

**Advisory Board:**

Michael Beck, President  
Beck Evaluation & Testing Associates, Inc.

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Indiana University

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Texas Assessment Program

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## An Efficacy Study of the Economics Version 9 Course

Florida Virtual School

*[Report 458, December 2012]*



## Contents

Executive Summary.....	2
Basic and Honors Students.....	2
Male and Female Students.....	3
Lower Socio-Economic Status and Higher Socio-Economic Status Students.....	3
White, Minority, and Multi-Ethnic Students.....	3
Research Design.....	4
Research Questions .....	4
Course Description.....	4
Description of the Research Sample.....	6
Description of the Assessments.....	7
Data Analyses and Results .....	9
Results for Each Module .....	10
Module 1.....	11
Module 2.....	14
Module 3.....	17
Module 4.....	20
Conclusions .....	23

## Executive Summary

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Florida Virtual School<sup>®</sup> contracted with the Educational Research Institute of America to analyze the test score data for students enrolled in the Economics version 9 course.

Florida Virtual School (FLVS<sup>®</sup>) is an established leader in developing and providing virtual Kindergarten through grade 12 education solutions to students worldwide. A nationally recognized e-Learning model, FLVS, founded in 1997, was the country's first state-wide Internet-based public high school. In 2000, the Florida Legislature established FLVS as an independent educational entity with a gubernatorial appointed board. FLVS is the only public school with funding tied directly to student performance.

Each course has a real-time teacher who guides each student through the coursework, which is broken down into modules. As a student works through the modules of a course, he or she will connect with the teacher to take exams online and receive discussion-based assessments over the phone. Students do the work at their own pace and on their own time, but they interact with their teachers in multiple ways--including Live Lessons, phone calls, chat, texting, and email--throughout the course.

The FLVS Economics course is designed to meet Florida Next Generation Sunshine State Standards and is mapped to national standards.

Pretest/posttest comparisons of students' performance were based on four module tests which covered the course content. The results showed statistically significant gains from pretesting to posttesting for all four modules. The effect size, a measure of how much gain was made, was large.

Inferential statistics were not possible for the subgroups since each group of students took a small number of randomly selected items which were not always equal in difficulty. The following differences for average scores across all four modules showed the following:

### Basic and Honors Students

- The average pretest score for the basic students was 52% correct and their average posttest score was 69%, resulting in a gain of 17%.
- The average pretest score for the honors students was 54% correct and their average posttest score was 77% correct, resulting in a gain of 23%.

### Male and Female Students

- The average pretest score for the male students was 53% correct, and their average posttest score was 72% correct, resulting in a gain 19%.
- The average pretest score for the female students was 52% correct, and their average posttest score was 72% correct, resulting in a gain of 20%.

### Lower Socio-Economic Status and Higher Socio-Economic Status Students

- The average pretest score for the lower socio-economic students was 50% correct, and their average posttest score was 67% correct, resulting in a gain of 17%.
- The average pretest score for the higher socio-economic students was 54% correct, and their average posttest score was 74%, resulting in a gain of 20%.

### White, Minority, and Multi-Ethnic Students

- The average pretest score for the white students was 54% correct, and their average posttest score was 74% correct, resulting in a gain of 20%.
- The average pretest score for the minority students was 50% correct, and their average posttest score was 67%, resulting in a gain of 17%.
- The average pretest score for the multi-ethnic students was 51% correct, and their average posttest score was 70% correct, resulting in a gain 19%.

In sum, the FLVS Economics course produces significant academic improvement and the improvement is found to a fairly similar extent across all three demographic groups (gender, socio-economic status, and ethnicity).

## Research Design

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Carefully constructed studies are needed to determine the efficacy of online courses. The courses provide an important educational opportunity to students, and participation continues to grow at a rapid pace. In addition, the enrichment of a student's educational opportunities through online courses can help to prepare him or her for the demands of post-secondary education and the workplace. FLVS has developed a unique approach to online course instruction in which excellent online curriculum resources are accompanied by significant direct instruction, support, and guidance from teachers. Real-world application provides unique student preparation for college and/or careers.

The use of a modular approach to course development includes pretest and posttest assessments that help to guide instruction and provide excellent data to analyze program success. This study used the pretest and posttest module scores of large numbers of students over a several year period.

### Research Questions

The following questions guided the design of the study and the data analyses:

1. Do students enrolled in the **Florida Virtual School Economics** program increase their knowledge and skills in Economics?
2. Do students enrolled in basic or honors courses achieve similar gains in the **Florida Virtual School Economics** program?
3. Do students with differing demographic characteristics (gender, socio-economic status, and ethnicity) achieve similar gains when enrolled in the **Florida Virtual School Economics** program?

### Course Description

The Economics version 9 course is designed with a total of six instructional modules. These modules include instructional activities to meet a specific set of standards for each module.

The goal of the course is to have students become a smart consumer who understands the flow of an economy between individuals, businesses, governments, and the rest of the world. Students learn how economic decisions affect us every day of our lives. They learn that economics means thinking about how scarcity, or limited resources, requires us to make choices and evaluate one option against others.

Students recognize examples of economics in their daily life and see how the economic choices

of larger groups, like businesses and governments, affect them and others. Students also recognize that the costs and benefits of choices connect individuals and groups around the world.

Segment I:

Module 1: What Is Economics?

Module 2: It All Begins with You

Module 3: Taking Care of Business

Module 4: Getting Political

Module 5: Thinking Globally

Module 6: The Circular Flow

Besides engaging students in challenging curriculum, FLVS guides students to reflect on their learning and to evaluate their progress through a variety of assessments. Assessments can be in the form of self-checks, collaboration activities, practice lessons, multiple-choice questions, writing assignments, projects, research papers, essays, discussion-based assessments, and student discussions. State and nationally-recognized educational standards and frameworks guide assessment design. Instructors evaluate progress and provide interventions through the variety of assessments built into the course, as well as through contact with the student in other venues.

## Description of the Research Sample

The study included students enrolled in the Economics course between *December 1, 2010 and October 30, 2012*.

Tables 1 to 3 provide a description of the demographic characteristics of the students included in the analysis.

*Table 1: Grade Levels of Students Comprising the Research Sample*

Grade Levels			
9	10	11	12
2%	10%	41%	47%

*Table 2: Gender, Course, and Free Lunch Eligibility for Free/Reduced Lunch Program of Students Comprising the Research Sample*

Gender		Course		Eligible for Free Reduced Lunch Program	
Males	Females	Basic	Honors	Yes	No
35%	65%	68%	32%	30%	70%

*Table 3: Ethnicity of Students Comprising the Research Sample*

Ethnicity		
White	Minority	Multi-Ethnic
52%	21%	27%

## Description of the Assessments

For this Economics study, there are four pretests and four posttests that will be analyzed. Two of the six modules end with project-based assessments and are not part of this analysis. Each pretest includes five to nine groups of banked test items for a total of 30 groups in these four modules. To limit item exposure and promote academic integrity, each student randomly receives the same number of test items from each bank of items in each group. Each group of items covers one or two standards, and each standard is assessed multiple times. Each group of items was also designed to measure the same set of standards at the same cognitive complexity level. This random sampling provides a broad assessment. All 302 items are included in the assessment bank, but each student takes only a total of 97 pretest items across the four module pretests throughout the course.

