

AN ABSTRACT OF THE DISSERTATION OF

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Title: *Pushing* into Advanced Mathematics Classes: A Grounded Theory Study of Ability Grouping in Middle Level Mathematics Classes

Abstract approved:

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The focus of this grounded theory research was to investigate the problems that those groups closest to students placed in mathematics classes by mathematics ability have and how those parties work to resolve the problems. The main problem found was a conflict between educators and parents over which students deserve to be placed into high ability mathematics classes. A theory termed *pushing* was identified and described from the multiple pieces of data provided by parents, teachers and administrators who worked with or had students in elementary, middle and secondary schools in the Northwest United States and in the literature representing international data. *Pushing* occurs when there is a break down in trust between parents and/or educators with various facets of the school. Once trust is broken parents and educators try to circumvent the system they no longer trust in order to gain advantaged placement for students whom they see as promising. These people push students to work harder, they lobby parents, educators and schools to garner advanced placement, and/or they position

themselves to push for program changes. *Pushers* act because they believe in innate intelligence or mathematics abilities; they act on behalf of students whom they see as needing rigorous training for high school or university success. The *pushers'* main focus is on a student's individual needs over the needs of all students. This study raises the questions: What does it mean to receive an equitable education in the public schools system? Who really knows what is happening in middle level mathematics classes with respect to ability grouping? And finally what are the social affects of ability grouping and parent involvement? A discussion of these questions and calls for further research are included. Finally, to add to further sociological research some of the fields that might also employ *pushing* are suggested and discussed.

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Pushing into Advanced Mathematics Classes:
A Grounded Theory Study of Ability Grouping in Middle Level Mathematics
Classes

by

Tina Louise Johnston

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Chair of the Department of Science and Mathematics Education

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I understand that my dissertation will become part of the permanent collection of
Oregon State University libraries. My signature below authorizes release of my
dissertation to any reader upon request.

Tina Louise Johnston

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TABLE OF CONTENTS

	<u>Page</u>
Chapter 1: Introduction.....	1
Mathematics Ability Grouping.....	1
The Problem.....	2
Chapter 2: Methodology.....	6
Theoretical Sampling, Subject Selection, and Data Analysis.....	8
Subjects.....	9
Data Collection.....	11
Data Analysis.....	13
Chapter 3: Results.....	19
The Middle Level Mathematics Placement Process.....	20
Forces.....	22
Setting Criteria.....	24
Trust.....	25
Loss of Trust.....	26
Pushing.....	27
Types of Pushing.....	34
Student Pushing.....	34
Placement Pushing.....	35
Pushing the System.....	36
Reasons for Pushing.....	37

TABLE OF CONTENTS (continued)

	<u>Page</u>
Mathematical Giftedness.....	38
Mathematics as a ‘Contentless Subject’.....	39
Academic Opportunity.....	40
Academic Challenge Versus Socialization.....	40
Behavioral Separation.....	41
Types of Pushers.....	42
The Educator Pusher.....	43
The Parent Pusher.....	50
The Parent-Educator Pusher.....	53
Chapter 4: Discussion.....	58
Problems With Pushing.....	58
Privatizing.....	59
Achievement Gap.....	63
Student Well-Being.....	64
Pushing Applied to Other Areas of Research.....	69
Chapter 5: Conclusions.....	73
Need for Further Research.....	75
Credibility and Rigor.....	76
References.....	81

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
1. Theoretical coding.....	14
2. Model for building the theoretical framework using grounded theory methodology.....	16
3. Criteria setting and mathematics placement process with pushing forces.....	21
3. Theoretical Framework of <i>Pushing</i>	27

Preface

Grounded theory (GT) is a method developed by Glaser and Strauss during a National Institute of Health (NIH) study of dying in the mid-sixties. The method grew from a two-pronged desire by Glaser and Strauss to understand the interaction between dying patients and medical personnel and to add to the methodological knowledge in the field of sociology. To this end the researchers observed a wide variety of interactions and conducted interviews with medical personnel in wards where terminal patients resided. Glaser and Strauss (1965) also sought insight into the well-documented problem that sociologists had in conceptualizing and accounting for these social interactions by seeking methodological problems and building the theoretical method that became GT (Glaser & Strauss, 1965).

The present study investigated the issues surrounding ability grouping in middle level mathematics classes using this GT methodology. Although GT methodology is a commonly used research method, a reader who is unfamiliar with the method may not recognize some of components that make up a GT study and the resulting research report. GT is a qualitative research method where no *a priori* hypotheses are posed and that may employ the use of both qualitative and quantitative data for analysis (Glaser, 2001). The task of GT researchers is to immerse themselves into the focus area to gather data of what is happening and the impact of the interactions. From data, GT researchers seek the problems that subjects have, identify a main problem, and then build a theory around how that problem is, on an ongoing basis, resolved (Glaser, 1965; 2004).

