

OCTEO CONFERENCE

OHIO CONFEDERATION OF TEACHER ORGANIZATIONS

UNIVERSITY/P-12 ISSUES, TRENDS AND INNOVATIONS PARTNERSHIPS
MATHEMATICS ACHIEVEMENT GAP-SUBURBAN STUDENTS' PERCEPTIONS OF
TEACHING AND LEARNING
DUBLIN, OHIO
APRIL 4, 2007

Presented by

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P-12/University Partnership

- The Tripod Project is a national consortium of schools and districts that have a shared interest in raising achievement for all students while narrowing gaps among students from different racial, ethnic, and social class backgrounds. It is supported and operated as a partnership between FreshPond Education of Cambridge, MA, and Dr. Ronald F. Ferguson, Tripod Project Director and Co-Chair and Director of the Achievement Gap Initiative at Harvard University.
- Freshpond has worked with school districts for more than ten years to organize and support teachers and school leaders in team-based professional development. Freshpond's work is particularly focused on the design of better lessons, improvement of instructional strategies, and refinement of assessment practices.

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Dublin City Schools' Targets

- Achievement Gaps
- Equity Gaps
- Remediation Rates in College
- Our partners
 - Harvard
 - OSU
 - Board of Regents
 - Westerville City Schools

Program Goals for Dublin

- Understand how classroom instructional practices affect students' academic score gains
- Special attention is paid to what distinguishes classrooms that demonstrate above average standardized assessment academic gains for both high and low achievers



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Data

- Derived from
 - School level student and teacher surveys
 - Gains calculated from 2 consecutive years of standardized test scores

Tripod Survey Proposal

- One 40 minute Tripod Survey administered to students in content areas in grades 8-11 measuring their perceptions of content, pedagogy and relationships (teacher-student)
- Tripod Survey Independent Variables:
 - Teacher *Demands*
 - Teacher *Encouragement*
 - Teacher *Sensitivity* to Students' Feelings
 - Teacher *Responsiveness* to Questions
 - Teacher's *Use of Multiple Effective Explanations*
 - Classroom *Goal Orientations*: Real Comprehension and/or Getting Good Grades
 - Working Hard* and *Staying Busy*
 - Students' Self-Assessed Performance* and *Satisfaction*

How Will This Data Help Us?

- Identify predictors of class to class differences in academic gains
 - Encourages reflection among teachers about their classroom behaviors and classroom learning
 - Illustrates differences among subgroups
 - Illustrates differences among content areas
 - Measures congruence among teacher and student perception of classroom practice
- Provides information for PLC deliberations

EMPT/OSU

- Identify rates of remediation among Dublin graduates attending college
- Pre-test junior year
- Remediate if necessary senior year

Overview of the Westerville School Community

- 9th Largest School District in Ohio
- 52 Square Miles
- 14,000+ Students and Growing
- 2001 Average Federal Adjusted Gross Income Ranks 49th of 613 Ohio School Districts – Top 8%
- 2003 Property Valuation \$2.1 Billion; Ranks 126th of 613 Ohio School Districts – Top 20%
- 71.1% of Population Has Some College or More

WCS Overview

A Diverse Student Population

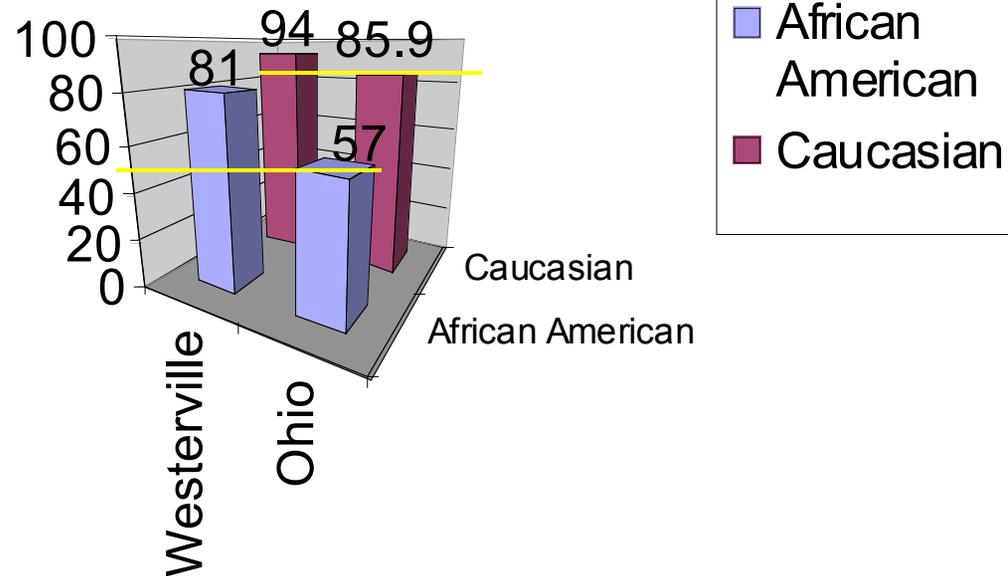
- 14% Economically Disadvantaged
- 15% Gifted
- 22% Minority
 - 550 ESL Students and Growing
 - 54 Countries – 52 Languages
- 12% Special Education