Each posttest includes five to nine groups of banked test items for a total of 30 groups (originally 31 groups, but one group was excluded due to the response not being a multiple choice response). To limit item exposure and promote academic integrity, each student randomly receives the same number of test items from each bank of items for each group. Each group of items covers one or two standards, and each standard is assessed multiple times. Each group of items was also designed to measure the same set of standards at the same cognitive complexity level. This random sampling provides a broad assessment since all 304 items are included in the assessment bank but each student takes only a total of 115 posttest items across the four module tests throughout the course.

The pretests and posttests were developed to assess the skills and strategies included in each Economics module. The assessments focused on the skills, strategies, and knowledge necessary for effective understanding of economics.



*Table 4  
Economics Module Pretests*

	<i>Basic and Honors</i>	
<i>Pretest Modules</i>	<i>Total # of Banked Items</i>	<i># of Items per Student</i>
<i>Module 1</i>	<i>57</i>	<i>15</i>
<i>Module 2</i>	<i>55</i>	<i>22</i>
<i>Module 3</i>	<i>103</i>	<i>35</i>
<i>Module 4</i>	<i>87</i>	<i>25</i>

*Table 5  
Economics Module Posttests*

	<i>Basic and Honors</i>	
<i>Posttest Modules</i>	<i>Total # of Banked Items</i>	<i># of Items per Student</i>
<i>Module 1</i>	<i>58</i>	<i>20</i>
<i>Module 2</i>	<i>46</i>	<i>25</i>
<i>Module 3</i>	<i>113</i>	<i>40</i>
<i>Module 4</i>	<i>87</i>	<i>30</i>

## Data Analyses and Results

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Data analyses were based on the percent correct score for each student. Since a different number of test items were included on the pretests and posttests, it was necessary to use percent correct scores. Only those students who were administered both a pretest and posttest for the module being analyzed are included in the data analysis.

Separate analyses were conducted for each of the modules 1 to 4. The following analyses were conducted to determine answers to the research questions that were the guiding focus of this study:

1. Pretest/posttest comparisons, using *Paired Comparison t-tests*, were used to analyze growth for each module.
2. Students were divided into two sub-groups based on their enrollment in either the basic or honors section of the Economics course. Pretest/posttest comparisons were then analyzed using *Paired Comparison t-tests* to determine if both groups increased statistically significantly.
3. Students were then divided into demographic groups based on gender, socio-economic status (determined by eligibility for free/reduced lunch program) and ethnicity (white, minority, or multi-ethnic). Pretest/posttest comparisons were then analyzed using *Paired Comparison t-tests* to determine if there were any increase differences between the various demographic groups.
4. An effect-size analysis was computed for each of the paired t-tests. Cohen's *d* statistic was used to determine the effect size. This statistic provides an indication of the strength of the treatment effect regardless of the statistical significance. Cohen's *d* statistic is interpreted as follows:
  - .2 = small effect
  - .5 = medium effect
  - .8 = large effect

## Results for Each Module

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Each of the three research questions are analyzed for each module:

1. Do students enrolled in the ***Florida Virtual School Economics*** program increase their knowledge and skills in economics?
2. Do students enrolled in basic or honors courses achieve similar gains in the ***Florida Virtual School Economics*** program?
3. Do students with differing demographic characteristics (gender, socio-economic status, and ethnicity) achieve similar gains when enrolled in the ***Florida Virtual School Economics*** program?

## Module 1

In Module 1, students define economics and how it impacts the world around us. They examine principles such as scarcity, opportunity cost, supply and demand, and discuss how these principles affect the choices we make. Table 6 shows that the increases from pretesting to posttesting were all statistically significant ( $\leq .0001$ ). As expected, the honors students scored higher than the basic students. In addition, the no free/reduced lunch group started with higher pretest scores and ended with higher posttest scores than the free/reduced lunch group. However, the gain was about the same for both groups.

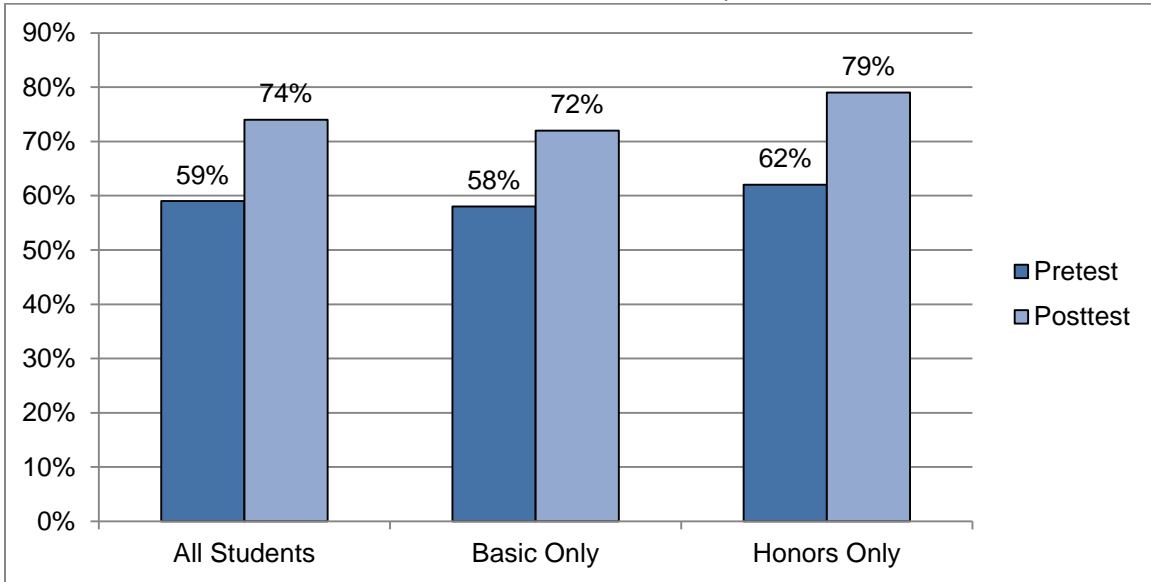
Effect sizes were large, with the exception of the minority group which had a medium effect size. Other differences between the various demographic groups were minimal.

