

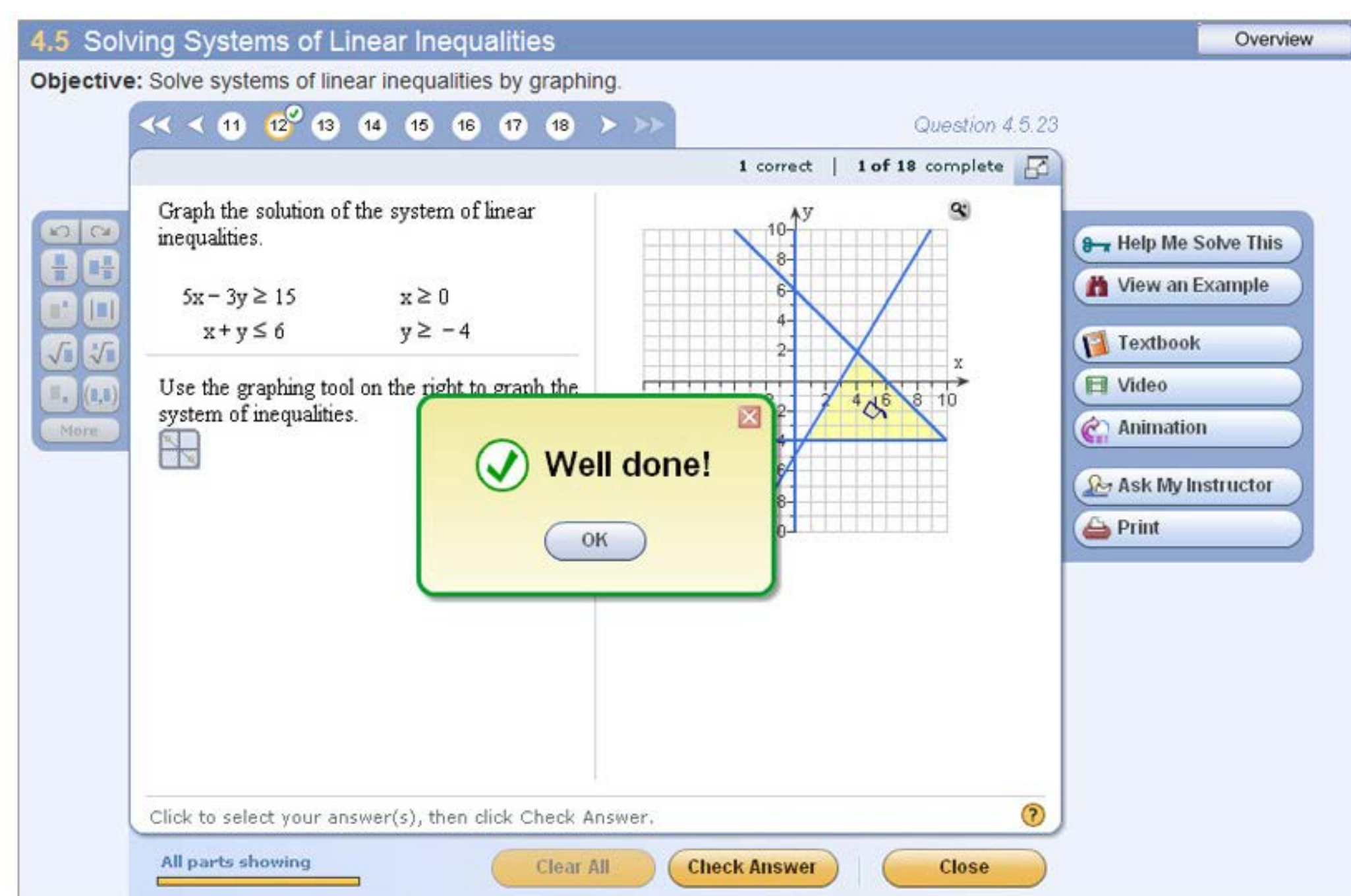


## 1. Introduction

Upon entering the University of Alabama in Huntsville, new freshmen often take their designated 100-level course based upon major and placement level. If a student has not met the requirements to enter into a 100-level math course, however, they are placed into MA 004, where they are taught the skills necessary to advance into their next math course.