The Problem

It is not known what variables contributed to the academic achievement gap as measured by the 2004-2005 Ohio Graduation Test (OGT) standardized mathematics assessment. Additionally, students' perceptions pertaining to the learning environment in their 2004-2005 mathematics courses are also unknown.

What variables contribute to Westerville students demonstrating such high rates of mathematics proficiency, particularly African American students?

2005 Ohio Graduation Test: Students Demonstrating Mathematics Proficiency or Higher



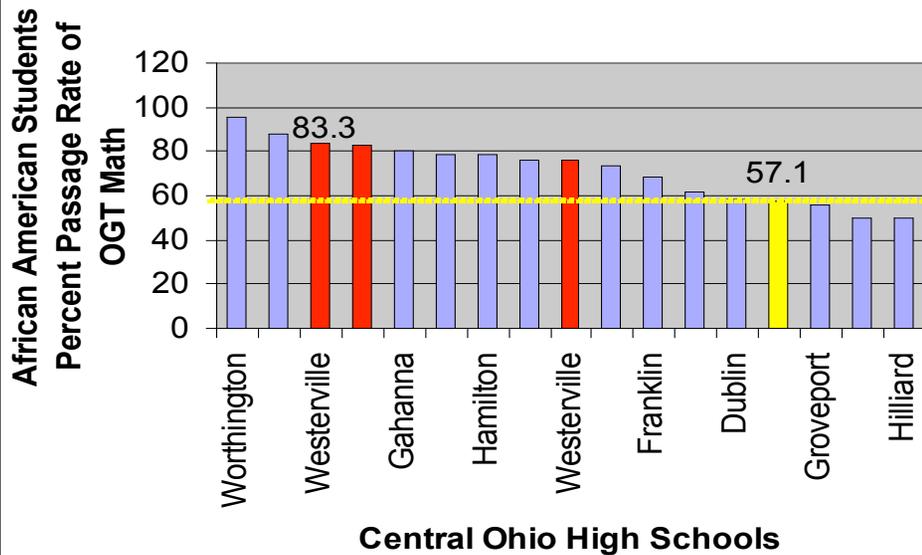
Drilling Down with Questions



- 1. Do differences exist between African American students and Caucasian students with regard to mathematic performance as measured by the standardized 2005 Ohio Graduation Test (OGT) mathematics assessment?
- 2. For those students who participated in the OGT mathematics assessments, do differences exist between students in advanced mathematics courses and students in regular mathematics courses with regard to their Tripod Survey responses?
- 3. If differences are found for research questions 1 and 2, then can the mathematics performance differences between African American students and Caucasian students be explained by their Tripod Survey responses?