Table 6: Comparison of Pretest to Posttest Percent Correct Scores  
Economics Instructional Module 1

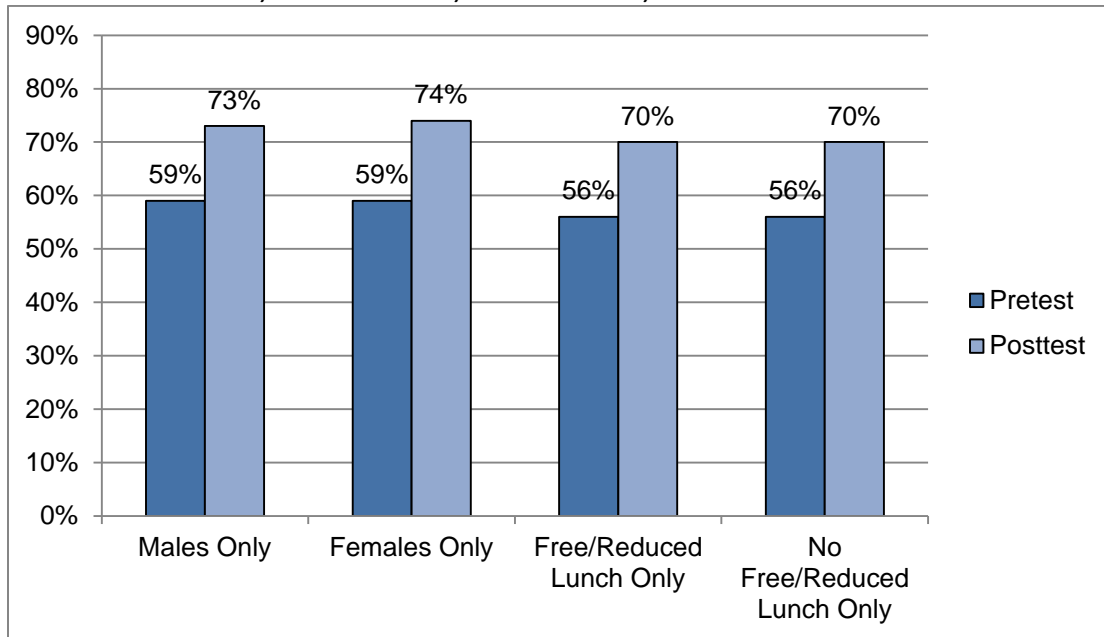
Group	Number of Students	Mean	Standard Deviation	t-Test	Significance	Effect Size
<i>All Students</i>						
<i>Pretest</i>	2285	59%	.18	35.443	$\leq .0001$	.91
<i>Posttest</i>	2285	74%	.15			
<i>Basic Only</i>						
<i>Pretest</i>	1545	58%	.18	26.005	$\leq .0001$	.85
<i>Posttest</i>	1545	72%	.15			
<i>Honors Only</i>						
<i>Pretest</i>	740	62%	.17	25.446	$\leq .0001$	1.12
<i>Posttest</i>	740	79%	.13			
<i>Males Only</i>						
<i>Pretest</i>	793	59%	.18	19.371	$\leq .0001$	.85
<i>Posttest</i>	793	73%	.15			
<i>Females Only</i>						
<i>Pretest</i>	1492	59%	.18	29.821	$\leq .0001$	.93
<i>Posttest</i>	1492	74%	.14			
<i>Free/Reduced Lunch Only</i>						
<i>Pretest</i>	683	56%	.18	17.263	$\leq .0001$	.85
<i>Posttest</i>	683	70%	.15			
<i>No Free/Reduced Lunch Only</i>						
<i>Pretest</i>	1602	61%	.17	31.147	$\leq .0001$	.96
<i>Posttest</i>	1602	76%	.14			
<i>Non-Minority Only</i>						
<i>Pretest</i>	1183	60%	.17	27.603	$\leq .0001$	1.06
<i>Posttest</i>	1183	76%	.13			
<i>Minority Only</i>						
<i>Pretest</i>	478	57%	.18	14.039	$\leq .0001$	.76
<i>Posttest</i>	478	70%	.16			
<i>Multi-Ethnic</i>						
<i>Pretest</i>	624	59%	.18	17.751	$\leq .0001$	.85
<i>Posttest</i>	624	73%	.15			

Figures 1, 2, and 3 provide a visual look at the increases. In general, the percentage increases were about 15% for each comparison group.

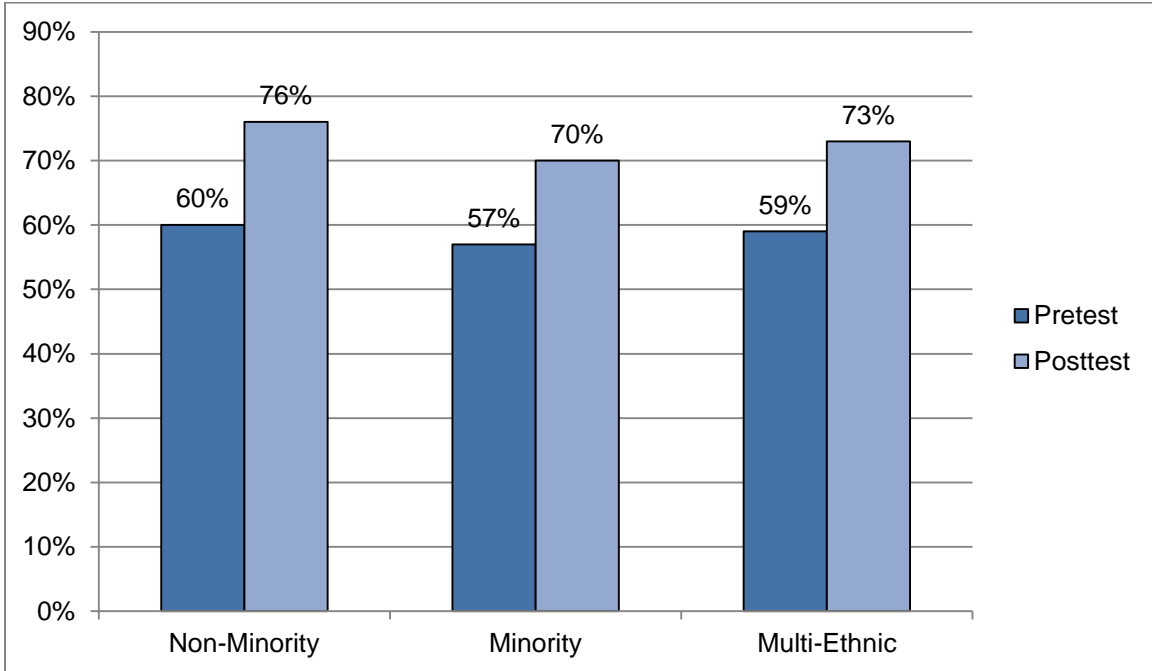
*Figure 1: Economics Module 1  
Pretest and Posttest Percent Correct Scores  
All Students, Basic/Honors Comparison*



*Figure 2: Economics Module 1  
Pretest and Posttest Percent Correct Scores  
Males/Females & Free/Reduced Lunch/No Free Reduced Lunch*



*Figure 3: Economics Module 1  
Pretest and Posttest Percent Correct Scores  
Non-Minority, Minority, & Multi-Ethnic*



## Module 2

In Module 2, students explore what it means to be financially smart by developing important financial skills such as balancing a checkbook, creating a budget, and paying off debt and taxes. They also plan for the future, by reviewing college and career paths and investment opportunities. Table 7 shows that the increases from pretesting to posttesting were all statistically significant ( $\leq .0001$ ) and the effect sizes were all large. As expected, the honors students scored higher than the basic students. In addition, the no-free/reduced lunch group scored higher than the free/reduced lunch group on the pretests. The non-minority group scored higher than the minority and multi-ethnic groups. However, the increase in scores from pretesting to posttesting was about the same for all three groups.

