DEVELOPING PEDAGOGICAL CONTENT KNOWLEDGE FOR THE TEACHING
OF MEIOSIS: A SELF-STUDY

BY

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Requirements for the Degree of Master of Science

(Science Education)

Supervisor

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Declaration

I declare that the research report is my own, unaided work. It is being submitted for the Degree of Master of Science in the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in any other university.

................................. Date: March 2015

David Kaseke
Abstract

In my Honours degree, I researched on learners’ understanding of meiosis after I had taught them the topic. The study was done on three schools. The results of the study revealed that the majority of learners from my school were unable to identify and explain some concepts in meiosis. The failure of the learners to understand the topic prompted me to reflect on my content knowledge of meiosis and its teaching. To investigate my own content knowledge in this self-study, I used concept maps and CoRes. Concept maps were seeking to develop my content knowledge and CoRes were seeking to develop both content knowledge and pedagogy of teaching meiosis. The aim of the self-study was therefore to improve my content knowledge and pedagogical content knowledge (PCK) of meiosis through the use of concept maps and CoRes as planning tools. The development of content knowledge and pedagogy was done with the help of collaborative friends.

Of the two planning tools I used (concept maps and CoRes), three concept maps and three CoRes were constructed. Each of the concept maps was analysed using number of concepts identified and the number of propositions. Both qualitative and quantitative methods were used to analyse the concept maps. The number of both concepts and propositions gave an indication of the development of content knowledge from one concept map to the other. CoRes were analysed qualitatively using a framework. The framework used focused on curricular saliency, student prior knowledge, what makes the topic difficult or easy, teaching strategies and representations. From these aspects of the framework, the teachers’ content knowledge and pedagogy was identified to see whether there was development from one CoRe to the other.

The study revealed that both concept maps and CoRes when used as planning tools can develop the teachers’ content knowledge and pedagogy on meiosis. Concept maps helps to indentify content gaps and misconceptions. CoRes helped me in the identification of the big ideas for the teaching of meiosis, the content which learners need to know and the identification of teaching strategies which can help the topic to be understood better.

Recommendations from the study were that teachers should read about what they teach to improve content knowledge. Teachers should team up to produce teaching tools like CoRes.
Key Words: Content Knowledge, Pedagogical Content Knowledge (PCK), Content Representation (CoRe) and Concept map
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Table of contents

Declaration.......................................................................................................................... ii
Abstract ................................................................................................................................... iii
Acknowledgements ............................................................................................................... iv
Table of contents .................................................................................................................. v
List of tables ........................................................................................................................ viii
List of figures ........................................................................................................................ ix

CHAPTER ONE .................................................................................................................... 1
Introduction .......................................................................................................................... 1
1.1 Introduction .................................................................................................................. 1
1.2 Context of study .......................................................................................................... 2
1.3 Research problem ....................................................................................................... 3
1.4 Aim of study and Research questions ....................................................................... 3
1.5 Self-study .................................................................................................................... 3
1.6 Theoretical framework .............................................................................................. 6
1.7 Outline of research report.......................................................................................... 6

CHAPTER TWO ................................................................................................................... 8
LITERATURE REVIEW AND THEORETICAL FRAMEWORK
2.1 Introduction .................................................................................................................. 8
2.2 CoRes .......................................................................................................................... 8
2.3 Concept maps ............................................................................................................ 11
2.4 Teaching and learning of meiosis ............................................................................. 14
2.5 Pedagogical Content Knowledge .............................................................................. 14
   2.5.1 Other researcher’s perspectives on PCK .......................................................... 15
   2.5.2 Domains of teacher knowledge ....................................................................... 20
   2.5.3 Manifestations of teacher knowledge ............................................................... 22
2.6 Topic Specific PCK .................................................................24
2.7 Conclusion ..............................................................................27

CHAPTER THREE ..............................................................................28

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction ..............................................................................28
3.2 Research design ........................................................................28
3.3 Participants ..............................................................................29
3.4 Reflective Journal .....................................................................30
3.5 Data collection ..........................................................................31
  3.5.1 Data collection instruments .................................................31
  3.5.2 Data collection through concept maps ..................................31
  3.5.3 Data collection through CoRes .............................................32
3.6 Data analysis .............................................................................34
  3.6.1 Analysis of concept maps .....................................................34
  3.6.2 How I analysed my first concept map ...................................35
  3.6.3 Data analysis of CoRes ..........................................................36
3.7 Ethical Issues ..............................................................................36
3.8 Validity .......................................................................................36
3.9 Conclusion ..................................................................................37