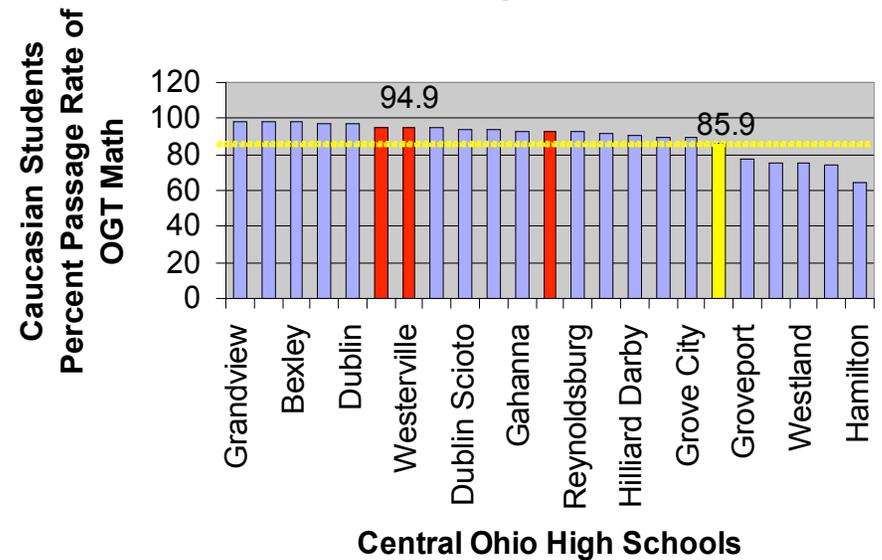
2005 OGT Math Achievement of African American and Caucasian Students in Central-Ohio Suburbs

2004-2005 Central-Ohio Suburbs Achievement Gap OGT Math



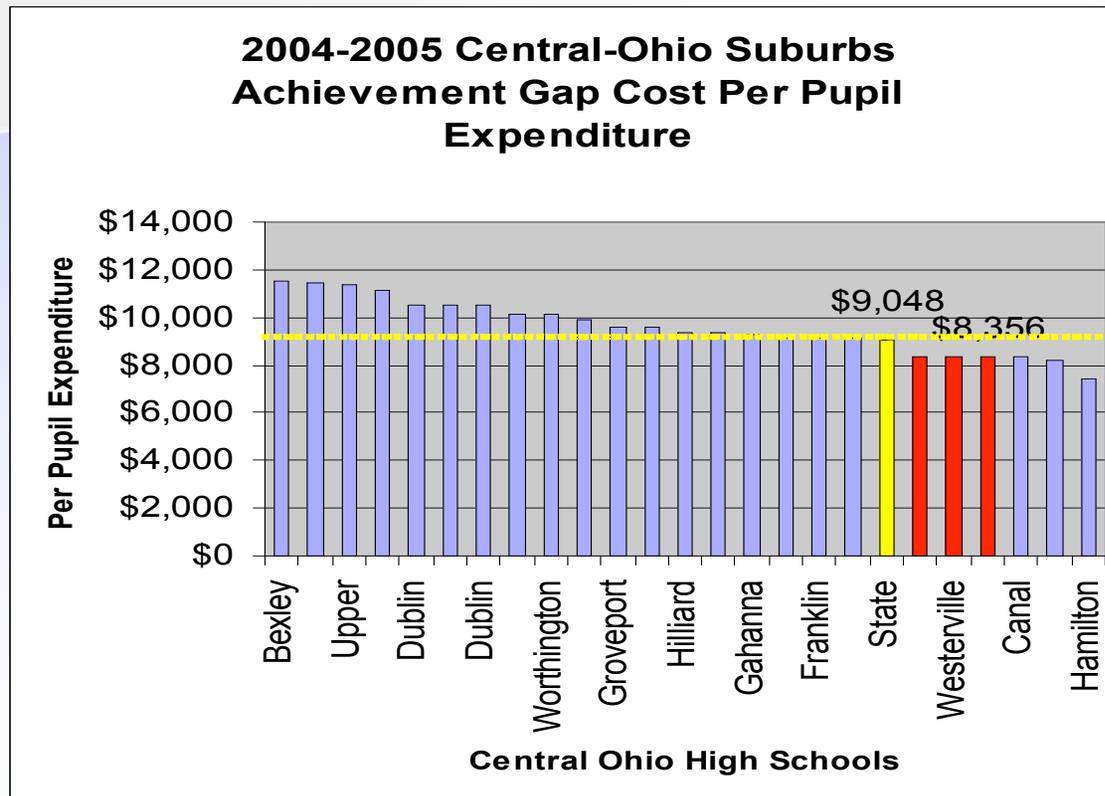
2005 Math Proficiency Levels: African American Students
 State Average 57.1%
 Westerville North High School 83.3%

2004-2005 Central-Ohio Suburbs Achievement Gap OGT Math



2005 Math Proficiency Levels: Caucasian Students
 State Average 85.9%
 Westerville North High School 94.9%

School Funding?



