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FACULTY OF SCIENCE

UNIVERSITY OF THE WITWATERSRAND

JOHANNESBURG



DEVELOING PEDAGOGICAL CONTENT KNOWLEDGE FOR THE TEACHING OF MEIOSIS: A SELF-STDY

BY

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A Research Report submitted to the Faculty of Science, University of Witwatersrand, Johannesburg, in Partial Fulfilment of the Requirements for the Degree of Master of Science (Science Education)

Supervisor

Eunice Nyamupangedengu

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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