A Comparison of Secondary School Student's Mathematics Skills

Patricia Byers

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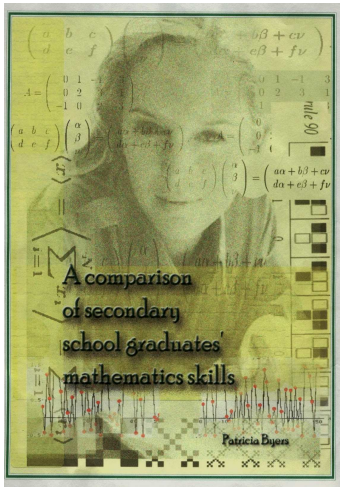
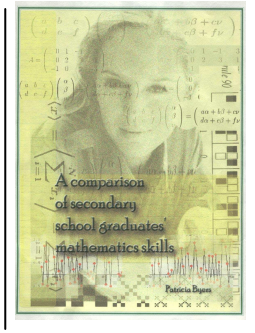


Outline



1. Context of the Study
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1. Participants & Methodology
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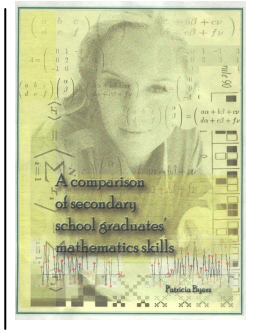
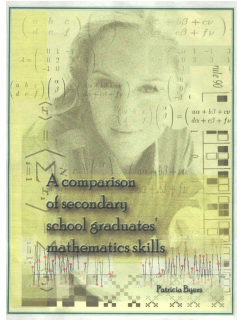
Context of the Study



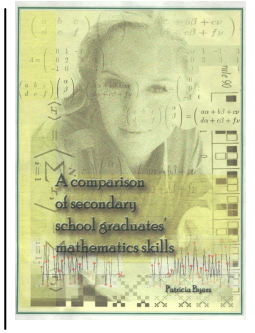
- This study was conducted in Fall 2002, the second year of curriculum implementation, but at a time when the students had not yet graduated from the revised curriculum.
- As such, the study did not directly evaluate the students' success in mathematics upon exiting high school.

Problem Statement



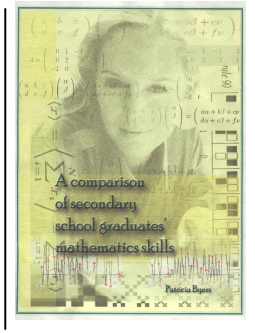
- Which mathematics skills do secondary school teachers and college teachers identify that students entering college will have to be successful in college programs and how will they compare?
- How do these identified skills compare with those established by the curriculum standards founded on social constructivist theory?

Participants



- **A secondary school teacher:**
  - 5 years teaching experience plus one year in the revised curriculum (Grade 11)
  - Currently teaching Grade 12
- **A college teacher:**
  - 3 years experience in the business community
  - 12 years teaching experience at a community college in the business, aviation management, computer programming & engineering technology programs

Methodology

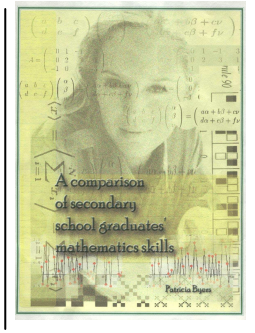


- A qualitative research study
- Phenomenological in nature
- The perceptions of these two teachers were explored through their lived experiences as members of an educated society and as professional teachers (**Marshall and Rossman**, 1999).

Surveys give no voice to ordinary teachers.

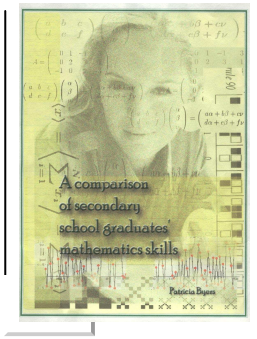
Hargreaves and Evans (1997, p. 6)

Methodology



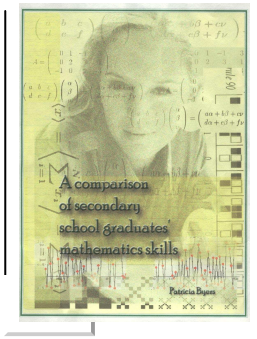
- Semi-structured, open-ended interview
- Data was scanned to identify "… categories of phenomena and relationships among categories." (**Schram and Mills,** 1997)

Findings



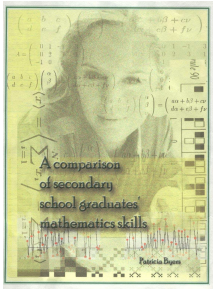
1. Major themes:
    1. The Role of the Revised Secondary School Mathematics Curriculum
    2. Mathematics Competencies of Secondary School Graduates
    3. Aids & Obstacles to Achieving Mastery in Secondary School Mathematics
    4. Teachers' Experiences & Concerns

The Role of the Revised Secondary School Mathematics Curriculum



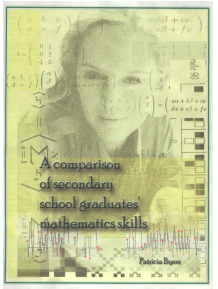
- Curriculum is providing a rich learning environment employing real life applications utilizing technology.
- Student success is in jeopardy due to depth of curriculum & its fast pace.
- Curriculum is lacking in teaching study skills & reinforcing basic mathematics skills.