2004-2005 Per Pupil Expenditure
Ohio's State Average: \$9048
Westerville's Average: \$8356

Achievement Gap Research Variables

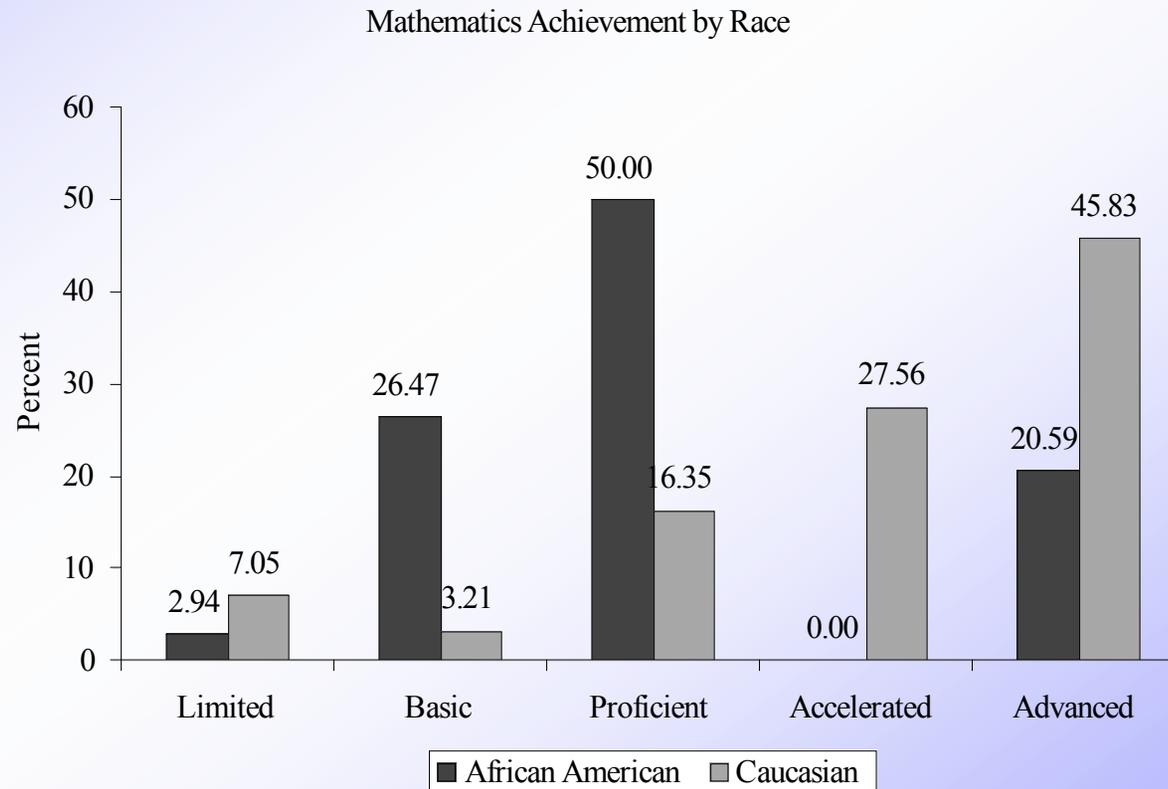
- In this study, the independent variables included:
 - Student's race.
 - Tripod Survey variables- (Trust versus Interest, Ambitiousness vs. Ambivalence and Industriousness vs. Disengagement-Feasibility, Relevance, Enjoyment, and Adult Support).
- The dependent variable was the mathematics achievement of African American and Caucasian students as measured by the standardized OGT.
- The OGT mathematics assessment consisted of 38 test items measuring number sense and operation; measurement; geometry and spatial sense; patterns, functions and algebra; and data analysis and probability academic content standards.

“Excellent School”

-Ohio Department of Education 2005

Descriptive statistics indicate that African American students perform lower, on average, than Caucasian students in mathematics as measured by a standardized assessment for this particular suburban high school. The *t*-test results indicate that the two groups are statistically significantly different, $t = -4.40$, $p < .00$.

