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A SELF-STUDY ON LEARNING AND TEACHING ELECTROMAGNETISM IN GRADE 11

A

RESEARCH REPORT

submitted by

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to the

FACULTY OF SCIENCE

UNIVERSITY OF WITWATERSRAND

JOHANNESBURG

in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

in

SCIENCE EDUCATION

SUPERVISOR: Prof. Fhatuwani J. Mundalamo

Signature of Supervisor: _____

Signature of student: _____

December 2011

DECLARATION

I, Gideon Nkosi, declare that apart from the assistance acknowledged, this research report entitled

A SELF-STUDY ON LEARNING AND TEACHING ELECTROMAGNETISM IN GRADE 11

is my own unaided work. All sources that I have used or quoted have been acknowledged by means of complete citation and referencing.

This report is being submitted in partial fulfillment of the requirements for the Master of Science in Science Education degree at the University of the Witwatersrand, Johannesburg. It has not been previously submitted for any degree or examination at any other university.

_____

G. Nkosi

December 2011

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ABSTRACT

This self-study research explores how my pedagogical content knowledge (PCK) on electromagnetism develops as I learn the topic and then teach it to grade 11 learners. The study uses the concept maps, Content Representation (CoRe), Pedagogical and Professional-experience Repertoire (PaP-eR) and video-recorded lessons as the primary sources of collecting data. The Hough, O'Rode, Terman and Weissglass analytical approach is used to analyse the structure of the concept maps. The Rollnick, Bennett, Rhemtula, Dharsey and Ndlovu's model of PCK is used to analyse the contents of the concept maps, CoRe, PaP-eR and video-recorded lessons. The results reveal that: (i) concept maps contribute not only in monitoring conceptual development but also in revealing aspects of teacher knowledge that need to be addressed before teaching the topic; (ii) the CoRe assist in transforming content knowledge into knowledge for teaching; (iii) the PaP-eR gives insight into how content knowledge is transformed into teachable knowledge; and (iv) lesson presentations assist in illuminating the extent to which PCK has developed. Elements of teacher knowledge which are responsible for the development of PCK (domains) and those which are visible in the classroom (manifestations) emerged from the data confirming that there was significant development that took place with regards to my topic-specific PCK. However, the findings also confirm that in some cases lack of adequate content knowledge and experience in teaching the topic somehow hindered the development of my PCK.

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