

©2013 by Musonda Moses. All rights reserved

No part of this thesis may be reproduced or stored in any form or by any means, electronic or mechanical, including photocopying, or any information storage or retrieval system, without permission in writing from the author or the University of Zambia.

I, MUSONDA MOSES, declare that this thesis represents my own work and that it has not been previously submitted for a degree at this or any other university.

Signed:

Date:

APPROVAL

This thesis of MUSONDA MOSES is approved as fulfilling the requirements for the award of the degree of Master of Education in Science Education by the University of Zambia.

Signed:

Date:

.....
.....
.....
.....
.....

.....
.....
.....
.....
.....

ABSTRACT

This study aimed at identifying which topics pupils perceived as difficult to learn in high school biology based on high schools in Kasama and Mungwi districts. It also examined the reasons for these difficulties and came up with recommendations on how to overcome the difficulties. Eleven heads of departments, 19 biology teachers and 451 high school pupils constituted the sample. The data were collected through questionnaires and semi-structured interviews. All the heads of departments, biology teachers and pupils completed the questionnaire. The 19 biology teachers and 66 out of 451 pupils attended the follow-up oral interviews. Results of the study revealed that the most difficult topics in descending order of difficulty were; Mendelian genetics, mitosis and meiosis, genes and chromosomes, DNA synthesis, skeletal system and evolution. The identified the reasons why pupils experienced challenges in learning the above topics as the following: the topics were characterized by complex terms; teachers were not conducting practical laboratory work but taught theoretically; lack of teaching and learning resources including suitable text books and failure by the teachers to use ICT in the classroom. The study also established that neither pupils nor teachers had access to internet facilities at the schools. Some teachers failed to handle the difficult topics as evidenced by their poor explanation of concepts, and some of the teachers did not have the right qualification to handle senior classes. Gender differences were identified as having an impact on the pupils' perception of learning difficulties. The teachers of biology agreed that gender had an effect on the pupils' perception of learning difficulties but they did not agreed on which gender had a better or a more positive perception of learning difficulties. The study established that a variety of teaching strategies would help pupils learn the difficult topics effectively well. These strategies included: strict lesson planning by teachers, use of adequate teaching and learning resources, incorporating ICT in the classroom, promoting active learner-centred teaching strategies and employing effective communication skills characterised by clear explanations coupled with real-life practical examples. The study also showed that the biology teachers would lessen pupils' learning challenges through motivating their pupils, administering remedial work to slow learners, revising the difficult topics with pupils, and giving to pupils some written assignments or research work followed by a feedback on such work.

To my wife Mildred and my daughters, Kaunda and Musonda for love and moral support.

ACKNOWLEDGEMENTS

I am deeply indebted to my supervisor, Dr.C.Katongo, without whose commitment this research could not have been a success. Thank you for your academic guidance and criticism.

Thanks to Head of the Department, Mathematics and Science Education, Mr.G.A Chibesakunda and course Co-ordinator, Dr.S. Mbewe for their guidance and support.

I would like to express my heartfelt gratitude to the following: Messrs: E.Mubanga and T.Zimba for their valuable professional advice and support. I sincerely thank Ms Kakula, Messrs: C.Silwamba, P.Mulenga, S.Mubanga, J.Saili, L.Yamba and F. Lubunda (all are Senior Lecturers at Kasama College of Education) for the great help rendered to me during data collection. Their role made my burden significantly lighter than it could otherwise have been without them.

Thanks to the District Education Board Secretary (DEBS), Mr.S. Kachiliko, and all high school Heads and their Deputies as well as Heads of Natural Sciences Department in Kasama and Mungwi districts for their co-operation and understanding.

Special thanks go to all the participants in Kasama and Mungwi districts who made it possible for me to undertake this study.

Finally, thanks to my wife and daughters for their unwavering patience and love.

TABLE OF CONTENTS

Copyright	i
Declaration.....	ii
Approval.....	iii
Abstract.....	iv
Dedication.....	v
Acknowledgements.....	vi
Table of Contents.....	vii
List of acronyms and abbreviations.....	x
List of Tables.....	xi
List of Figures.....	xi
CHAPTER ONE: INTRODUCTION.....	1
1.0 General.....	1
1.1 Background.....	1
1.2 Statement of the problem.....	2
1.3 Purpose of the Study.....	2
1.4 Objectives	2
1.5 Main Research Question.....	2
1.5.1 Sub-research questions.....	3
1.6 Significance of the Study.....	3
1.7 Theoretical Framework.....	3
1.8 Limitations and delimitations of study.....	5

CHAPTER TWO: LITERATURE REVIEW	6
2.0 Introduction.....	6
2.1 Impact of language on pupils’ performance in biology.....	6
2.2 Specialist vocabulary of biology.....	7
2.3 Pupils’ attitude	8
2.4 Mathematical background.....	8
2.5 Gender effect.....	9
2.6 Lack of practical work and necessary resources.....	9
2.7 Teachers’ indifference towards practical work in biology.....	10
2.8 Teachers’ academic qualification affecting pupils’ performance.....	10
2.9 Conclusion.....	10
CHAPTER THREE: METHODOLOGY	11
3.0 Introduction.....	11
3.1 Research Design.....	11
3.2 Data Collection.....	11
3.2.1 Target population.....	11
3.2.2 Sample Size.....	11
3.2.3 Sampling Techniques.....	12
3.2.4 Pilot Testing.....	12
3.2.5 Data Collection Instruments.....	13
3.2.5.1 Questionnaires.....	13
3.2.5.2 Interview schedules.....	13
3.2.6 Data Collection Procedures.....	13
3.3 Data Analysis.....	13
3.4 Reflections on Ethical issues.....	14