*Table 7*  
*Comparison of Pretest to Posttest Percent Correct Scores*  
*Economics Instructional Module 2*

Group	Number of Students	Mean	Standard Deviation	t-Test	Significance	Effect Size
<i>All Students</i>						
<i>Pretest</i>	2292	59%	.18	46.700	$\leq .0001$	1.09
<i>Posttest</i>	2292	77%	.15			
<i>Basic Only</i>						
<i>Pretest</i>	1557	58%	.18	35.866	$\leq .0001$	1.03
<i>Posttest</i>	1557	75%	.15			
<i>Honors Only</i>						
<i>Pretest</i>	735	61%	.17	30.806	$\leq .0001$	1.32
<i>Posttest</i>	735	81%	.13			
<i>Males Only</i>						
<i>Pretest</i>	790	60%	.19	25.317	$\leq .0001$	1.08
<i>Posttest</i>	790	78%	.14			
<i>Females Only</i>						
<i>Pretest</i>	1502	58%	.17	39.480	$\leq .0001$	1.19
<i>Posttest</i>	1502	77%	.15			
<i>Free/Reduced Lunch Only</i>						
<i>Pretest</i>	682	56%	.16	24.519	$\leq .0001$	1.03
<i>Posttest</i>	682	72%	.15			
<i>No Free/Reduced Lunch Only</i>						
<i>Pretest</i>	1610	60%	.18	39.804	$\leq .0001$	1.18
<i>Posttest</i>	1610	79%	.14			

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*Table 7 - continued*  
*Comparison of Pretest to Posttest Percent Correct Scores*  
*Economics Instructional Module 2*

Group	Number of Students	Mean	Standard Deviation	t-Test	Significance	Effect Size
<i>Non-Minority Only</i>						
<i>Pretest</i>	1183	62%	.17	33.605	≤.0001	1.19
<i>Posttest</i>	1183	80%	.13			
<i>Minority Only</i>						
<i>Pretest</i>	474	55%	.17	20.847	≤.0001	1.09
<i>Posttest</i>	474	73%	.16			
<i>Multi-Ethnic</i>						
<i>Pretest</i>	635	57%	.18	24.834	≤.0001	1.06
<i>Posttest</i>	635	75%	.16			

Figures 4, 5, and 6 provide a visual look at the increases. In general, the percentage increases were about 18% to 20% for each comparison group.

*Figure 4: Economics Module 2*  
*Pretest and Posttest Percent Correct Scores*  
*All Students, Basic/Honors Comparison*

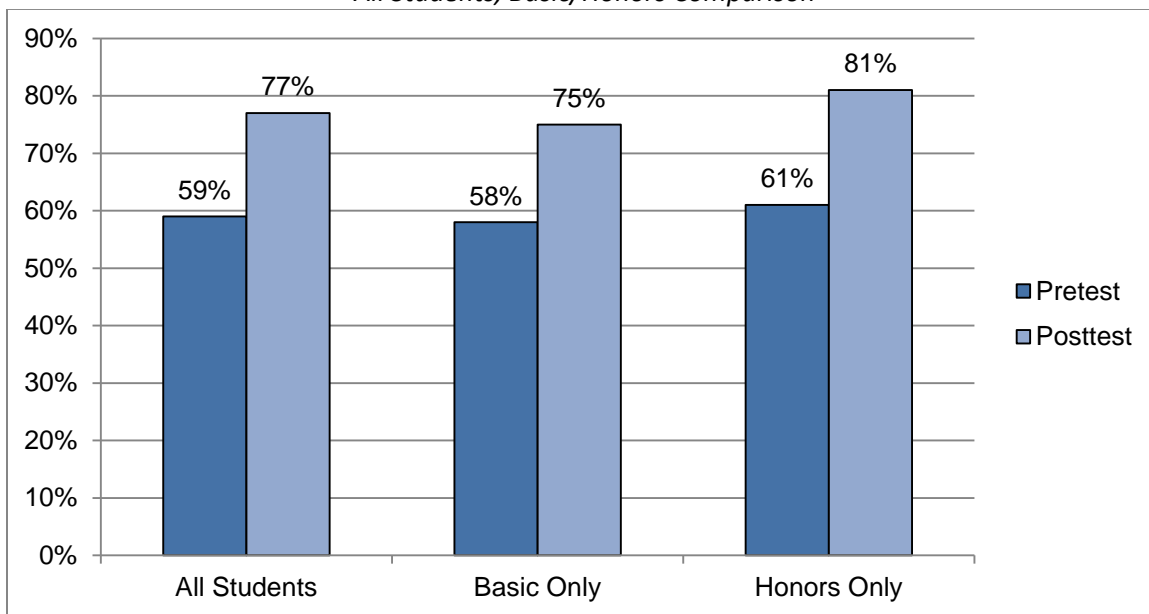




Figure 5: Economics Module 2  
Pretest and Posttest Percent Correct Scores  
Males/Females & Free/Reduced Lunch/No Free Reduced Lunch

