Integration of Mathematics and Science: Views of Ontario Elementary School Teachers

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Background

- If In the real world, our lives are not separated into subjects then why are our kids learning mathematics and science as separate subjects in schools? (Czerniak Weber, Sandmann, & Ahern, 1999)
- Dewey (1916) criticized the fragmented subject approach and described the present separate subject system as based on the traditional educational philosophy of teaching and learning.
- Harlen (1993) states that Mathematics is often called "the language of science," for it enables the young as well as the older scientist to generalize, to summarize and to communicate in clear and concise mathematical terms, formulations and equation"(p.17).
- Making real-world connections between mathematics and science is extremely important.(Ontario Ministry of Education, 2007)

Introduction

- This thesis examines the integration of mathematics and science teaching from the perspectives of elementary school teachers in Ontario.
- The purpose of this study is to examine the perceptions of Ontario elementary school teachers about the integration of mathematics and science in their teaching.
- It explores teachers' understandings of the effects of integration on students' learning and teachers' pedagogy.

Purpose

1. To examine the perceptions of Ontario elementary school teachers in relation to the integration of mathematics and science teaching and the effects of integration on students' learning and teaching practices.
2. To explore the problems and issues experienced by elementary school teachers in integrating mathematics and science teaching with the existing separate subject curricula.

Study Design

This research is qualitative in nature using case study methodology, utilizing survey questionnaires and audio taped semi- structured interviews.

Participants Selection Criteria: Six teachers from public and private elementary schools located in South Western Ontario were proposed as participants.

- Qualified and certified to teach mathematics and science at the elementary school level in Ontario
- Teaching mathematics and science to grade 5 and/or grade 6.

Six teachers from five schools consented to participate. The data collection period lasted six weeks(January/February 2010).

Data Analysis

Grounded Theory methodology was used to analyze the interview data. The following broad categories, derived from the research questions, guided the analysis:

- Teachers' views about integration of mathematics and science teaching.
- Teachers' perceptions about the effects of integration of mathematics and science on teaching and learning.
- Ways in which elementary school teachers integrate science and mathematics in their teaching practices.
- Teachers' perceptions about the enablers and constraints of integrating mathematics and science teaching.

Findings

Discussion with participants revealed the meaning of the integration of mathematics and science as applying the knowledge, skills and principles of mathematics in science. All participants appreciated a mathematics and science integrated approach. They mentioned that teaching science in connection to mathematics creates more interest and excitement for learning among the students. they have been attempting to integrate mathematics and science in their lessons whenever it is possible. All participants agreed that shortage of time, lack of resources, funds and teacher knowledge of both disciplines are the biggest challenges.

Discussion & Conclusion

- To implement the integration of mathematics and science teaching, teachers need to determine the applicable meaning of 'integration'.
- Despite their willingness to integrate mathematics and science, teachers rarely find suitable opportunity to do so.
- Teachers need pro-integrate curriculum to implement integration planned lessons.

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