CHAPTER 4: RESULTS	15
4.0 Introduction.....	15
4.1 School profiles.....	15
4.1.1 School type.....	15
4.1.2 Performance in biology by school for past three years.....	16
4.1.3 Number of teachers in biology section by school and gender.....	18
4.1.4 Teachers’ demographics.....	19
4.1.5 Pupils’ profile.....	23
4.2 Pupils’ responses.....	26
4.2.1 Topics in biology perceived to be difficult for pupils to learn.....	27
4.2.2 Reasons why the topics are perceived to be so difficult.....	29
4.2.3 Possible practical strategies to lessen pupils’ learning difficulties.....	35
4.3 Teachers’ responses.....	38
4.3.1 Teachers’ responses about their pupils’ performance in Biology.....	38
4.3.2 Topics in biology perceived to be difficult for pupils to learn.....	38
4.3.3 Reasons why the topics are perceived to be so difficult.....	42
4.3.4 Effect of gender difference on pupils’ perception of learning difficulties.....	47
4.3.5 Possible practical teaching strategies to lessen learning difficulties.....	48
4.4. HODs’ responses.....	50
4.4.1 Topics in biology perceived to be difficult for pupils to learn.....	50
4.4.2 Reasons why the topics are perceived to be so difficult.....	51
4.4.3 Possible practical strategies to lessen pupils’ learning difficulties.....	52
CHAPTER 5: DISCUSSION	53
5.0 Introduction.....	53
5.1. Topics in biology high school pupils perceived to be difficult.....	53
5.2 Reasons why the topics are perceived to be so difficult	54

5.3 Effects of gender difference on pupils' perception of learning difficulties	57
5.4 Possible strategies to lessen pupils' learning difficulties.....	58
CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATIONS.....	61
6.1 Summary.....	61
6.2 Conclusion.....	62
6.3 Recommendations.....	63
6.4 Recommendations for Further Research.....	64
REFERENCES.....	65
List of appendices.....	68
Appendix I: Consent Form.....	68
Appendix II: Research permission letter.....	69
Appendix III: Questionnaire for Heads of Natural Sciences Department.....	70
Appendix IV: Questionnaire for biology teachers	76
Appendix V: Questionnaire for pupils.....	80
Appendix VI: Interview schedule for biology teachers.....	84
Appendix VII: Interview schedule for pupils.....	85

List of Acronyms and Abbreviations

MoE	-	Ministry of Education.
HOD	-	Head of Department.
CPD	-	Continuing Professional Development.
ICT	-	Information and Communication Technology
DNA	-	DeoxyriboNucleic Acid.
DVD	-	Digital Video Disc

- CD - Compact Disc
- SESO - Senior Education Standards Officer
- DESO - District Education Standards Officer
- ESO - Education Standards Officer

List of Tables

Table 4.1 performance by school in biology for the past three years.....17

Table 4.2 Information on teachers’ gender and age.....19

Table 4.3 Teachers’ qualification by school and gender.....21

Table 4.4 Number of senior pupils, gender and age-range by school.....24

Table 4.5 Pupils’ gender, age and grade level.....25

Table 4.6 Pupils’ reasons’ for the most difficult topics in biology.....30

Table 4.7 Pupils’ specific challenges when learning difficult topics in biology31

Table 4.8 Pupils’ verbal reasons for the most difficult topics in biology.....33

Table 4.9 Pupils’ thoughts about how best teachers could help them.....35

Table 4.10 Pupils’ thoughts about how best teachers could help them.....37

Table 4.11 Teachers’ reasons for the topics in biology pupils perceive as most difficult.....43

Table 4.12 HODs’ reasons for the topics in biology pupils perceive as most difficult.....51

List of Figures

Figure 1.1 Process of knowledge construction and accommodation.....5

Figure 4.1.School type15

Figure 4.2 Summary of overall performance by school.....16

Figure 4.3 Number of teachers in biology section by school and gender.....18

Figure 4.4 Teachers' experience.....	20
Table 4.5 Summary of teachers' qualification.....	22
Figure 4.6 Biology teachers' teaching load.....	23
Figure 4.7 Pupils' responses about their performance in biology.....	26
Figure.4.8 Pupils' responses about their favourite science subject.....	27
Figure 4.9 Topics in biology perceived to be difficult for pupils to learn.....	28
Figure 4.10 Topics pupils perceive as most difficult.....	29
Figure 4.11 Pupils' challenges when learning difficult topics.....	32
Figure 4.12 Teachers' responses about the performance of pupils in biology.....	39
Figure 4.13 Topics in biology teachers think pupils perceive as most difficult.....	40
Figure 4.14 Topics in biology teachers think pupils perceive as most difficult.....	41
Figure 4.15 Teachers' challenges when teaching topics in biology perceived as difficult.....	44
Figure 4.16 Teachers' reasons for the topics perceived as most difficult.....	45
Figure 4.17 Teachers' challenges when teaching topics in biology perceived as difficult.....	46
Figure 4.18 Teachers' opinions about the effect of gender difference.....	47
Figure 4.19 Teachers' suggested strategies to lessen learners' difficulties.....	48
Figure 4.20 Teachers' suggested strategies to lessen learners' difficulties.....	49
Figure 4.21 Topics HODs think pupils perceive as most difficult.....	50
Figure 4.22 HODs' suggested strategies to lessen learners' learning difficulties.....	52