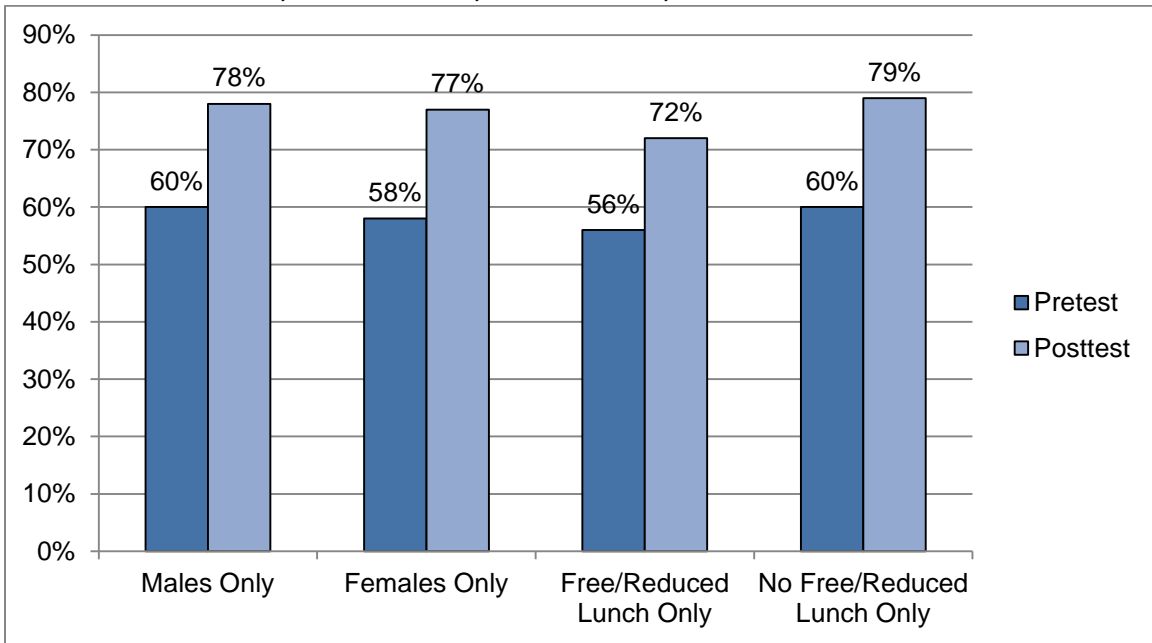
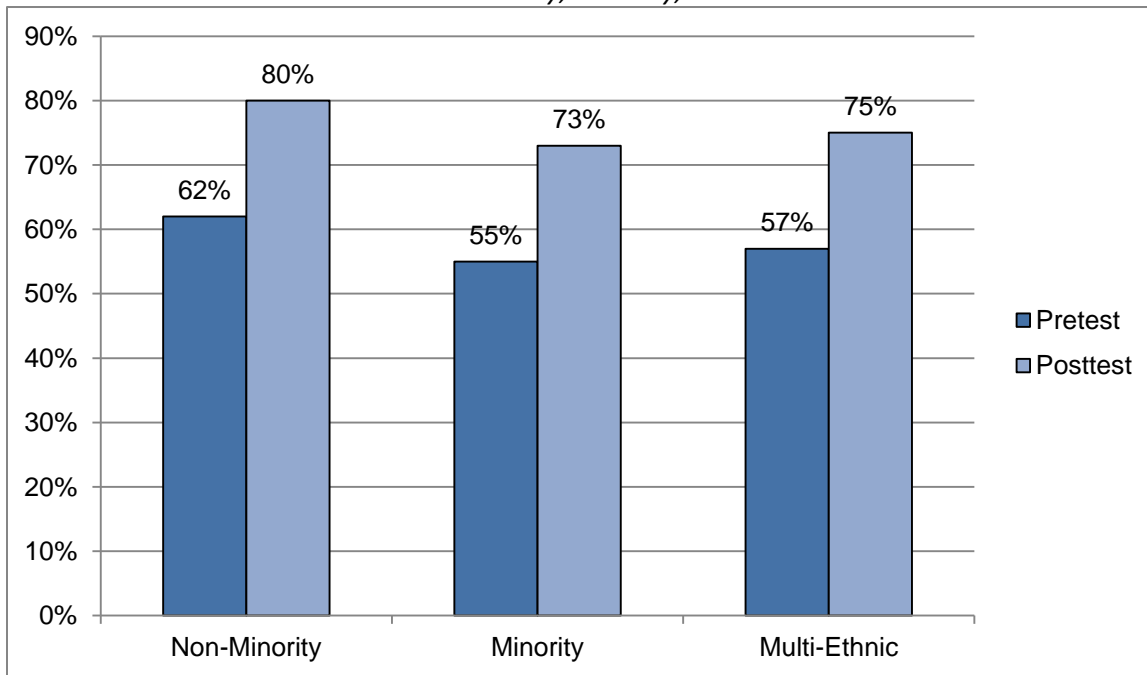


Figure 6: Economics Module 2  
Pretest and Posttest Percent Correct Scores  
Non-Minority, Minority, & Multi-Ethnic



### Module 3

In this module, students consider the impact resources and factors of production have on the products, pricing, and advertising a business participates in. They discuss entrepreneurship and other forms of business organization as they analyze ways to build a successful business. Table 8 shows that the increases from pretesting to posttesting were all statistically significant ( $\leq .0001$ ) and the effect sizes were large. As expected, the honors students scored higher than the basic students. In addition, the no-free/reduced lunch group scored higher than the free/reduced lunch group on the pretests. The non-minority group scored higher than the minority and multi-ethnic groups. However, the increases in scores were greater for both the non-minority and multi-ethnic groups.

*Table 8*  
*Comparison of Pretest to Posttest Percent Correct Scores*  
*Economics Instructional Module 3*

Group	Number of Students	Mean	Standard Deviation	t-Test	Significance	Effect Size
<i>All Students</i>						
<i>Pretest</i>	2249	49%	.17	51.104	$\leq .0001$	1.31
<i>Posttest</i>	2249	70%	.15			
<i>Basic Only</i>						
<i>Pretest</i>	1529	49%	.17	38.259	$\leq .0001$	1.12
<i>Posttest</i>	1529	67%	.15			
<i>Honors Only</i>						
<i>Pretest</i>	720	50%	.17	35.732	$\leq .0001$	1.61
<i>Posttest</i>	720	75%	.14			
<i>Males Only</i>						
<i>Pretest</i>	770	49%	.19	30.318	$\leq .0001$	1.20
<i>Posttest</i>	770	70%	.16			
<i>Females Only</i>						
<i>Pretest</i>	1479	49%	.16	41.200	$\leq .0001$	1.29
<i>Posttest</i>	1479	69%	.15			
<i>Free/Reduced Lunch Only</i>						
<i>Pretest</i>	672	47%	.16	23.688	$\leq .0001$	1.10
<i>Posttest</i>	672	64%	.15			
<i>No Free/Reduced Lunch Only</i>						
<i>Pretest</i>	1577	50%	.17	45.967	$\leq .0001$	1.37
<i>Posttest</i>	1577	72%	.15			

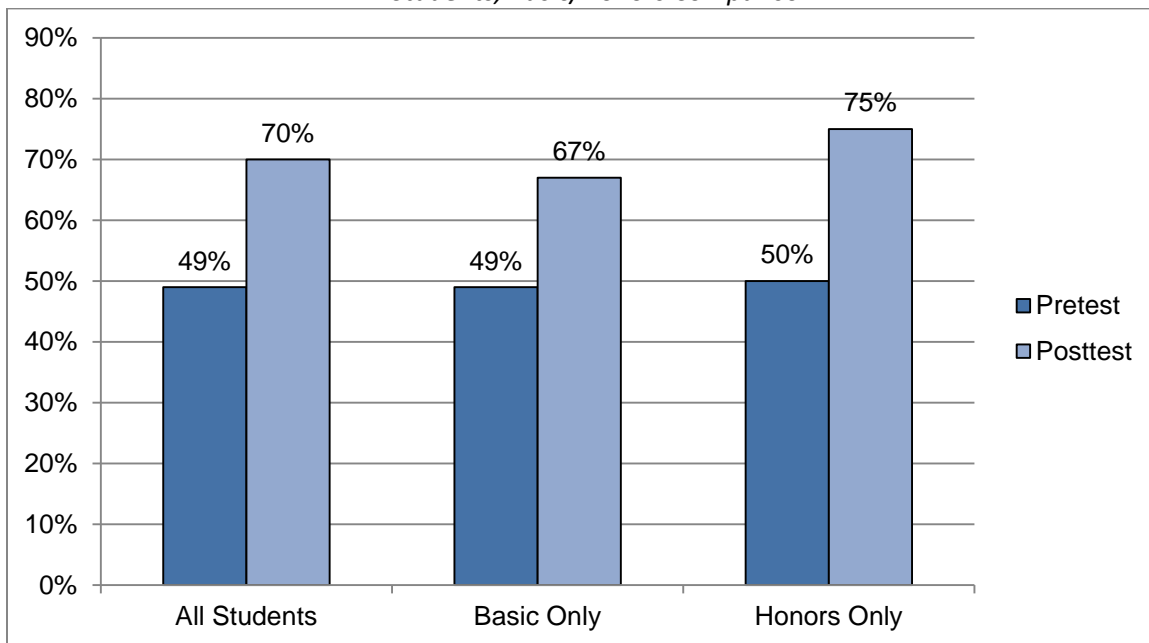
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*Table 8 – continued:  
Comparison of Pretest to Posttest Percent Correct Scores  
Economics Instructional Module 3*

