>
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<tr>
<td>54.</td>
<td>Teacher reflects on lesson</td>
<td></td>
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<tr>
<td>55.</td>
<td>Assessment integrated in instructional practice</td>
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<tr>
<td>56.</td>
<td>Process and context interrelated with content</td>
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<tr>
<td>57.</td>
<td>Ownership of curriculum</td>
<td></td>
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<tr>
<td>58.</td>
<td>Relates mathematics to other learning areas</td>
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</table>
## SCHEDULE F

### Document analysis I

#### PART A

**Analysis of Learner Documents and Records**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Books/notes</th>
<th>Portfolios</th>
<th>Reports of learners</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose of lesson obvious</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Real-world problems</td>
<td></td>
<td></td>
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<tr>
<td>Variety of contexts used</td>
<td></td>
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<tr>
<td>Contexts chosen by teacher</td>
<td></td>
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<tr>
<td>Evidence of learner context choices</td>
<td></td>
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</tr>
<tr>
<td>Focus is on content</td>
<td></td>
<td></td>
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<tr>
<td>Focus is on process</td>
<td></td>
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<tr>
<td>Evidence of issues related to human rights, environmental, social justice</td>
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<tr>
<td>Reflects indigenous knowledge systems</td>
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<tr>
<td>Conceptual knowledge developed</td>
<td></td>
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<tr>
<td>Individuals needs catered for</td>
<td></td>
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<tr>
<td>Lesson integrates with other disciplines</td>
<td></td>
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<tr>
<td>Various methods of communication</td>
<td></td>
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<tr>
<td>Use of calculators</td>
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<tr>
<td>Estimation</td>
<td></td>
<td></td>
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<tr>
<td>Use of technology</td>
<td></td>
<td></td>
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<tr>
<td>High knowledge problems set</td>
<td></td>
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<tr>
<td>High skills problems set</td>
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</table>
PART B

Analysis of Educator Documents and Records

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Subject framework</th>
<th>Work schedule</th>
<th>Lesson plans</th>
<th>Departmental minutes</th>
<th>Staff development documentation</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philosophy and policy</td>
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<tr>
<td>NCS principles</td>
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<tr>
<td>Conceptual progression</td>
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<tr>
<td>Integration of LOs &amp; ASs</td>
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<td>Resources-learning &amp; teaching</td>
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<tr>
<td>Inclusivity &amp; diversity</td>
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<tr>
<td>Assessment</td>
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<tr>
<td>Contexts &amp; content</td>
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<tr>
<td>Teaching methodology</td>
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<tr>
<td>Learning methodology</td>
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</table>
The documents will be explored and summarized according to the following criteria:

1. What is the purpose of the document?
   - What is the rationale for the document?
   - What are the goals and objectives of the document?
   - What principles is the document based on?
   - What are the implied intentions of the document?

2. How is the document related to transformation?

3. What is the 'theory of action'?

4. Which themes emerge?

Three documents i.e., National Curriculum Statement Mathematical Literacy, Learning Programme Guidelines Mathematical Literacy, an Subject assessment Guidelines Mathematical Literacy, will be analyzed with respect to purpose, principles, scope and opportunity.
The purpose of this summary form is to collect any additional information pertinent to this study from auxiliary (subject files, vision statement for implementation, timetable etc.) educator documents.

Site: __________________________________________

Document number: ____________________________

Date received or picked up: ____________________

Name or description of document:

EVENT OR CONTACT, IF ANY, WITH WHICH DOCUMENT IS ASSOCIATED:

SIGNIFICANCE OR IMPORTANCE OF DOCUMENT:

BRIEF SUMMARY OF CONTENTS:
The purpose of this checklist is to collect contextual information on the school in order to compile a vivid and rich description of the case study school for the narrative of this research.

To be completed by the researcher/teachers in the school

**PLEASE FILL IN OR PLACE A TICK IN THE APPROPRIATE COLUMN**

1. Type of building

<table>
<thead>
<tr>
<th>Type of building</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>a) Building designed as school</td>
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<tr>
<td>b) Prefab</td>
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<td>c) Teacher training college</td>
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<tr>
<td>d) Other (specify)</td>
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</table>

2. School building

<table>
<thead>
<tr>
<th>School building</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>a) Number of blocks</td>
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<tr>
<td>b) Number of storeys</td>
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</tbody>
</table>

3. Condition of school and furniture

<table>
<thead>
<tr>
<th>Type of structure: Specify (e.g., brick wall, tile roof, etc)</th>
<th>No maintenance needed</th>
<th>Need maintenance</th>
<th>Need maintenance &amp; structural repair</th>
<th>Beyond repair</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Roof</td>
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<td></td>
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<tr>
<td>b) Windows</td>
<td></td>
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<tr>
<td>c) Doors</td>
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<td></td>
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<tr>
<td>d) Walls</td>
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<tr>
<td>e) Furniture</td>
<td></td>
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<tr>
<td>f) Floors</td>
<td></td>
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<tr>
<td>g) Toilets</td>
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<tr>
<td>h) Ceilings</td>
<td>Fitted</td>
<td>Not fitted</td>
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</tr>
<tr>
<td>i) Other (specify)</td>
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</tbody>
</table>
4. Number of toilets for teaching/administrative staff
   - a) Male staff
   - b) Female staff
   - c) Out of order

5. Number of toilets for learners
   - a) Males
   - b) Females
   - c) Out of order

6. Power and energy supply
   - a) Wired & supplied with electricity
   - b) Wired but not supplied with electricity
   - c) Not wired and/or & no electricity available
   - d) Generators
   - e) Other (specify)

7. Overall condition of building
   - Very weak (not suitable for occupation)
   - Weak (structure needs attention)
   - Needs paint & minor repairs
   - Good condition
   - Excellent, no foreseeable repairs

8. Safety
   - a) Building is completely fenced with security at the entrance
   - b) Building is completely fenced without security at the entrance
   - c) Building has been fenced but fence is damaged
   - d) No fence
   - e) Other (specify)

9. Office space
   - Adequate
   - Inadequate
   - None
   - Estimated shortfall number
   - a) Offices for management
   - b) Offices for admin staff
10. Access roads

<table>
<thead>
<tr>
<th></th>
<th>Good condition</th>
<th>Poor condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Tar road</td>
<td></td>
<td></td>
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<tr>
<td>b) Gravel road</td>
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11. Please provide a general description of the overall surroundings

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### SCHEDULE J

**Researchers Journal**

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<th>Date:</th>
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<tr>
<th>Day:</th>
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<tr>
<th>Time:</th>
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**RESEARCHER REFLECTIONS**

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REFERENCES


Department of Education. 2003a National Curriculum Statements. Grades 10-12 (General). Pretoria, Department of Education.


Department of Education. 2003c Qualification and Assessment Policy Framework. Grades 10-12 (General). Pretoria, Department of Education.


Tate, W. 2004. *Access and opportunities to learn are not accidents: Engineering mathematics progress in your school*. Tallahassee, FL: SERVE.


