Page Index

Description
Participants
Findings
Outcomes
Impact
Related Documents

Quick Links

Download Infosheet
Download Report
Visit Website

Transforming Pre-service Teacher Knowledge

Project Title	Transforming Pre-service Teacher Knowledge in Science Education through Multimedia
Project Team	Dr Phil Keys (SiMERR NT), Jim Watters (Queensland University of Technology)
Period	June 2006 – June 2007
Funding Agency	SiMERR
Organisational Base	SiMERR NT

Description

Top

The way pre-service teachers teach science is strongly influenced by the beliefs they hold about teaching, learning and science. The beliefs that a teacher holds concerning the nature of science and how science should be taught will influence all aspects of teaching science. These beliefs are developed from his/her own personal experience as a student in science and later reinforced from his/her engagement as a preservice teacher with that of in-service teachers in the field. The problem is that many of the beliefs and practices that the pre-service and in-service teachers hold do not reflect current contemporary theory and advocated practice in science education. A vicious cycle exists where in-service teachers unwittingly model ineffectual practices of science teaching to preservice teachers. What is needed is an instructional approach where preservice teachers are able to view models of exemplary science teaching practice and make a conscious effort to critically compare and review their own beliefs and practices.

The purpose of this study was to determine if the beliefs of primary preservice teachers had been influenced by the provision of an interactive CDROM of modelled case studies of teaching science education. The study was conducted in a compulsory science education unit at Charles Darwin University. Twenty-four of the 36 students enrolled voluntarily participated in the study.

The students worked in pairs and completed a series of questions provided on the CDROM. The tasks were completed in the computer laboratories. The questions that were asked of the pre-service teachers were designed to encourage them to critically reflect on their science teaching in the light of the vignettes presented. The data were taken from three main sources and what unfolded from one source was compared with the other three sources otherwise known as the triangulation of data:

- Students' assignments
  - Critical reflection essay – This assignment required the student's to view their video taped science and write a critical reflective essay;
  - Students' on line discussion forum notes from 'Blackboard';
  - Electronic Portfolio responses to the interactive CDROM;
- Observations of student's microteaching lessons which were reviewed on video combined with anecdotal notes from conversation with students; and
- Focus group sessions conducted at the end of the semester with the participants.

Participants

Top

24 preservice teachers

Findings

Top

An analysis of the findings revealed that the modelled practices contained in the CDROM by themselves made little impact on the preservice teachers' beliefs and practices. The twenty-four preservice teachers in the study continued to use traditional teaching approaches in their lessons but at the same time espoused the concepts of constructivism. Nevertheless, toward the end of the semester through a combination of learning experiences of the preservice teachers' critical reflection of their own video-taped science lessons culminating in a research focus group session, the preservice teachers were able to differentiate between their own beliefs and teaching practices with what was presented on the CDROM. The outcome of this study provides a transformative learning model that uses multimedia and ICT as a strategy in bringing about change in preservice teachers' beliefs and has application in professional development for in-service teachers.

Outcomes

Top

Conference presentation

- Keys, P.M. & Watters, J.J., (2006). Transforming pre-service teacher knowledge in science education through multimedia and ICT. Paper presented at the National Association of Research in Science Teaching, San Francisco, CA.

Impact

Top

The outcome this study resulted in changes to the science education unit for the pre-service teacher education program. Greater emphasis is now placed on students' examining their beliefs of the nature of science and how that is translated into their practice. The activities and assessment requirements have incorporated the processes that were used in the research. The students are asked to write critical reflection of teaching a science lesson and compare this with the interactive CDROM and other science education literature. Students are also required to complete a module of activities during their tutorial sessions that ask them to critically reflect on the examples of teacher practice provided within the interactive CDROM.

Student Evaluation Learning Teaching assessment SELT of 2007 reports and anecdotal evidence from student conversations indicate that students' attitudes and confidence towards teaching science is improving. Some of the comments reported in the SELT evaluation that indicate a shift in students perceptions of teaching science have included:

- Helps people to feel comfortable with science and teaching it when they might not have been comfortable before.
- Stresses the importance of teaching science with a constructivist method and emphasising student's hands on learning.

The research has also informed the development of a new science unit called Science Literacy. In the design of the new Bachelor of Teaching and Learning it was decided that students in the primary pre-service education program be provided another science unit. The results of this research has influenced its' design. The focus of this unit is on understanding the nature of science - what is science and experiencing science with the aim of demystifying science and misconceptions of science that would often hold teachers back from teaching science.

Related documents

Top

Click here to download this infosheet.

Click here to download the report on this project.

Click here to visit this project's website.

Top