African American Mean=3.09 (Proficient)
Caucasian Mean=4.02 (Accelerated)



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Advanced and Regular Math Groups

T-test results indicate that there were significant differences between the advanced and regular mathematics groups with regard to their perceptions of content, pedagogy and teacher-student relationships.

In all cases, the advanced mathematics group provided more positive responses, on average, than the regular mathematics group.

Trust and Interest:

-Advanced math students tend to have significantly more positive perceptions of teacher-student relationships pertaining to their teacher's sensitivity.

Ambitiousness & Industriousness:

-Advanced math students also had significantly more positive perceptions of content and pedagogy pertaining to student's performance orientation, student mastery orientation, teacher's emphasis on mastery of material, and student self-efficacy.

Advanced math students report more positive classroom responses, on average, compared to regular math groups.

- My teacher in this class makes me feel that he/she truly cares about me.
 - I feel close to my teacher in this class.
 - My teacher in this class treats the students with respect.
 - My teacher really tries to understand how students feel about things.
 - I have done my best quality of work in this class all year long.
 - One of my goals in this class has been to learn as much as I can.
 - I care about pleasing my teacher in this class.
 - I wish my teacher in this class would push me harder to do my best.
 - I have been able to figure out the most difficult work in this class.
 - My teacher in this class cares a lot about how much all of us learn.
 - My teacher works hard to make sure we learn a lot.
 - In this class, really understanding the material is the main goal.
 - Even if the work in this class is hard, I can learn it.
 - I'm certain I can master the skills taught in this class.
 - If you don't understand something, my teacher explains it another way.
 - My teacher has several good ways to explain each topic that we cover in this class.
- Our class stays busy and doesn't waste time.
 - I like the topics we learn about in this class.
 - I enjoy doing the work for this class.
 - My teacher makes learning enjoyable.
 - When I work hard for this class, an important reason is because I enjoy it.
 - My teacher makes lessons interesting.
 - My teacher is enthusiastic about what he/she is teaching.
 - When I work hard in this class, an important reason is the teacher demands it.
 - When I work hard, an important reason is that the teacher encourages me.
 - The teacher in this class demands that the students work hard.
 - The teacher in this class encourages me to do my best.
 - In this class, my teacher accepts nothing less than our full effort.
 - My teacher doesn't let people give up when the work gets hard.
 - My teacher in this class likes it when we ask questions.
 - The teacher in this class welcomes questions if anyone gets confused.
 - If I need help after school for this class, I can usually get the help I need.
 - My teacher in this class shows that he/she will help me succeed in class.

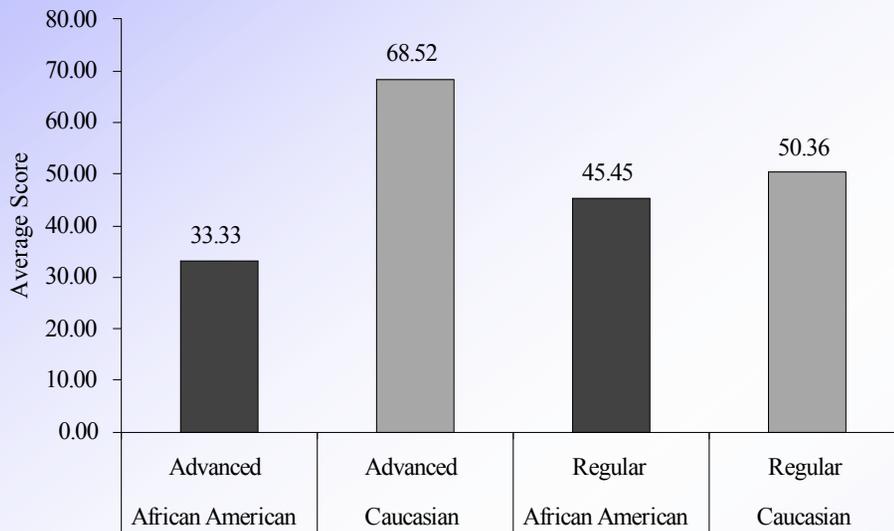
Advanced and regular math students reported no statistically significant survey responses to the following:

- I have pushed myself hard to completely understand my lessons in this class.
- In this class, it is important to me to thoroughly understand my class work.
- My teacher wants us to use our thinking skills, not just memorize things.
- The hardest lessons in this class are very difficult for me.
- Other students understand the lessons in this class better than I do.
- In this class, you must re-do some assignments on which you do poorly.