Prior to 2004, MA 004 was a traditional lecture-style course with three hour-long lectures per week. In 2004, the course was redesigned to have no traditional lecture, but include three hours of monitored computer-based instruction and assignments using MyMathLab, a part of CourseCompass course management. This software allows the student to be more in control of their learning, by offering immediate feedback and the chance to work at their own pace (within a one-semester time frame).

The following is a sample interactive tutorial.



A sample of what a student's individual study plan might look like is seen below.

Study Plan				
Click a chapter below to start practicing, or follow these steps to create a personalized study plan.				
<ol style="list-style-type: none"> <li>Take a <a href="#">sample test</a> or an <a href="#">assigned test or quiz</a>. Then return to this page.</li> <li>Practice the questions in the topics you need to study.</li> <li>When you have answered all questions correctly, take another <a href="#">sample test</a> or an <a href="#">assigned test or quiz</a> to prove mastery.</li> </ol>				
<a href="#">Show All</a> <a href="#">Show What I Need to Study</a>		<a href="#">Jump to where I worked last</a>		
Book Contents for All Topics	Correct	Worked	Questions	Time Spent
Ch 0: Orientation Questions for Students			8	
Ch 1: Real Numbers	18	19	273	23m 19s
1.1 Study Skills for Success in Math, no exercises necessary			0	
1.2 Problem Solving	5	6	12	13m 57s
Learn the five-step problem-solving procedure.	1	1	4	42s
Solve problems involving bar, line, and circle graphs.	3	3	3	6m 42s
Solve problems involving statistics.	1	2	5	6m 33s
1.3 Fractions			26	
1.4 The Real Number System	13	13	13	9m 22s
1.5 Inequalities			18	

The aim of this research study was to determine if students who had taken MA 004 after the redesign were performing as well as, better than, or worse than, students who had not taken the MA 004 class before starting their 100-level math course, which could be MA 107, MA 110, or MA 112.

## 2. Method

**Data Preparation:** Student data was initially acquired from the University of Alabama in Huntsville via the OURS system. Data were obtained that included a student's major, placement level, and the grades of every math course they had taken at UAH starting with the Fall semester of 2003 and going through the Spring semester of 2013. Data was then sorted using Excel to include a student's first attempt at MA 004 and the math class immediately following that semester, which resulted in three worksheets of students going from MA 004 to MA 107, MA 004 to 110, and MA 004 to MA 112. Students who did not take MA 004 as their first math course at UAH were grouped as well. These students were placed in worksheets of students having only taken MA 107, MA 110, or MA 112. This separation of students took up a large portion of the time spent researching.

**Data Analysis:** For each year of 2003 – 2013, the percentage of students passing their next math course was calculated using Excel. This was accomplished by dividing the number of students passing by the total number of students for each year. There was also the assigning of a 4 to a grade of "A," a 3 to a grade of "B," a 2 to a grade of "C," a 1 to a grade of "D," and a 0 to a grade of "W" or "F." This allowed for the calculation of average GPA's for each year between 2003 and 2013. Z-scores were also determined to see if students who took MA 004 were statistically performing significantly better or worse than those who did not take the MA 004 class. The formula for such z-score calculations is

$$z = \frac{X - \mu}{\sigma}$$

For example, to examine MA 107, the average for all MA 107 students was subtracted from the yearly average for students who did take MA 004, and then divided by the standard deviation of all of the MA 107 students. This was also done using the yearly average for students who did not take MA 004 before MA 107. This method was used to compare all students who took MA 107, MA 110, and MA 112. Results for all comparisons are shown below.

## 3. Results

**MA 107:** For students who took MA 004 before

taking MA 107, the z-scores seem to indicate

that there were both good years and bad years.

