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# Role Drills in the Learning of Mathematical Concepts

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# Role of Drills in the Learning of Mathematical Concepts

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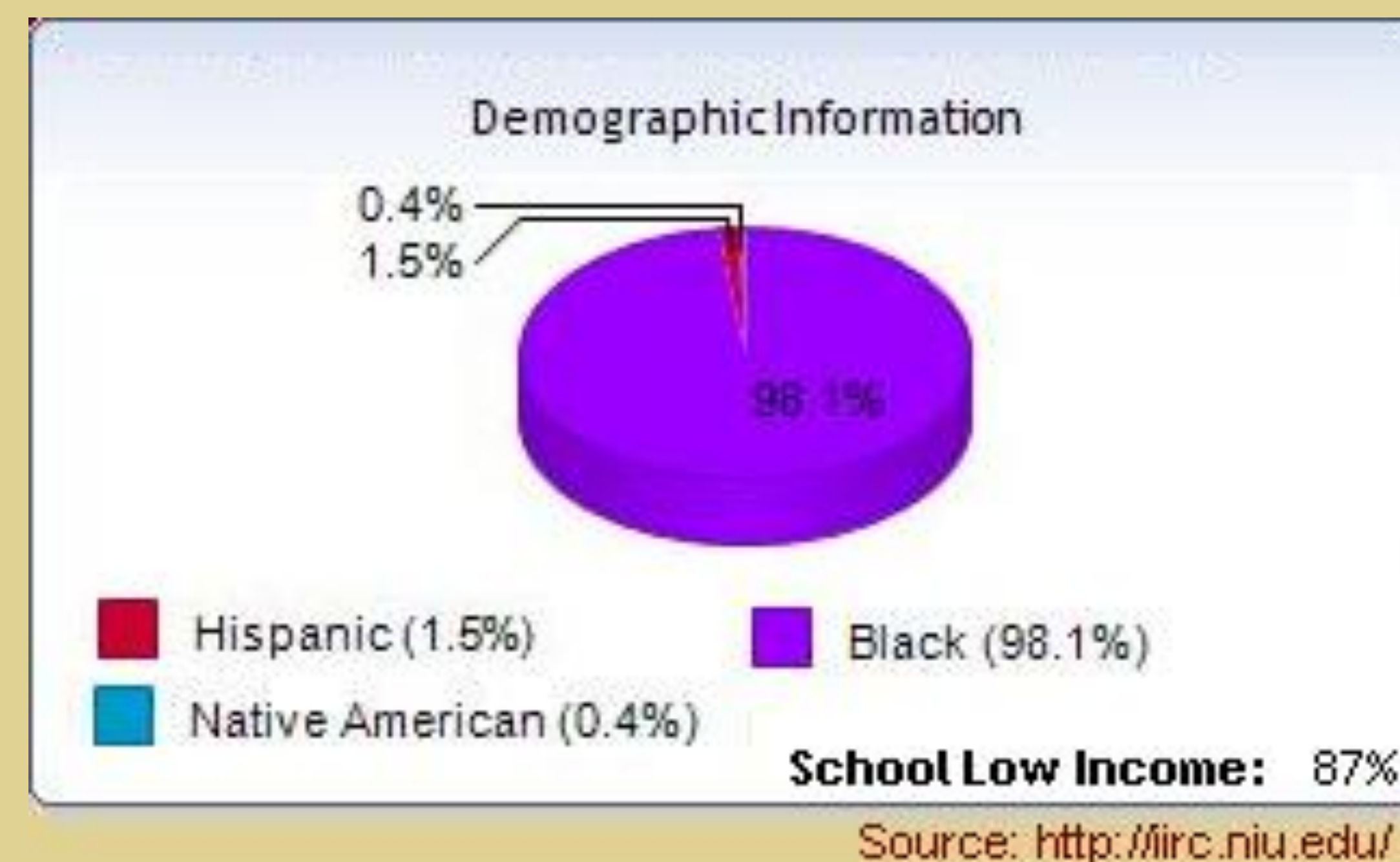
**Research Questions:** What are variables of drills that can be changed? What are the affects on student learning due to the manipulation of variables? To what extent can drills help reinforce the retention of knowledge?

## Abstract

The purpose of this study is to see how math drills can be integrated into a classroom to aid in the learning of mathematical concepts while reinforcing the basic skills needed to succeed in mathematics. I administered several math drills throughout a semester. I found that drilling can be used a supplementary instructional tool that can advance both the learning of math concepts and skills.

## Literature Review

- Drills have been shown to aid short term retention (Kumar, 1971).
- Conceptual understanding can be helped with drills (Baroody, 2009).
- Drills do not have to be limited to reinforcing skills.
- There are many variables that can be changed to help students of various learning abilities.
  - Games
  - Interval training (Burns, 2005)
  - Various technology applications (Cates, 2005)
  - Use of peers (Cates 2005)
- Through varied and customized approach, certain drills can help fluency while helping to create availing beliefs in students.



## Methodology

- Approximately 100 juniors in Algebra II
- The demographic information for the school is shown on the graph to the left.
- Weekly drills on converting fractions to decimals
- A game for adding fractions was used in an ACT prep course
- An effort was made for each drills to connect to a larger concept of different representation of numbers

## Results

- Students showed improvement in converting fractions to drills (See table below)
- Some students showed 'drill fatigue' around drill 4 or 5.
- Students showed enthusiasm for adding fractions during ACT Prep class.
- Virtually no students showed no or negative growth.
- Students showed a greater understanding that there are many different ways to represent the same idea in mathematics as noted in journal entries

Period	Drill 1	Drill 2	Drill 3	Drill 4	Drill 5	Drill 6	Change
One	7.21	6.86	9.08	8.18	8.55	7.47	<b>+2.26</b>
Two	5.52	5.9	6.82	8.11	6.92	7.04	<b>+1.52</b>
Six	7.18	10.03	10.52	10.96	10.1	10.5	<b>+3.32</b>
Seven	8.48	9.81	10.71	11.43	12.94	12.5	<b>+4.02</b>
Average	7.0975	8.15	9.2825	9.67	9.6275	9.3775	<b>+2.28</b>

## Conclusion

There are still many more variables that can be manipulated for greater customization. However, what has been tried shows promise for the future use of drills in my personal classroom. As long as it remain a supplementary teaching tool, math drills can give students to work on personal goals.