



2017 HAWAII UNIVERSITY INTERNATIONAL CONFERENCES

SCIENCE, TECHNOLOGY & ENGINEERING, ARTS, MATHEMATICS & EDUCATION JUNE 8 - 10, 2017
HAWAII PRINCE HOTEL WAIKIKI, HONOLULU, HAWAII

CONCEPTION AND IMPLANTATION OF AN
EXPERIMENTAL APPROACH TO SCIENCE
TEACHERS' TRAINING IN FRANCOPHONE
MINORITY COMMUNITIES: A THREE PHASES
DESIGN RESEARCH

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Conception and Implantation of an Experiential Approach to Science Teachers' Training in Francophone Minority Communities: A Three Phases Design Research

Synopsis:

We describe an "experiential" approach to training for science teaching in minority settings in which future teachers are encouraged to explore their representations about science teaching and learning and to undertake a process of internal transformation of their representations in order to improve their pedagogical skills towards minority communities. In this regard, our research is part of a partnership between a faculty of education and a French high school in a minority setting.

Conception and Implantation of an Experiential Approach to Science Teachers' Training in Francophone Minority Communities: A Three Phases Design Research

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Keywords: *Teacher training; Science education; Experiential approach; Minority educational system; Secondary school*

To remedy the problems of science teaching in francophone minority communities in Canada, we propose an "experiential" approach to train future science teachers. In this approach, they are encouraged to explore their representations about science teaching and learning while undergoing lived experiences in minority settings, reflect on their experiences by linking them with formal concepts taught in university courses, and begin the process of inner transformation of these representations (Seed, 2008). In this regard, our research aims to conceive and identify the conditions for implementing such experiential training, as well as evaluate its effect on the development of science teaching skills, as part of a collaboration between a university education faculty and two high schools in a French minority environment.

The experiential approach had been implemented in two science education courses in a teacher training program taught in a Canadian university at two consecutive sessions during the school year. The choice of the two schools where the activities took place was done on the basis of their proximity to the Faculty of Education, which allowed volunteers to get there easily without affecting their studies. To assess the achievement of our research objectives, we used a mixed methodology, combining qualitative and quantitative methods, following a design research model (Vogt and Gardner, 2012; Oh & Reeves, 2010). The first two research objectives for the design and study of implantation conditions of an experiential training approach to science education were treated using qualitative methods such as the log of the researcher and participants, as well as semi-structured interviews (Creswell, 2009). The third research objective, with respect to the assessment of effects of the proposed approach on development of pedagogical skills, was treated using quantitative methods. Regarding the qualitative data collected in this research, we follow the method developed by Miles, Huberman and Saldaña (2014) to classify data into pre-established categories or create new categories.

We report here on the results of the third phase of our design research process. Initial conception of the prototype was made with respect to guidelines already established by precedent research (Trudel & Métioui, 2010) and based on literature review of science teachers' training in minority settings. As for the implantation in local minority settings, some key findings are reported here. First, to implant the experiential approach in minority schools, it was important to address successfully concerns expressed by stakeholders in this environment, such as insurance and security issues, confusion between the experiential approach and practicum, and worries among teachers about the extra workload that such project could generate. In this regard, faculty and schools agreed on rules of collaboration. One example of such a rule stated that if a future teacher brought more work than rewards, he could be excluded from the program. Moreover, to facilitate their collaboration, the university and the schools chose someone who could bridge the gap between them. Furthermore, the use of information and communication technology (ICT) was helpful to promote interaction between participants and facilitate feedback with respect to lesson

planning of future teachers. With respect to teaching skills, our future teachers mentioned that they enjoyed their involvement in schools, which had allowed them to become familiar with the characteristics and needs of science teaching in minority communities. However, they complained about the lack of time which did not allow them to explore different ways that a specific activity may take in its implementation in classroom. Consequently, activities made by our future teachers for schools were appreciated by their mentor teacher but needed some refining before being put into practice. Finally, we discuss advantages and limits of this research and make suggestions for subsequent research.

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