There was neither an upward trend nor a down-

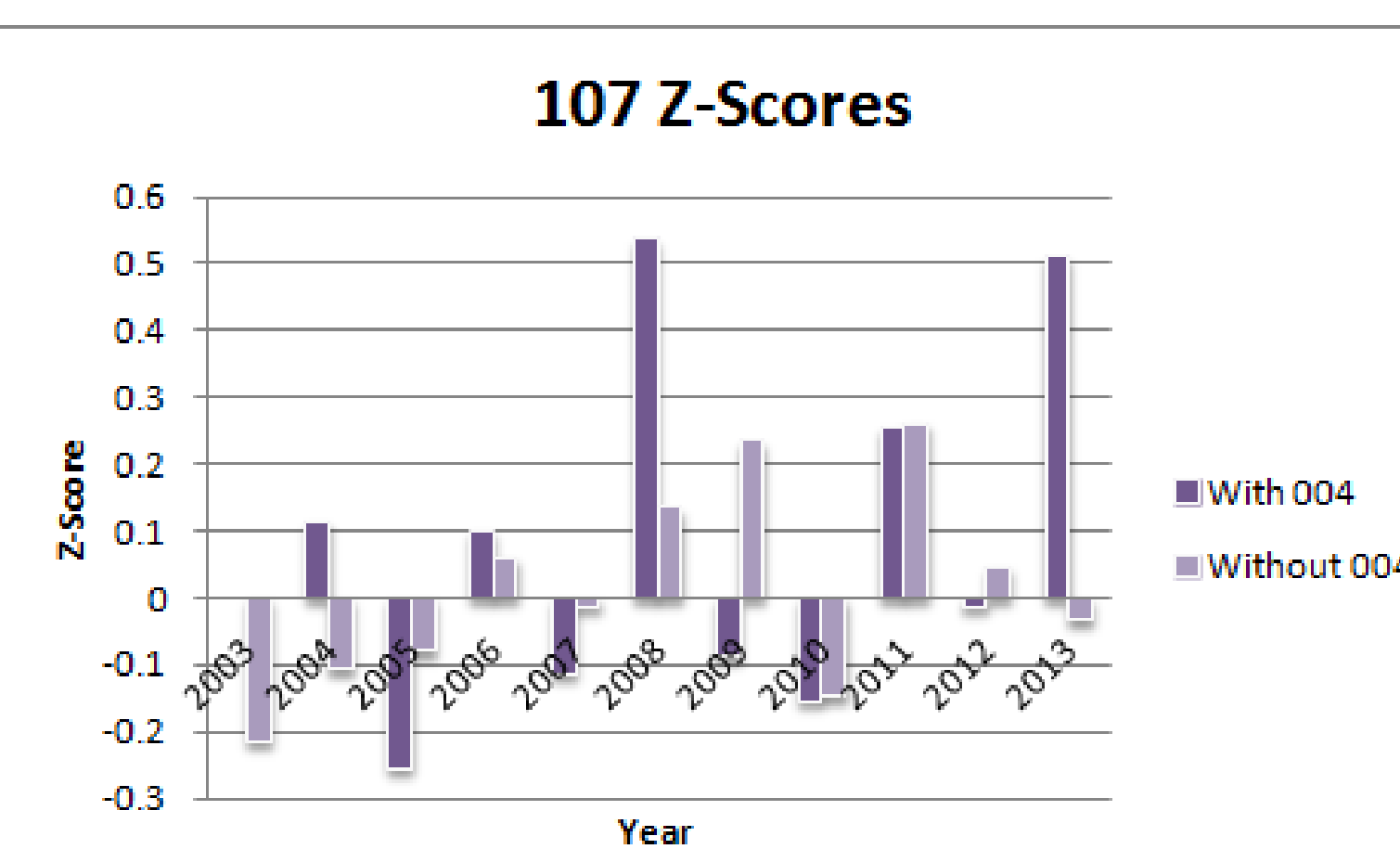
ward trend regarding the z-scores of those who

took MA 004 and those who did not take MA

004. Neither groups z-score went outside of 1

standard deviation, so statistically, neither group

was better than the other. However, when it came time to look at side-by-side data of how students performed in MA 107 each year, it seems as if students who took MA 004 before MA 107 were doing almost as well if not better than students who took MA 107 without taking MA 004 beforehand. Note: There was no data for 2003 students who took MA 004 beforehand due to years of data requested. As seen below, we had a fairly large sample of



