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Analysis of representations of nature of Science and indigenous knowledge systems in South African Grade 9 Natural Science textbooks

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DECLARATION

I declare that, apart from the assistance acknowledged, this report, titled:

"Analysis of Representations of Nature of Science and Indigenous Knowledge Systems in South African Grade 9 Natural Science textbooks"

is my own work. All sources that I have used or quoted have been acknowledged by means of complete citation and referencing. This report is being submitted to the University of the Witwatersrand in partial fulfillment of the requirements for the degree of Masters of Science in Science Education. It has not been previously submitted for any degree or examination at any other university.

M.F. MOLOTO **DATE**

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- May God bless everyone who was involved in this study!

DEDICATION

This study is dedicated to my sons; Kgothatso, Phuti and Kholofelo and my sisters; Boitumelo and Mmapheko.

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LIST OF ACRONYMS

AAAS:	American Association for the Advancement of Science
ABET:	Adult Basic Education and Training
AS:	Assessment Standard
DoE:	Department of Education
GET:	General Education and Training
FET:	Further Education and Training
IK:	Indigenous Knowledge
IKS:	Indigenous Knowledge Systems
LO:	Learning Outcome
NCS:	National Curriculum Statements
NOS:	Nature of Science
NRC:	National Research Council
NSES:	National Science Education Standards

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Analysis of Representations of Nature of Science and Indigenous Knowledge Systems in South African Grade 9 Natural Science textbooks

Matlhodi Moloto

ABSTRACT

This study analyzed representations of Nature of Science (NOS) and Indigenous Knowledge Systems (IKS) in three South Africa Grade 9 Natural Science textbooks. The textbooks were purposefully selected from a possibility of ten textbooks available on the public market and used in science classrooms in the Gauteng Province of South Africa. The aim of the analysis was to determine the extent to which both NOS and IKS were represented and to ascertain whether the representations were: naïve or informed; and implicit or explicit. The content analysis of the textbooks was based on adaptations of analytical frameworks developed by Akerson, Abd-El-Khalick and Lederman (2000) for NOS and Ninnes (2000) for IKS, respectively. For NOS the analysis focused on seven tenets, which are; science is empirical, the difference between observation and inference, functions and relations between theories and laws, the role of creativity and imagination in science, the tentativeness of scientific knowledge, the social and cultural embeddedness of the scientific process, and subjectivity of science. The analysis for IKS representations focused on four pillars of IKS which are; indigenous legends and myths, indigenous technology, indigenous knowledge of the natural world, and indigenous social life. It was found that, for the NOS, in all the three textbooks, only the empirical nature of science and observation and inference are represented to a considerable extent and mainly in a naïve and implicit manner. The other investigated tenets are either minimally represented or not represented at all. Representations of IKS in the three textbooks were also found to be very minimal and mainly naïve and implicit. It is concluded the selected science textbooks do not respond well to the NCS mandate of integrating NOS and IKS into mainstream science education. Recommendations for improving integration of NOS and IKS into the school science curriculum are suggested for textbooks authors, curriculum developers and science educators.

Key words

nature of science, indigenous knowledge systems, textbooks, natural science, naive, informed, implicit, explicit, positivism, constructivism