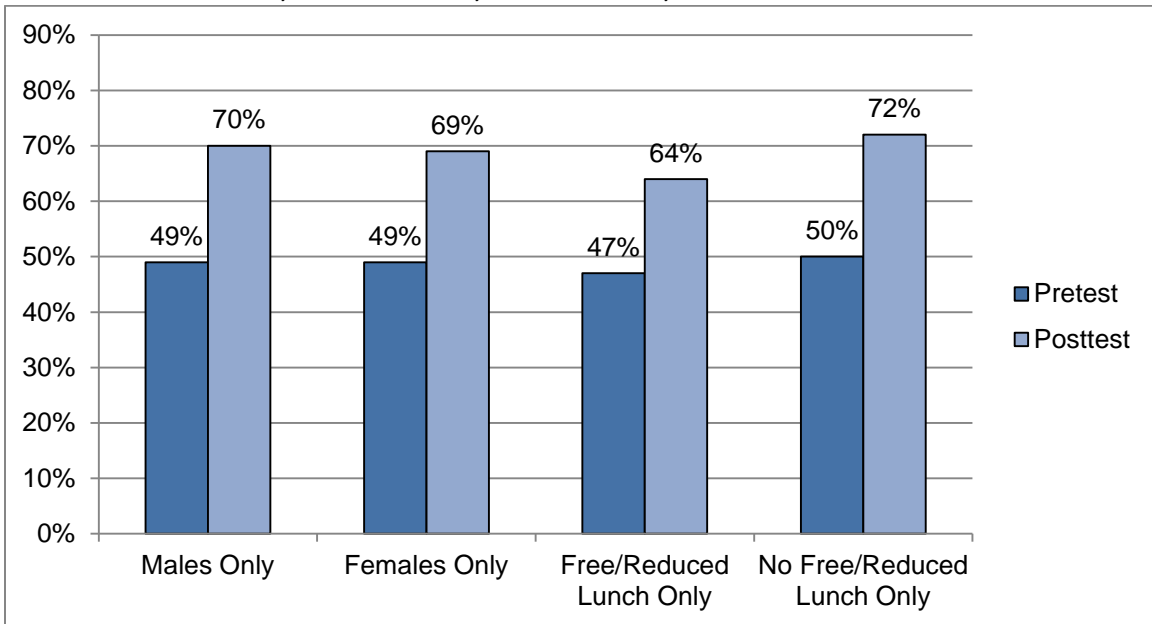
Group	Number of Students	Mean	Standard Deviation	t-Test	Significance	Effect Size
<i>Non-Minority Only</i>						
<i>Pretest</i>	1159	51%	.17	40.509	≤.0001	1.41
<i>Posttest</i>	1159	73%	.14			
<i>Minority Only</i>						
<i>Pretest</i>	467	47%	.17	18.882	≤.0001	1.03
<i>Posttest</i>	467	64%	.16			
<i>Multi-Ethnic</i>						
<i>Pretest</i>	623	48%	.17	26.197	≤.0001	1.21
<i>Posttest</i>	623	68%	.16			

Figures 7, 8, and 9 provide a visual look at the increases. In general, the percentage increases were about 20% to 25% for each comparison group.

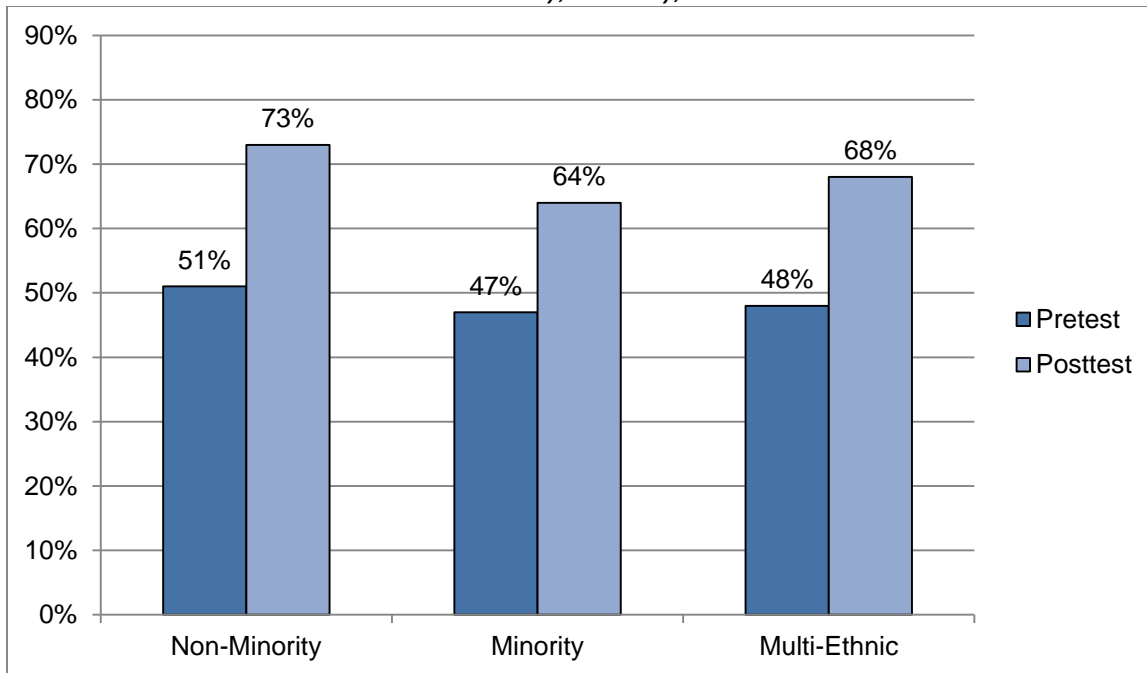
*Figure 7: Economics Module 3  
Pretest and Posttest Percent Correct Scores  
All Students, Basic/Honors Comparison*



*Figure 8: Economics Module 3  
Pretest and Posttest Percent Correct Scores  
Males/Females & Free/Reduced Lunch/No Free Reduced Lunch*



*Figure 9: Economics Module 3  
Pretest and Posttest Percent Correct Scores  
Non-Minority, Minority, & Multi-Ethnic*



## Module 4

In Module 4, students examine the government's role and functions in the economy, along with the debate surrounding government regulation and price controls. They consider monetary and fiscal policy and how the government's involvement in the economy impacts them. Table 9 shows that the increases from pretesting to posttesting were all statistically significant ( $\leq .0001$ ) and the effect sizes were all large. As expected, the honors students scored higher than the basic students. In addition, the no-free/reduced lunch group scored higher than the free/reduced lunch group on the pretests and made a bit more gain than did the free/reduce lunch group. The non-minority group scored higher than the minority and multi-ethnic groups on the pretests. However, the increases in scores from pretesting to posttesting were about the same for all three groups.