## 3. Results

**MA 110:** We were not

as fortunate as we were

with MA 107 when it

came to sample size

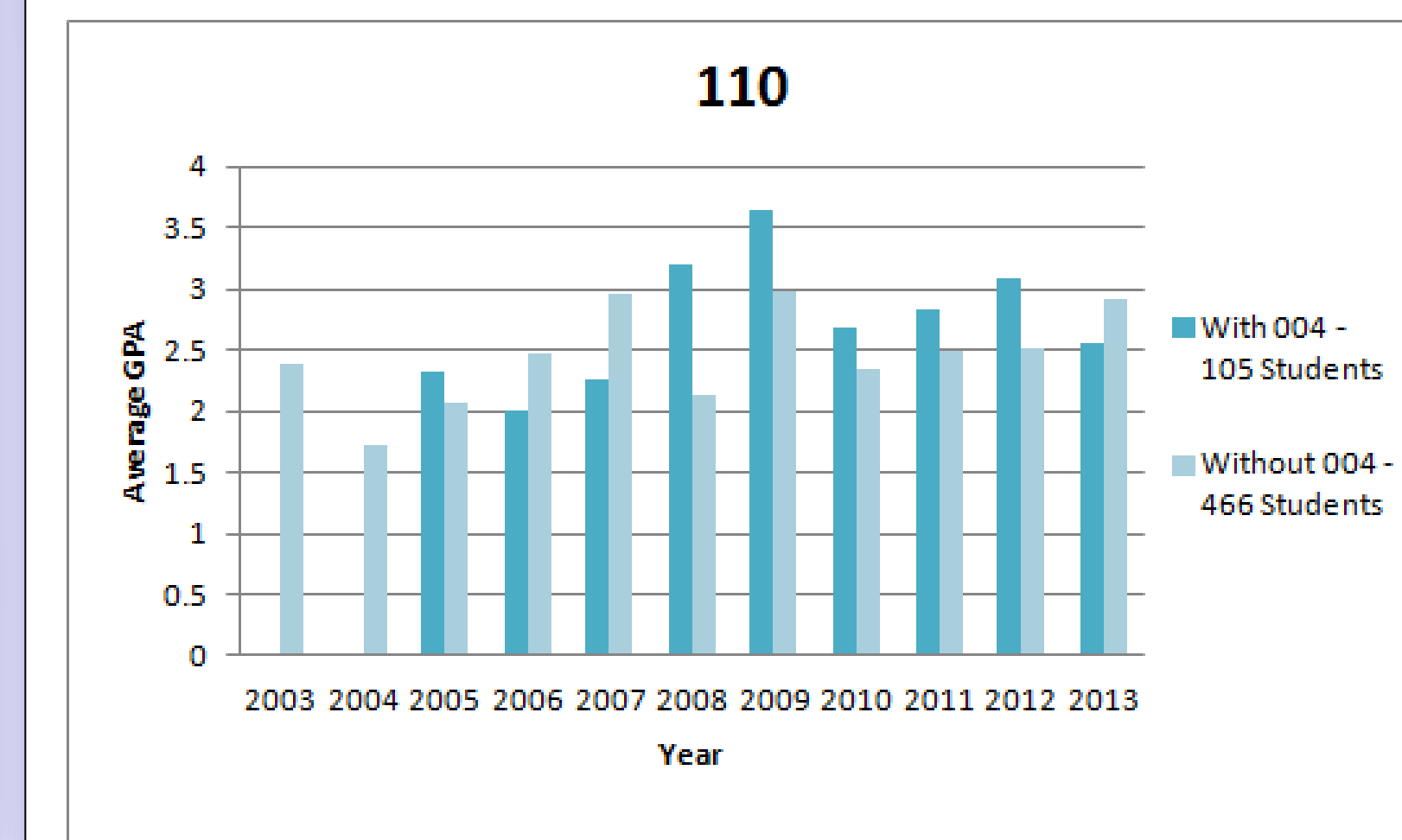
for MA 110. Again,

there was no clear trend

in the z-scores to show

that one group was

performing significantly better than the other. Side-by-side comparison also showed



that students were

performing quite well

after taking MA 004.

These results may be

due to such a small

sample size, though.

However, sample size

was no issue when it

came to MA 112.

**MA 112:** MA 112 did

not have quite the up

and down z-score graph

as MA 107 and MA 110.