- If you don't like your grade on an assignment, you can re-do work to raise it.
- Things I am learning in this class will help me in my life.
- My teacher never makes people who ask questions feel stupid.
- I don't like asking the teacher in this class for help, even if I need it.
- I would ask the teacher for help, if I needed it.
- If I were confused in this class, I would handle it by myself, not ask for help.
- I don't mind asking questions in this class if I need to.

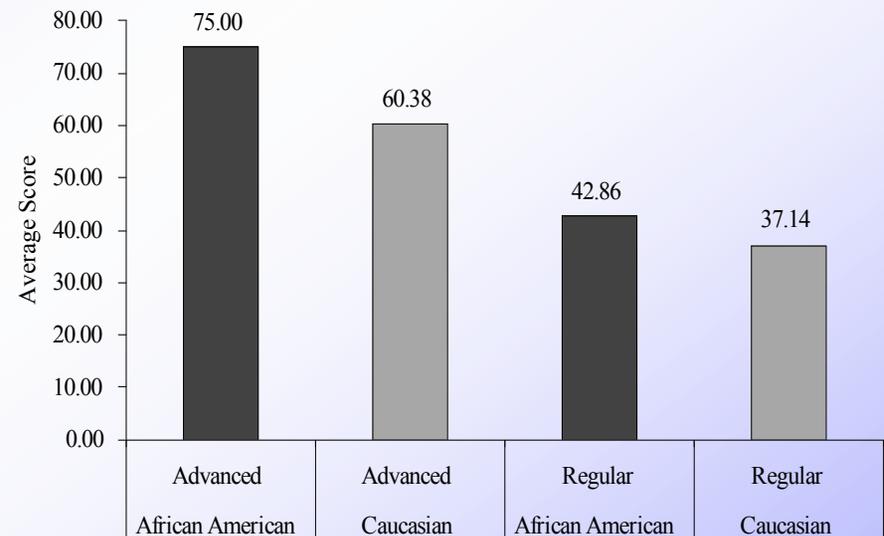
Teacher Sensitivity

My teacher in this class treats the students with respect.



The most favorable response was provided by the advanced Caucasian course, followed by the regular Caucasian course, therefore African American students respond the least favorable in this category (teacher sensitivity).

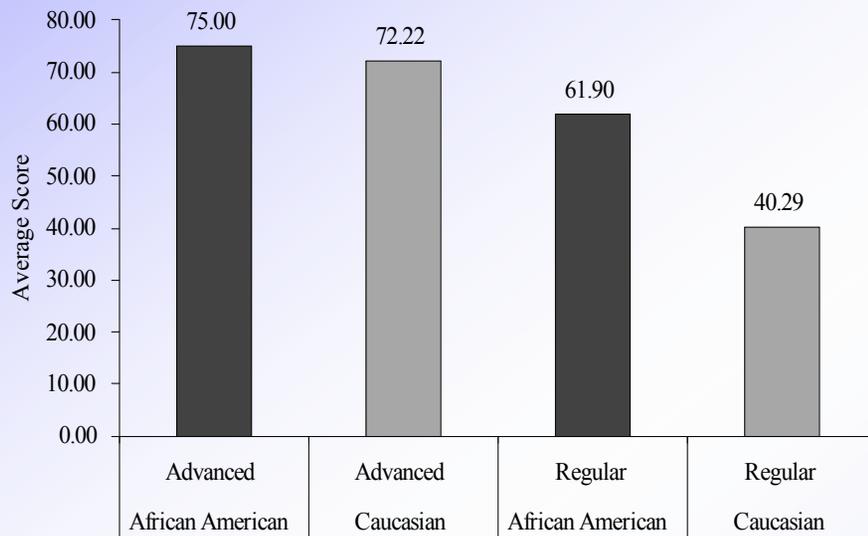
My teacher in this class makes me feel that he/she truly cares about me.



African American students in the advanced course feel that their teacher cares about them more so than African American students in the regular course. The same is true for the Caucasian group, but not to the same extent (teacher sensitivity).