Some may be concerned that simple immersion into data and seeking a problem is *fishing* (a term that has come to have negative connotations in the research field). In going directly to the field to seek a problem, the researcher is indeed *fishing*. *Fishing* has long been considered inappropriate for quantitative methods (where *a priori* hypotheses are determined from the literature and are then tested), as it jeopardizes validity (Trochim, 2005). When using qualitative methodologies such as GT, however, *fishing* is exactly the goal, or paring back all preconceived notions so that hypotheses can be found (Glaser, 1998; Livingston, 1994). Seeking a hypothetical theory of interaction is the goal of research that employs GT methodology (Glaser, 1998, 2001)

A GT research report has some differences to a traditional six chapter report (introduction/statement of the problem, literature review, methods, results, discussion, and conclusion). Instead, a GT research report employs an introduction/statement of the problem, methods, results, discussion, and conclusion. Within these chapters some unexpected components exist that are not normally part of a quantitative or non-GT research report. Throughout the report references and quotes from the subjects (the data gathered in the study) are used to illustrate and support statements. In chapter one these references and quotes illustrate and support the problem and illuminate the descriptions of the problem. In chapter three the references and quotes support the developed theory (in this case, *pushing*) as well as the categories and properties of each category. In chapter four quotes and references illustrate and support the problems associated with the theory of

pushing as well as other subject areas where *pushing* is applicable. For the purposes of this study quotes are highlighted by use of italics, rather than double quotes, so that the reader can discern between quotes from the literature (presented with double quotes) and those from subjects (presented with italics).

“GT transcends time, place and people of any and all units sampled and conceptually generates the patterns yielding hypothesis which can explain the behavior of participants as they go through the patterns” (Glaser, 2001, p. 5). The theory developed in this study was discovered through the interviews of both parents and educators who have or work with students in school districts located in the Northwest United States. Some interviewees were raised in other states and countries while the literature represented the research from around the world. All groups contributed data that aided in the development of the problem, the setting, the categories and properties. In order to maintain a feeling of “transcendence of time, place and people,” school and persons’ names were changed in quotes to preserve anonymity. Although at times some quotes clearly represent the views of an educator or parent, the researcher has made no attempt to highlight the authors of the quotes.

Chapter One contains the introduction to the topic, an introduction and description of the focus area and a statement of the problem. Since a GT problem is developed from the data (acquired from the parties involved in the focus area), the

presentation in the introduction provides the focus area description and statement of the problem that are supported by the data. This style is in contrast to the style more commonly used with research report formats where the problem presented in this chapter is solely supported by the literature.

Chapter Two, the methods chapter, is similar to that of a commonly used research report format. The description provides details of the GT methodology and literature support for the benefits and properties of developing a theory using this method and explains why this methodology is appropriate for this particular research project. A description of the subjects in the research is followed by a discussion of the data analysis methods.

Chapter Three, the results chapter, provides the description of the theory based on the data and analysis. Categories and properties of the theory are described, as in Chapter One, using both interview quotes and literature references to support the theoretical components.

Chapter Four, the discussion chapter, presents the problems that result from the theory (in this case one of action) are discussed. These problems are supported with literature from the research as well as data quotes. Because of the dual purpose of GT (building theory from a focus area but also adding to sociological knowledge), Glaser suggests extending this discussion to other subject areas where the newly developed theory can be applied (Glaser, 1998). As such, a discussion of additional sociological areas where components related to the theory can be found or applied are included in the discussion chapter.

The final chapter, conclusions, will contain recommendations for future research as well as a discussion of the limitations of this study. Again because GT methodology is method derived in the field of sociology its discoverer, Dr. Glaser, suggests that GT researchers think beyond the research focus area when they complete a GT study to both further the research area but also sociology as a whole. As a result the researcher will suggest research focus in areas relating to mathematics, education, as well as fields that may benefit from looking to *pushing* as a theory that can be refined and applied. This section will include both further research in mathematics fields but also education and sociological fields as well. A typical limitations discussion including reliability and validity measures are not used for GT studies. Glaser (1998) suggests that credibility and rigor are more suitable to judge the “believability” of a grounded study (Glaser, 1998, pg. 236). There are four tests of credibility and rigor used for this study. They are; fit, relevance, work and modifiability. Fit is achieved if the theory, categories, and properties are representative of the data collected. Relevance is attained when the identified problems and issues of those interviewed are relevant to the reader. If the theory readily identifies how subjects resolve the main problem then workability is achieved. Finally, if any new data can easily be incorporated into the theory then the theory has modifiability (Glaser, 2001; Glaser & Strauss, 1967).