*Table 9*  
*Comparison of Pretest to Posttest Percent Correct Scores*  
*Economics Instructional Module 4*

Group	Number of Students	Mean	Standard Deviation	t-Test	Significance	Effect Size
<i>All Students</i>						
<i>Pretest</i>	2251	43%	.18	52.478	$\leq .0001$	1.28
<i>Posttest</i>	2251	66%	.18			
<i>Basic Only</i>						
<i>Pretest</i>	1527	42%	.18	39.566	$\leq .0001$	1.17
<i>Posttest</i>	1527	63%	.18			
<i>Honors Only</i>						
<i>Pretest</i>	724	44%	.18	36.099	$\leq .0001$	1.60
<i>Posttest</i>	724	72%	.17			
<i>Males Only</i>						
<i>Pretest</i>	775	43%	.19	31.600	$\leq .0001$	1.30
<i>Posttest</i>	775	67%	.18			
<i>Females Only</i>						
<i>Pretest</i>	1476	43%	.18	41.910	$\leq .0001$	1.28
<i>Posttest</i>	1476	66%	.18			
<i>Free/Reduced Lunch Only</i>						
<i>Pretest</i>	673	41%	.17	24.155	$\leq .0001$	1.09
<i>Posttest</i>	673	60%	.18			
<i>No Free/Reduced Lunch Only</i>						
<i>Pretest</i>	1578	44%	.18	47.332	$\leq .0001$	.91
<i>Posttest</i>	1578	68%	.17			

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Table 9 – continued  
 Comparison of Pretest to Posttest Percent Correct Scores  
 Economics Instructional Module 4

Group	Number of Students	Mean	Standard Deviation	t-Test	Significance	Effect Size
<i>Non-Minority Only</i>						
Pretest	1167	44%	.18	40.035	≤.0001	1.43
Posttest	1167	69%	.17			
<i>Minority Only</i>						
Pretest	460	40%	.18	19.668	≤.0001	1.08
Posttest	460	60%	.19			
<i>Multi-Ethnic</i>						
Pretest	624	41%	.18	28.541	≤.0001	1.30
Posttest	624	65%	.19			

Figures 10, 11, and 12 provide a visual look at the increases. In general, the percentage increases were about 25% to 30% for each comparison group.

Figure 10: Economics Module 4  
 Pretest and Posttest Percent Correct Scores  
 All Students, Basic/Honors Comparison

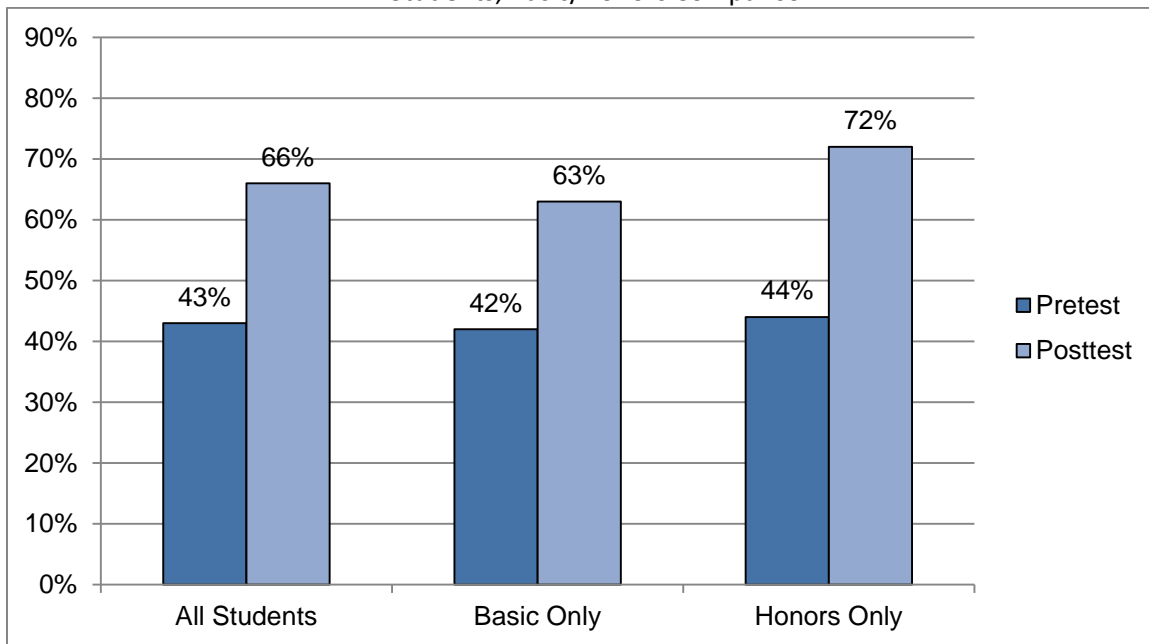


Figure 11 Economics Module 4  
Pretest and Posttest Percent Correct Scores  
Males/Females & Free/Reduced Lunch/No Free Reduced Lunch

