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An investigation of the assessments used to determine the content knowledge of Post-Graduate Certificate in Education pre-service teachers for FET Life Sciences teaching and their performance in those assessments: a case study

Kahn, Robyn Raina

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Abstract

This study investigated the content knowledge that is possessed by life sciences Post Graduate Certificate in Education (PGCE) students upon entrance into the PGCE course. All PGCE students are considered to have mastered the content of the subjects that they have chosen to train to teach during their previously completed academic degrees. At Wits School of Education (WSoE), the level of PGCE students' content knowledge is assessed at the beginning of the PGCE course. However, students' performance in these tests has never been documented and as a result the content knowledge of those who enrol into the PGCE Life Sciences course over the years is currently only known by those who teach them. This was the motivation for this case study in which I investigated the content knowledge possessed by the 2020 cohort of PGCE Life Sciences pre-service teachers (PSTs) at Wits School of Education with the aim of documenting it. The construct of content knowledge with a focus on substantive aspects (i.e., facts; concepts; theories; and history of science) and syntactic aspects (i.e., procedures pointing to the validity of different scientific facts and concepts; and different perspectives and controversies on specific topics) and Bloom's taxonomy were used as the conceptual framework for the study. Data included the Curriculum and Assessment Policy Statement (CAPS) document to determine the content knowledge that should be taught at FET level; four objective tests that were used to assess the PGCE students' content knowledge; students' responses to each test; and a questionnaire which was given to the PSTs to get their confidence levels on their content knowledge. The results of this study showed that the content knowledge that should be taught at FET level and hence the content knowledge that pre-service teachers are expected to teach consists mainly of substantive content knowledge and syntactic content knowledge. The study also revealed that the objective tests that were given to the PSTs assessed only certain aspects of substantive and syntactic content knowledge namely: facts; concepts; history; practical investigations; calculations; and practical equipment but not others: specifically not theories; different perspectives and controversies on specific topics; and controversial topics within the subject. In addition, the tests only assessed the lowest cognitive level of remembering and not the other cognitive levels of understanding, application, analysis, evaluation and creation. The results show that PGCE students' performance in these tests was very high and basing on this performance, one could conclude that PGCE students who participated in this study have high levels of life sciences content knowledge. However, considering that students' performance at higher cognitive levels was not assessed and that majority of questions tested mostly knowledge of facts and concepts and very little on theories

and syntactic aspects, this causes the findings above to be inconclusive and therefore their preparedness to teach once they have qualified cannot be ascertained. An interesting finding was that most of the questions that students answered correctly were on topics that they had covered in their first degree and those they got incorrect were on botany which most of the participants had not done. This may point to a possible gap in PGCE students' content knowledge as their first degree is not necessarily aligned to the topics to be taught at FET level. The study therefore recommends that in order to effectively assess PGCE students' content knowledge, the tests that are used to assess their content knowledge should include questions that assess all aspects of content knowledge and that cover all of the cognitive levels of Bloom's taxonomy.