Teacher Knowledge in an Indigenous Science Classroom

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Project Title	Teacher Knowledge in an Indigenous Science Classroom: A case study of a teacher teaching a year eight indigenous science class
Project Team	Dr Phil Keys (SiMERR NT),
Period	April 07 - December 07
Funding Agency	SiMERR
Organisational Base	SiMERR NT

Description

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Teacher knowledge is about teachers’ beliefs and practices within the classroom, and is sometimes referred to as teacher’s craft knowledge or practical theories. The purpose of this study is to investigate teacher knowledge in the teaching of science to indigenous students. In particular the research seeks to understand what craft knowledge the teacher finds useful in making the science lessons more meaningful for Indigenous students and how this craft knowledge is underpinned by the teacher’s beliefs of teaching and learning of science?

Based of the principles of Self-study a case study approach of a teacher teaching a Year 8 Indigenous science class has been adopted. The principal investigator was a participant observer, co-teaching and observing the science teacher’s lessons. The lessons were collaboratively planned and taught. A teacher knowledge filter was used as a theoretical framework to analyse the teacher’s beliefs and practices.

The science teacher and the researcher met at the commencement of the term and each week to plan and evaluate the unit of work. These sessions involved critically reviewing the video footage taken of the lessons for that week and discussing our views of the NOS and teaching science and these compared with the intended and enacted lessons.

The critical reflection was undertaken by using the teacher knowledge filter (author, 2007) as a basis of their analysis. The critical reflection was undertaken by using the teacher knowledge filter (author, 2007) as a basis of their analysis. Common issues were identified and the sessions were audio recorded and fully transcribed.

Participants

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Classroom teacher and Indigenous students

Findings

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Four themes emerged from the findings that challenge teachers' practice; facilitating the students' understanding of scientific concepts; engaging Indigenous students; group work and the role of the teacher aid.

1. The science teacher placed an emphasis on learning scientific terminology - a reflection of her views of the nature of science (NOS) - but at the same time justified it on the grounds of improving students' literacy levels. There appeared to be a quandary of reconciling the teacher's beliefs of the NOS and how science should be taught with understanding the role and function of literacy in science.

2. Engaging the students in science the study found that the students were content with the 3Cs of copying, cutting and colouring. The teacher was unable to provide an explanation for this behaviour. Whilst the teacher believed that the Indigenous students needed a more hands on approach the lessons oscillated between the 3Cs and a hands on approach.

3. When the Indigenous students were asked to work as a group it was found that the students were reliant on one person to speak on their behalf. To have an open collaborative discourse proved to be a challenge. The students needed to be encouraged to either work independently or as a pair to ensure that they were engaging in the topic. This behaviour has implications for programs that place emphasis on the importance of group work.

4. The teacher aid was found to influence class participation. The Indigenous students were found to be reliant on the teacher aid to provide answers and they exhibited a lack of confidence whenever the teacher aid was present in the class. This incident raises concerns as to how teacher aids are trained and the influence of their understanding of the NOS.

This study has implication for teaching Indigenous students across other curriculum areas. In order to create culturally safe learning environments teachers need to examine their beliefs regarding their subject in this case science; and their teaching and learning beliefs and practices.

Outcomes

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Conference presentations

- Keys, P. (2008, January). Teaching Indigenous students science. Paper and workshop presented at the Australian Government Summer School for Teachers. Flinders University, South Australia.
- Keys, P. (2008, December). Teaching Indigenous Students Science. Paper to be presented at the 2008 Australian Association for Research in Education, Brisbane.

Impact

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The project has begun to make an impacted in the pre-service teacher education program and teachers across Australia. Teachers are being challenged to closely assess their views and beliefs of teaching science to Indigenous students:

The Delivery of an Indigenous Perspective in Science Education for Pre-Service Teacher Education Program

The students enrolled in the science education subject were provided edited video segments taken from the many hours of video taped evidence from the research project. The video segments were categorised into topics and provide examples of teaching science to Indigenous students.

The pre-service teachers were asked to critically reflect on the teaching practices that they have viewed and compare it with their own experience and readings of contemporary science education literature. Discussion focussed on “What does it means to provide an Indigenous perspective in science?”

Students’ feedback on this approach has been very positive with comments that reflect that it was the first time someone had ever really taken the time to help them understand how to deliver a science lesson with an Indigenous perspective.

Professional Development for Teachers

At the local level in Darwin – Six teachers at an Indigenous Community school were provide a half day professional development session on the topic of teaching Indigenous students science. The format of presentation was similar to that of the pre-service teacher program; involving the viewing of video segments of examples of teaching science lessons and critically reflecting on their own practice. The feedback from this session confirmed the four major findings of the research. An agreement has been reached with the school to provide ongoing professional development for the staff and continued research into teacher practice.

At a National level - Australian Summer school – Thirty teachers from across Australia who attended the Australian Summer School for Teachers of Science in Adelaide attend the session and workshop; Teaching science to Indigenous students. The presentation and workshop challenged the teachers to critically examine their own views as to what it means to teach science from an Indigenous perspective. During the workshop the teachers were provided with the edited video segments of the research project that addressed specific pedagogical issues when teaching science to Indigenous students. Informal feedback from this session indicated that it provided the teachers a positive practical approach of working with Indigenous students.

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