Mathematics Competencies of Secondary School Graduates



- Algebra Skills
- Applications
- Basic Skills
- Use of Technology
- Supporting Skills

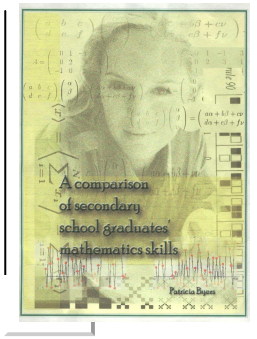
Mathematics Competencies of Secondary School Graduates



- "The student who is willing to do their work at home, to check their answers to see if they're right, if they're not sure why, try it out and then look at maybe reasons why, they're going to do fine in the course. They're going to be successful. A student who is not willing to put that effort in will not be. And I find that again and again. In all my courses."

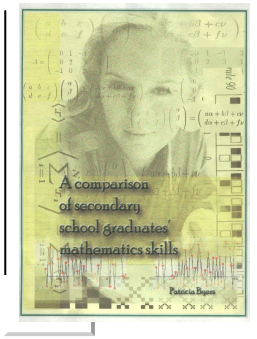
  - *Quote from secondary school teacher*

Aids & Obstacles to Achieving Mastery in Secondary School Mathematics



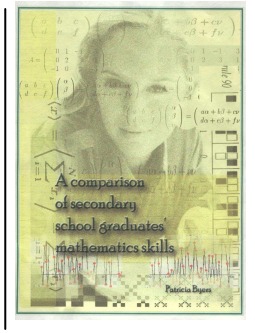
- Counseling students and parents
- Study skills are not being taught
- Lack of bridging courses
- No technical mathematics courses

Teachers' Experiences & Concerns



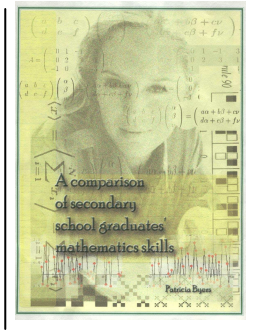
- The need to be considered credible -
  - Body language
  - Citing credentials
  - Citing classroom examples
- The secondary school teacher cited many more examples of being in the classroom and expressed fewer concerns than the college teacher.

Additional Reflections



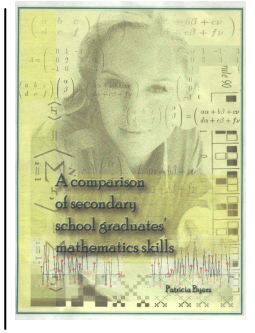
- What was not discussed:
  - whether graduating students will have the ability to communicate mathematics more effectively.
  - whether graduating students will have the ability to problem solve.

Additional Reflections



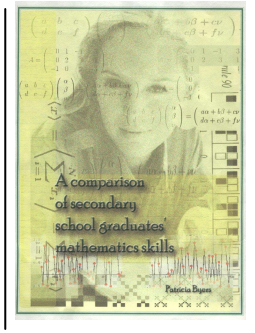
- The Educational Change Process (Fullan, 2003)
  - A strong sense of moral purpose
  - An understanding of the dynamics of change
  - Great emotional intelligence as relationships are built
  - A commitment to new knowledge
  - A capacity for coherence making
- Both teachers demonstrated these mind sets as leaders of the change process.

Recommendations



- The Role of Colleges -
  - Reexamine college curricula
  - Assess & teach foundation mathematics skills
  - Develop ways to help students' construct knowledge missed in previous learning
  - Teach effective study skills in mathematics
  - Encourage communities of learning to enhance student learning
  - Select texts founded on constructivist principles

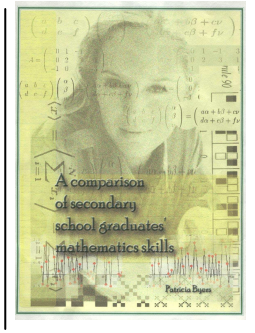
Recommendations



- Support the School/College/Work Initiative program through the Sustaining Quality Curriculum program supported by the MET.

- The development of learning communities to provide opportunities for college mathematics faculty to discuss issues, teaching strategies and to share classroom experiences.

Future Research

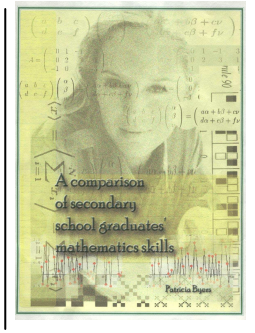


- The college student's perceptions of their mathematics learning as they make the transition from the social-constructivist model of learning to a more traditional model.

- An examination of college mathematics and the current changes taking place in education and mathematics reform.

- The life experiences of mathematics teachers examining their role in the change process of curriculum reform.

Future Research



- The role of technology in the college classrooms
- Constructing mathematical knowledge for the adult learner

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"We do n[illegible] rethink our curriculum and pe[illegible] to appeal to the ran[illegible] classrooms. We rethink pedagogy and curriculum because the world of knowledge has changed."

-Newton, et al., 2001, p. 2

Questions