

TAU RESEARCH PROJECT REPORT

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TITLE OF PROJECT: Using multilingual science materials to enhance pre-service teachers' multiple literacies and access to science knowledge: A pilot case study

1) RESEARCH AIMS AND QUESTION

As implied in the title, the research project set out to develop multilingual materials to support student teachers' academic biliteracy skills. The students were taught science method through the medium of English (L2). They were from diverse language backgrounds, namely, Afrikaans, English and isiXhosa and were prepared to teach science from Grades 7 – 9 (Senior Phase).

The aims of the research were as follows:

- (i) to support pre-service science teachers' access to science literacy through the use of science materials in three languages (Afrikaans, English and isiXhosa)
- (ii) to enhance pre-service teachers' multilingual competences and practices as a means of enhancing their science literacy skills.
- (iii) to determine the relevance and suitability of the multilingual materials in supporting pre-service teachers' access to science literacy.

The research project is underpinned by this research question:

How can multilingual materials be utilized to support pre-service teachers' multiple literacies to enhance their disciplinary and pedagogical knowledge in science?

2) PROGRESS

As indicated in my last TAU report on Unit four, there were slight deviations from the initial aim of the project due to delays incurred as a result of the students' unrest at UWC towards the end of 2015. Another factor that contributed to the delay in the design of the multilingual materials was the late transfer of the project funds to translate the materials into isiXhosa and Afrikaans. As a result, I was unable to carry out the lecture observations with the third year students which would examine how the materials were used by lecturers and students as outlined in the initial proposal.

As a first phase of my research, I conducted a survey with fourth year students in March 2015 to establish their language profiles (language identities) and their understanding of the role of language in the teaching and learning of science, both in basic education and in Teacher Education. An open-ended questionnaire was administered online to students, with the assistance of their lecturer. Out of 21 students, 20 of them responded to the questionnaire. The data was coded and analysed according to different themes highlighted below (from A – F).

A. STUDENTS' LANGUAGE PROFILES

The table below reflects the student teachers' language profiles which have implications for their epistemological access to science learning, as well as their teaching practice in schools.

Age	%	Gender	%	Home Language	%	Other Languages
21 – 25	80	Male	55	Afrikaans	60	IsiZulu Sesotho
26 – 30	10	Female	45	English	15	
30+	10			IsiXhosa	25	

B. SECOND LANGUAGE AS A BARRIER IN LEARNING

More than 60% of the students were of the view that a second language is a barrier to meaningful learning and knowledge construction. The following utterances were voiced by the student teachers in relation to the use of English (L2) in science teaching and learning in Higher Education.

Miranda: I feel that language can be a huge barrier to learning since a lot of us find it difficult to be taught in a language that is not our home language

Anele: For those students with a home language other than English, it is a big problem. This is a very big learning barrier and might inhibit the true potential of varsity students

C. THE COGNITIVE BENEFITS OF THE HOME LANGUAGE

The majority of students (80%) who were involved in the survey regarded one's home language as a cognitive resource in learning, as illustrated below:

Busi: If you are taught in your mother tongue, you will understand a lot easier... this makes it easier to understand the subject content

Gert: If students are taught in their home language, it is more likely that they will excel (in learning)

D. MIXED FEELINGS

Some students voiced mixed feelings with regard to the use of a second language (English) in teaching and learning. While they were aware of the cognitive, socio-cultural and affective benefits of the home language, they also expressed the need to learn through the medium of English, given its international status. The same students showed awareness that learning in a second language had a negative impact on one's learning. In this case, the hegemonic status of English seemed to influence the students' responses.

E. EMBRACING LINGUISTIC DIVERSITY

Students showed awareness of the importance of linguistic diversity. They expressed the need to embrace diversity through inclusive pedagogy which entailed the use of other languages in teaching and learning. Such strategies include translanguaging and code switching as a means of supporting learning in multilingual classrooms.

F. STUDENT EXPERIENCES: THE EFFECTS OF L2 LEARNING IN PRIMARY SCHOOL SCIENCE

The following were mentioned as some of the difficulties that were experienced by student teachers in science classrooms where they practised to teach. The challenges were due to the mismatch between the learners' home languages and the language of learning and teaching (LOLT):

- Understanding science concepts
- Pronunciation of scientific terms
- Associating scientific terms with everyday knowledge
- Meaningful learning and science literacy

3) GOING FORWARD WITH MY RESEARCH PROJECT

As stated above, I could not complete the project according to the proposed schedule. I managed to do the first phase which was based on survey data. The second phase of my project will focus on the following:

- Reflecting on the questionnaire data to make informed conclusions
- Proceeding with interviews with the lecturer and students
- Completing the design and translation of writing frames in Afrikaans (for science education)
- Observing lectures where the writing frames will be used to scaffold learning
- Producing a final research report which includes the use of triangulated data from questionnaires, interviews and observations. This will be in the form of journal articles and book chapters, and reference will be made to appropriate approaches to multilingualism and biliteracy in Teacher Education.

