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UNIVERSITY OF THE WITWATERSRAND

A Comparison of Grade 11 learners' and Pre-service Teachers' understandings of Nature of Science

Kizito Musekiwa (545570)

February 2017

Supervisor: Professor E. Vhurumuku

A research project report submitted to the Faculty of Science, University of the Witwatersrand, Johannesburg, in partial fulfilment of the requirements for the MSc in Science Education

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Abstract

An understanding of the NOS is a basis for scientific literacy which is one of the major goals of science education the world over. This study compared Grade 11 High school learners (n=10) and third year Bachelor of Education, Pre-service teachers' (n=10) understandings of Nature of Science (NOS). Data on participants' understandings of NOS was collected by means of a Likert type questionnaire and through semi - structured interviews. Likert type questionnaire data was quantitatively analysed using a combination of descriptive statistics, the Mann-Whitney U test and graphical comparison of group median scores on questionnaire items to ascertain differences in NOS understandings between the Grade 11 learners and the B.Ed. Pre-service teachers. Semi-structured interview data was analysed through a combination of typological and interpretative analysis of interview transcripts to determine differences in NOS understandings between the two groups. The findings reveal that there are no significant differences in the understandings of the NOS between the Grade 11 learners and third year, Bachelor of Education, Pre-service teachers. The analyses reveal that overall; the Grade 11 Learners and third year B.Ed. Pre-service teachers' understandings of NOS are not very different from each other. Both groups held such misunderstandings as; there is a single scientific method, scientific knowledge is not socially and culturally embedded, scientific knowledge is universal and can be proven through collection of empirical data. It is recommended that if the goal of science education for scientific literacy is to be achieved, initial teacher education training should do more to explicitly develop Pre-service teachers' subject matter knowledge understandings, pedagogical skills and valuing of NOS, that is, their pedagogical content knowledge for nature of science. Explicit testing of learners' NOS understandings is also suggested as a way of improving the school Physical Science curriculum. The effectiveness of the current science content and methods courses in improving the Pre-service teachers' NOS understandings is questioned. Recommendations for further studies are suggested.

Key words

Nature of science, nature of scientific inquiry, pre-service teachers, learners, understandings

Declaration

I declare that this research report, titled:

A Comparison of Grade 11 learners' and Pre-service Teachers' understandings of Nature of Science

is my own work and that all sources l have used or quoted have been indicated and acknowledged by means of a complete references list.

It is being submitted for the degree of Masters of Science at the University of the Witwatersrand, Johannesburg, South Africa. It has not been submitted before for any degree or examination purposes at any other university.

Signature___ 

Kizito Musekiwa (545570) Date___17 February 2017_____

Protocol Number: 2015ECE044M

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