THE RELATIONSHIP BETWEEN THE EFFECTIVENESS OF AN INDUCTIVE AND A DEDUCTIVE APPROACH TO PROBLEM SOLVING IN ALGEBRA

BY

DENNIS IPPOLITO

A Thesis Submitted as Required in Mat 591

Western Connecticut State College

Danbury, Connecticut

O.K. Robert L. Hoburg
June 3, 1977

November 1976

INTRODUCTION

The historical development of the mathematics taught in high school has been from the problematic to the axiomatic. It evolved out of necessity; people were counting before the invention of numbers, adopting rational and irrational numbers as the need for them arose and solving problems of algebraic, trignometric and geometric persuasion long before any axioms were formally recognized. It wasn't until mathematics had progressed appreciably that man re-examined the system he had invented and generalized the axioms we recognize today as the foundation of our mathematics.

Although the development of mathematics was from the problematic to the axiomatic, using an axiomatic approach to teach mathematics reverses this order, demanding a knowledge of general axioms as a prerequisite to solving particular problems. Today's students of mathematics are first exposed to a number of rigorous axioms or rules which they eventually apply to solving equations and problems.

For the person who has an overview of the entire subject, this approach is seemingly the most logical and in theory should be the most effective method of communication of mathematical ideas. But most students, unfortunately, do not have this advantage possessed by their teachers and the motivation for learning rules for a game they know nothing about is limited.

This wanting in motivation manifests itself in the students questioning, "Why do we have to know all of this useless information?" This is a legitimate question on the part of the students which is heard often enough to warrant investigation of other possible approaches to teaching problem solving in mathematics.

The purpose of this study will be first, to examine the various opinions offered on the approaches to teaching problem solving and then, through experimental means demonstrate an alternate approach, one favoring inductive methods, to teaching problem solving in algebra and compare the results to commonly used deductive techniques.