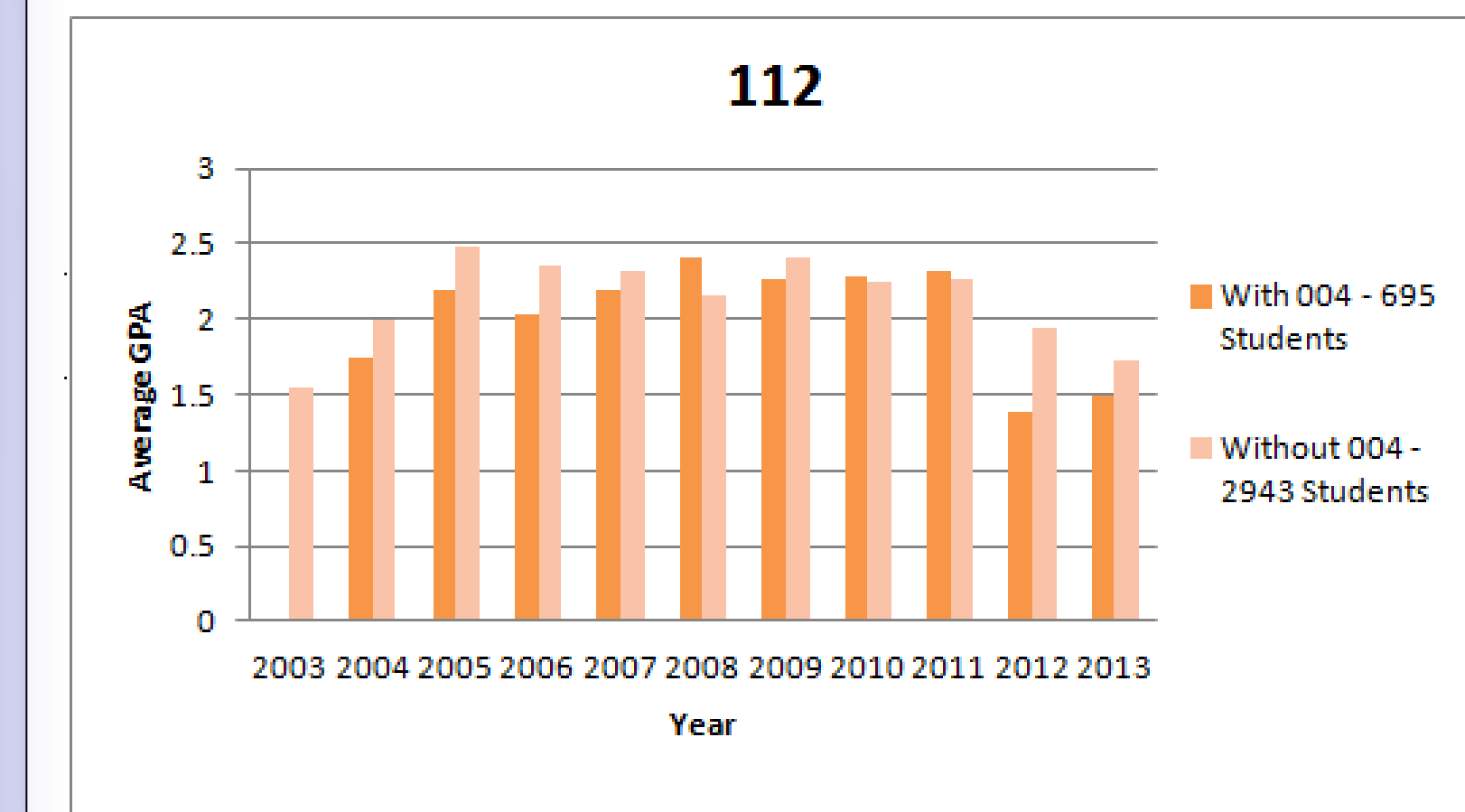
Students in MA 112

seem to have started out

performing more poorly

if they took MA 004

immediately following the redesign, but quickly bounced back to performing as well as those who did not need to take MA 004, before 2012. Both groups seemed to



perform more poorly

then. Once again, we

saw the trend of both

groups performing

at approximately the

same level when

compared side-by-side.

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