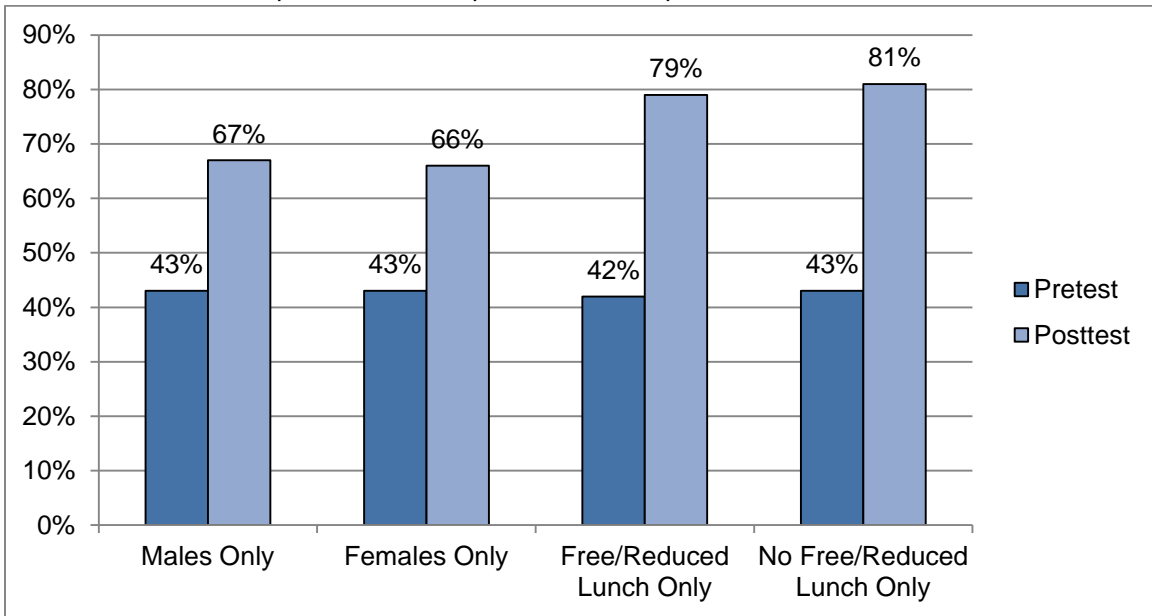
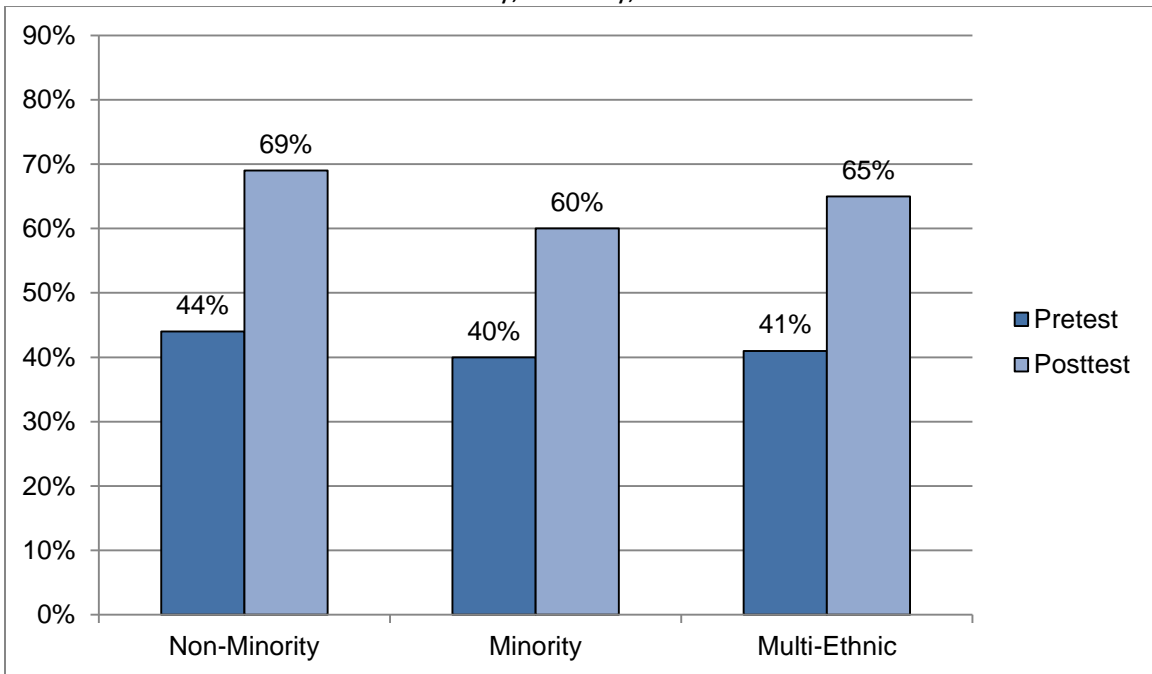


Figure 12: Economics Module 4  
Pretest and Posttest Percent Correct Scores  
Non-Minority, Minority, & Multi-Ethnic



## Conclusions

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The conclusions will review the data analyzed to answer each of the three questions that guided this study.

**Question 1:** *Do students enrolled in the **Florida Virtual School Economics** program increase their knowledge and skills in economics?*

For each of the comparisons across the 4 modules, the increases were statistically significant ( $\leq .0001$ ), indicating a difference that would occur by chance less than 1 out of 10,000 repetitions. The effect size, an even more significant estimate of the strength of a change, was large for all of the modules with the exception of the minority group on the first module with a medium effect size. Perhaps of even greater significance for the minority students is that the growth from pretesting to posttesting increased across the four modules.

The average percent increase for all students across the four modules is shown in Table 10.

Table 10: Gain Scores Across 4 Modules for All Students

Pretest Percent	Posttest Percent	Gain
53%	72%	19%

*The module pretest/posttest comparison shows significant increases (gains) for each of the modules and thus for the total Economics course.*

**Question 2:** *Do students enrolled in basic or honors courses achieve similar gains in the **Florida Virtual School Economics** program?*

In general, the conclusion can be reached that the honors course students pretest scores were almost always higher than the basic students. Honors students were starting out higher and were also making larger gains than the basic students. While none of these differences were extremely large, the pattern was consistent. The data suggests that students in the honors sections did show higher achievement levels at pretesting and, for the later modules, made larger gains by posttesting.

Overall, the honors students scored higher than the basic students on the pretests and posttests for all modules. The basic and honors students average percent increases for students across the four modules are shown in Table 11.



Table 11: Gain Scores Across 4 Modules for All Students

Group	Pretest Percent	Posttest Percent	Gain
Basic	52%	69%	17%
Honors	54%	77%	23%

*The conclusion is that honors students made larger gains. The differences are modest, but they are consistent and they increase with later modules.*

**Question 3:** *Do students with differing demographic characteristics (gender, socio-economic status, and ethnicity) achieve similar gains when enrolled in the **Florida Virtual School Economics** program?*

Gender differences were almost non-existent in comparing pretest to posttest scores for males and females. Some quite small differences were present for some modules when comparing the pretest scores of students who were eligible for free and reduced lunch programs with those who were not eligible for such programs. Finally, there were some small differences favoring non-minority students over minority or multi-ethnic students. Again, however, these differences were small and were not consistent across the modules.

The average percent increase for male and female; higher socio-economic level and lower socio-economic level; and white, minority, and multi-ethnic students across the four modules are shown in Table 12.

Table 12: Gain Scores Across 4 Modules for All Students

Group	Pretest Percent	Posttest Percent	Gain
Gender Groups			
Male	53%	72%	19%
Female	52%	72%	20%
Socio-Economic Groups			
Lower	50%	67%	17%
Higher	54%	74%	20%
Ethnic Groups			
White	54%	74%	20%
Minority	50%	67%	17%
Multi-Ethnic	51%	70%	19%

*The conclusion based on the data is that there seem to be very minor and non-consistent differences for gender, socio-economic status, and ethnicity. All students, regardless of demographic differences, made statistically significant and large effect size gains from pretesting to posttesting.*

***The overall conclusion based on the gain scores on the 4 module pretests and posttests is that students overall made statistically significant and large effect size gains from pretesting to posttesting. Honors students scored higher than basic students on the pretests and made larger gains than did the basic students. Higher socio-economic students made larger gains than lower socio-economic students, and non-minority students made larger gains than minority students. However, all of these differences were small, and all of the groups made statistically significant gains. The program resulted in statistically significant gains regardless of gender, socio-economic status, or ethnicity.***