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Workshop & Poster

Catchment and river management in graduate teacher education: a case study of student teacher learning and teaching in the Upper uThukela valley, KwaZulu-Natal

Keywords: Environmental Education, Catchment and River Basin Management (CRM), School Curriculum Analysis, Senior High School Geography Content.

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Workshop Abstract:

This study involved the successive clarification of the pedagogical content knowledge (PCK) and fieldwork teaching practices for catchment and river management (CRM) in Geography Teacher Education. The research was developed as a exploratory study teaching Postgraduate Certificate of Education (PGCE) students at the University of KwaZulu-Natal where I teach Geography Education to teachers-in-training. The study unfolded as three phases which provided the developing process for clarifying a pedagogical landscape for CRM in the Geography curriculum. The study developed through an analysis of content knowledge in the existing curriculum (phase 1), to lecture delivery and the opening up of PCK (phase 2), to an analysis of student pedagogical engagement with the topic on teaching practice (phase 3). Data were generated via the teaching and learning interactions in this three-phase progression that included reflection with student teachers involved in the teacher education programme. The analysis covered new environmental knowledge, social-ecological systems, sustainability competencies and pedagogy, all of which are essential reflexive contexts for the research process towards the development of a progressive, sustainability-oriented process of teacher education. This nexus of concerns (PCK, systems thinking and sustainability practices) is necessary for the effective teaching of CRM within a contemporary social-ecological-systems (SES) and complexity science perspective, which is characterising integrated water management systems in South Africa and globally. The research developed as an investigative study that was undertaken to contribute new knowledge for teacher education practice in higher education in South Africa. Here the intension was to progressively explore the alignment of curriculum content knowledge, teaching practices and sustainability concerns in Geography Education.

Key lessons from the fieldwork and lectures

To properly understand social ecological systems thinking in the planning and presentation of lessons, there cannot be inherent scientific mis-conceptualisation, the misuse of scientific or disciplinary terminology, the use of inappropriate scale, and confusion over geographic distribution or continuity on the part of the participants on the field trip.

Proper scientific and geographic training needs to be in place before ambitious teaching and learning targets are set.

Rivers are not just rivers to people. Cultural beliefs hold sway. Mountains are seen by some people as being synonymous with dangerous animals and therefore to be avoided.

Student teachers quite skeptical about new ideas in catchment and river management, like catchment management systems and social ecological systems, ever taking root properly in South Africa.

Question 1: What are concrete opportunities and challenges in teaching and learning about mountains and sustainable mountain development?

Opportunities:

Students volunteered for the mountain-based fieldwork; all were very keen to learn, especially during the lectures.

Mountain-based fieldwork a good opportunity to test knowledge, skills, attitudes and values towards a mountain environment.

The environmental crisis, including longer and more prevalent droughts, in South Africa is making mountain-based education initiatives more pressing.

Challenges:

A disconnect between student teachers' academic training and their knowledge/ connection with the mountains (only one of the five student teachers had gone to the Drakensberg for recreation).

Student enthusiasm in the lectures did not necessarily translate to excellent teaching during the field trips.

A proper integrated water resources management approach is highly contested in South Africa, and does not show much progress, including in education, despite many years of talks.

Issues of scale and systems-thinking are major issues.

Question 2: What experiences from the development and organization of SMD education programs can be generalized beyond their specific contexts? What coordination mechanisms exist or could be developed?

Generalization of experiences:

The hoped for alignment of curriculum content knowledge, teaching practices and sustainability concerns in geography education proved rather difficult and was not as successful as originally envisaged.

It all depends on the practitioners; in this case, the student teachers on the field work.

Coordination mechanisms:

Specific training required for mountain-based education.

For practitioners to go about a successful mountain-based exercise, they need to hold a value set that includes care for, or consciousness of, mountain environments.

Mountain-based fieldwork centres are to be recommended, and even an institute.

Quinary catchments should be “adopted” by nearby rural schools, and these schools could even “twin” with richer and suburban schools.

Question 3: How can outputs and knowledge from SMD practice be incorporated into SMD curricula and learning opportunities?

Key lessons from the local and the global must be incorporated.

Attention must be paid to addressing and incorporating experiences from poor and deeply rural areas.

Sometimes or often mountain consciousness is a middle class concern. Attention must be paid to including beliefs about mountains from rural and indigenous people outlooks.

Curricula and learning opportunities must help try to meet the deeper developmental needs of the quinary catchments that are ideal for learning.