

Abstract

I graduated, together with many other teachers, from a previously disadvantaged college of educations. As such, I had poor content knowledge in physical science, the subject I was teaching at the secondary school level. Such inadequate subject matter knowledge impacted negatively on my teaching thus leading to learning difficulties experienced by my students. This experience motivated me to carry out a self-study.

In this Self-Study I aimed to develop both my content knowledge and content knowledge for teaching about the chloralkali industry to grade 12 learners. To this end: 1) I constructed and used concept maps to find out how my understanding of the content knowledge and content knowledge for teaching developed, 2) I used Content Representation (Co-Re) and Pedagogical and Professional experience Repertoires (PaP-eRs) to document and portray my pedagogical content knowledge (PCK), 3) I videotaped my teaching lessons and 4) I used a journal, that documented all my thoughts that emerged while preparing lessons and teaching which I then used later for further reflections and directions. Both quantitative and qualitative analyses of the data were carried out.

The findings revealed that 1) All the concept maps grew in terms of correctness and connectedness, 2) The increase in complexity scores was not steady as concept map one was more complex than concept map two, though concept map one's correctness score was higher, 3) The complexity of a concept map does not necessarily imply map's correctness nor connectedness, 4) the construction and use of concept maps has influenced my content knowledge which I later transformed into the content knowledge for teaching 5) The teaching of the content helped enrich the construction of my concept map as well as the content knowledge,

Furthermore, the comparison of the answers to big ideas in developed CoRes coupled with the analyses of the PaP-eRs showed a large increase in my PCK. This was further mirrored in my manifestations in which various domains were carefully integrated to yield better representations, curricular saliency, topic-specific instructional strategies and assessment in accordance with Rollnick's *et al.* (2008) tailored model for PCK. I could recommend this approach to other teachers as a way of improving their PCK.

Declaration

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

(Signature of candidate)

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Dedication

This work is dedicated to husband, Mpho Mosabala and our children Kata and Toka.

To the memory of my late father, Pitjeng Malose Alpheus

Table of contents

Abstract.....	i
Declaration.....	ii
Acknowledgements.....	iii
Dedications.....	iv
Table of contents.....	v
List of Tables.....	ix
List of Figures.....	x
Abbreviations.....	xii

Chapter 1: Introduction..... 1

1.1 Introduction.....	1
1.2 Rational of the study	2
1.3 Statement of the problem	3
1.4 Aim of the Study	3
1.5 Research Questions.....	3
1.6 Researcher and Positionality	3
1.7 Outline of the Research Report.....	4

Chapter 2: Literature Review..... 6

2.1 Introduction	6
2.2 Theoretical framework	6
2.2.1 What is pedagogical content knowledge?	6
2.2.2. Other perspectives on PCK researchers?	7
2.2.3 How can teachers' PCK be captured and portrayed	12
2.3 Background on the Chloralkali industry	13
2.3.1 A context based approach	13
2.3.2 Redox reactions	16
2.3.3 Electrolysis	18
2.4 Summary	21

Chapter 3: Methodology.....	23
3.1 Introduction	23
3.2 Research Approach	23
3.3 Participants/Sample	24
3.4 Instruments	25
3.4.1 Concept maps	25
3.4.2 Journal	26
3.4.3 Co-Re, Pap-eRs and lesson plan	27
3.4.4 Video taped and audio taped lessons	28
3.4.5 Learners' activities	30
3.5 Data Collection	29
3.6 Rigour	30
3.7 Data Analysis	31
3.8 Ethical consideration	31
3.9 Concluding remarks	32
 Chapter 4: Concept maps	 33
4.1 Introduction	33
4.2 Data sources	33
4.3 Results and analysis	35
4.3.1 Correctedness	35
4.3.2 Connectedness	46
4.3.3 Complexity	49
4.4 Conclusions	51
 Chapter 5: Capturing and documenting pedagogical content knowledge	 54
5.1 Introduction	54
5.2 Construction of the Co-Re	54
5.3 Discussions of the Co-Res	61
5.3.1 Construction of big idea 1	61
5.3.2 Construction of the big idea 2	63
5.4 Conclusion on Co-Re	65
5.5 Construction of PaP-eRs	66
5.6 PaP-eR for the chloralkali industry	67

7.7 Recommendations	122
7.8 Directions for future research	123
References.....	124
Appendices.....	129

LIST OF TABLES

Table 2.1: Components of pedagogical content knowledge from different conceptualisation (extended from van Driel et al., (2008)).....	9
Table 4.1: My scores on concept maps at different stages of the project.....	35
Table 4.2: Criteria for scoring correctness	36
Table 4.3: Criteria for scoring connectedness	46
Table 4.4: Criteria for scoring complexity	50
Table 5.1: 2008 and 2009 Co-Res	58
Table 6.1: Learners' responses to question 1	105

List of Figures

Figure 2.1: Tailored model for PCK	9
Figure 4.1: Plot of correctness score	36
Figure 4.2: Sample from concept map one	38
Figure 4.3: Sample from concept map two	39
Figure 4.4: Sample from concept map one	40
Figure 4.5: Sample from concept map one	41
Figure 4.6: Sample from concept map two	42
Figure 4.7: Sample from concept map one	43
Figure 4.8: Sample from concept map two	44
Figure 4.9: Sample from concept map three	45
Figure 4.10: Sample from concept map two and three	45
Figure 4.11: Plot of connectedness scores	46
Figure 4.12: Sample from concept map two chain structure and concept map one net structure	47
Figure 4.13: Sample from concept map three- net structure	48
Figure 4.14: Plot of complexity scores	49
Figure 4.15: Sample from concept map two	50
Figure 4.15: Sample from concept map three.....	50
Figure 5.1: Sample picture from part one of the lesson	68
Figure 5.2: Sample picture from part three of the lesson.....	71
Figure 5.3: Membrane cell	73
Figure 5.4: Diaphragm cell	73
Figure 6.2: Explanation of oxidation	79
Figure 6.3: Explanation of reduction	79
Figure 6.4: Sample from concept map three of the lesson about the anode compartment	80
Figure 6.5: Sample from concept map three about the cathode compartment	81
Figure 6.6: Learner observing in practical investigating	83
Figure 6.7: Learner struggling to connect a battery	84
Figure 6.8: learner testing hydrogen gas	85

Figure 6.9: Learner testing for chlorine in the presence of NaI	85
Figure 6.10: Apparatus and chemicals	86
Figure 6.11: Sample of part of NaOH story	88
Figure 6.12: A story of NaOH	88
Figure 6.13: Structure of membrane (Developed from the chlorchem plant)	92
Figure 6.14: Membrane cell process	94
Figure 6.15: Themba's response to question one	95
Figure 6.16: Thabo's response to question one	95
Figure 6.17: Lebo's response to question one	96
Figure 6.18: Musa's response to question one	96
Figure 6.19: Dika's response to question one	97
Figure 6.20: Papi's response to question one	97
Figure 6.21: Majority of learners' response to question two	97
Figure 6.22 Correctness of learners' assessment	99

Abbreviations

SMK	Subject Matter Knowledge
NSC	National Senior Certificate
DoE	Department of Education
RADMASTE	Research And Development in Mathematics And Science Technology Education
PCK	Pedagogical Content Knowledge
STS	Science Technology in Society
PCKg	Pedagogical Content Knowing
CoRe	Content Representation
PaP-eRs	Pedagogical and Professional experience Repertoires
LO3	Learning Outcome Three