CHAPTER FOUR ..................................................................................38

PRESENTATION OF FINDINGS AND DISCUSSION ..............................38
4.1 Introduction ..............................................................................38

Section A

4.2 Analysis of and presentation of findings from concept maps ..........38
  4.2.1 Concept map 1 ......................................................................39
  4.2.2 Discussion of concept map 1 with team ...............................40


4.2.3 Reflection from the discussion .................................................................40
4.2.4 Concept map 2 .........................................................................................42
4.2.5 Discussion of concept map 2 with the team ............................................43
4.2.6 Reflection from the discussion .................................................................44
4.2.7 Concept map 3 .........................................................................................45
4.2.8 Discussion of concept map 3 with team ...................................................45
4.2.9 Reflection from the discussions ...............................................................46
4.2.10 Final discussion on concept maps ..........................................................46
4.3 Quantitative data for the three concept maps ............................................47
4.4 Concepts as a measure of content knowledge ...........................................48
4.5 Correctness ..................................................................................................50
4.6 Relationships as a measure of content knowledge .......................................51
4.7 Conclusion on concept maps ......................................................................51

Section B
4.8 The analysis of CoRes ..............................................................................52
4.8.1 Construction of CoRe 1 ..........................................................................53
4.8.2 Discussion of CoRe 1 (big ideas) with team ............................................58
4.8.3 Reflection from discussion on big ideas ..................................................58
4.8.4 Analysis of CoRe 1 ..................................................................................59
4.8.5 Discussion of CoRe 2 with team ..............................................................67
4.8.6 Reflection from the discussion ..................................................................68
4.8.7 Construction of CoRe 3 ............................................................................69
4.8.8 Discussion of CoRe 3 with team ..............................................................75
4.8.9 Reflection and discussion on CoRe 3 .......................................................77
4.8.10 Conclusion ..............................................................................................78
CHAPTER FIVE ........................................................................................................80

REFLECTIONS, IMPLICATIONS AND RECOMMENDATIONS

5.1 Introduction .....................................................................................................80
5.2 Concept maps and PCK ..................................................................................80
  5.2.1 The content gaps ......................................................................................80
  5.2.2 Insights from the construction of concept maps .....................................80
  5.2.3 Concept maps and learning – implications ...........................................81
5.3 CoRes and PCK ..............................................................................................83
  5.3.1 Identification of big ideas .........................................................................83
  5.3.2 The first four prompts in a CoRe ..............................................................84
  5.3.3 The last four prompts of my CoRes .........................................................85
  5.3.4 Insights from the use of CoRes .................................................................86
5.4 Self-study as a methodology ..........................................................................86
5.5 Reflections on concept maps ..........................................................................87
5.6 Reflections on CoRes ......................................................................................87
5.7 Recommendations ..........................................................................................88

References .............................................................................................................90

APPENDIX A: Samples of commented concept maps .........................................98
APPENDIX B: CoRes............................................................................................101
APPENDIX C: Study consent documents .............................................................110
  GDE Research Approval letter .........................................................................110
  Ethics clearance (University of Witwatersrand) ...............................................112

List of Figures

Fig 1: Model for PCK ..........................................................................................19
Fig 2: Amalgamation of two models of PCK .......................................................25
Fig 3: Part of concept map showing concepts and propositions .......................34
Fig 4: Concept map 1 ..........................................................................................39
Fig 5: Concept map 2 ..........................................................................................42
Fig 6: Concept map 3 ..........................................................................................44

List of Tables

Table 1: CoRe template ..........................................................................................9
Table 2: Components of pedagogical content knowledge from different from
conceptualizations ..............................................................................................18
Table 3: CoRe components adapted from Mavhunga and Rollnick (2013) ..........33
Table 4: Concept map scores ..................................................................................48
Table 5: Some correct concepts from concept maps 1, 2 and 3...............................49
Table 6: Results showing comparison of links forming propositions .......................50
Table 7: Overview of the five components and their explanations .........................53
Table 8: CoRe 1 ....................................................................................................55
Table 9: CoRe 2 ....................................................................................................62
Table 10: CoRe 3 ..................................................................................................69