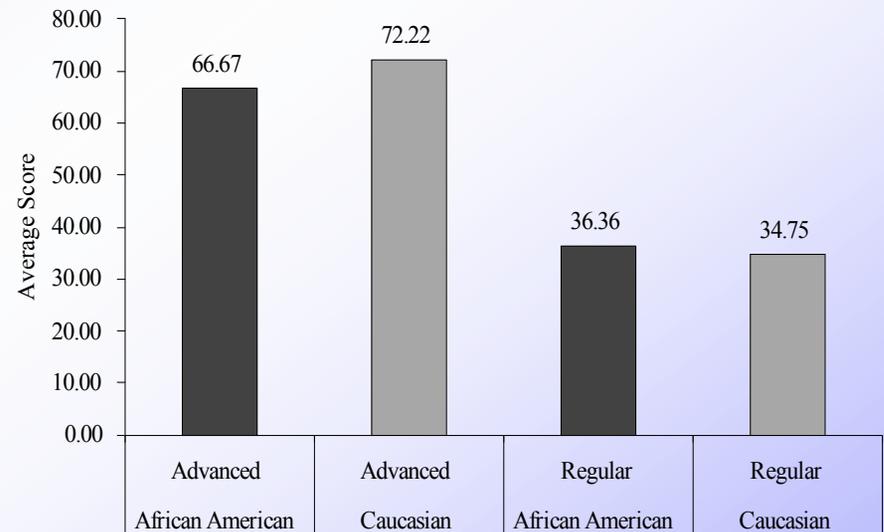
Content and Pedagogy

I have been able to figure out the most difficult work in this class.



African American students in the advanced course provided the highest responses relating to the notion that they want to learn as much as they can. African American students in regular math course affirmed this more so than their Caucasian peers (self assessment of performance).

If you don't understand something, my teacher explains it another way.

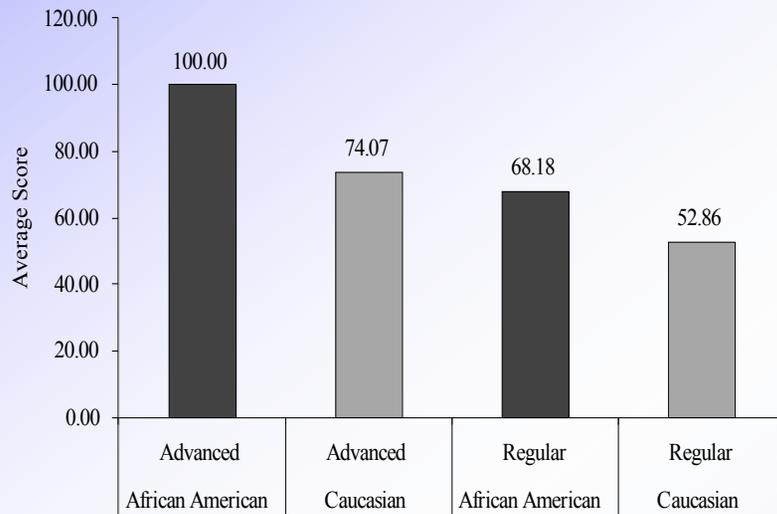


African American students in the advanced course provided the highest responses relating to the fact that they want to learn as much as they can (teacher's use of multiple explanations).

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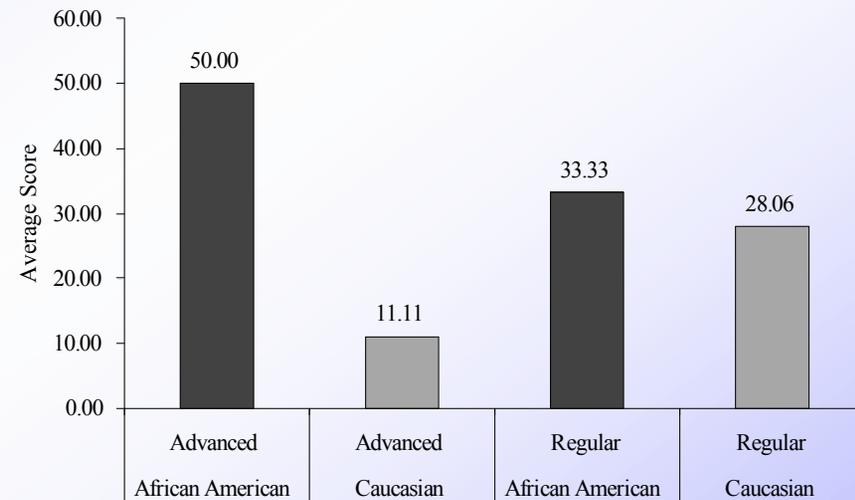
Content and Pedagogy

One of my goals in this class has been to learn as much as I can.



African American students in the advanced course provided the highest responses relating to the fact that they want to learn as much as they can (student's mastery orientation).

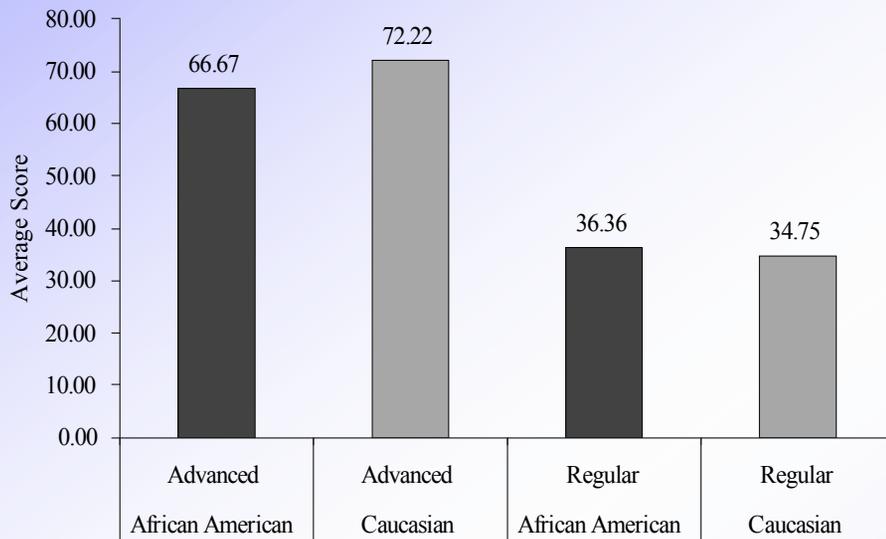
I wish my teacher in this class would push me harder to do my best



African American students are more likely to want their teacher to push them harder within in the advanced course, however the opposite is true for Caucasian students. African Americans students want their teacher to push them harder more so than do Caucasian students, regardless of the course level(attitudes about effort).

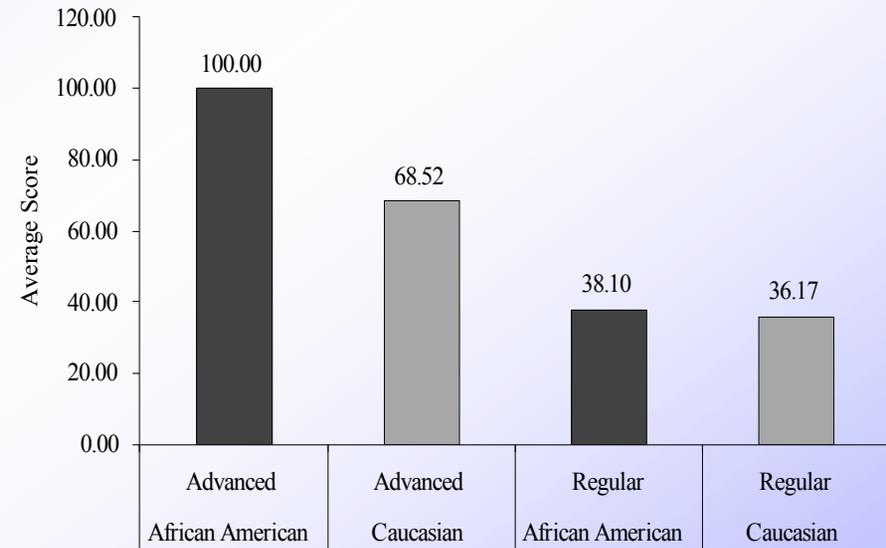
Content and Pedagogy

If you don't understand something, my teacher explains it another way.



Students who are in the advanced courses more highly associate with the perception that the teacher will explain something differently if the students does not understand the content; this perceptions is affirmed more so by those Caucasian students in the advanced course (teacher's use of multiple explanations).

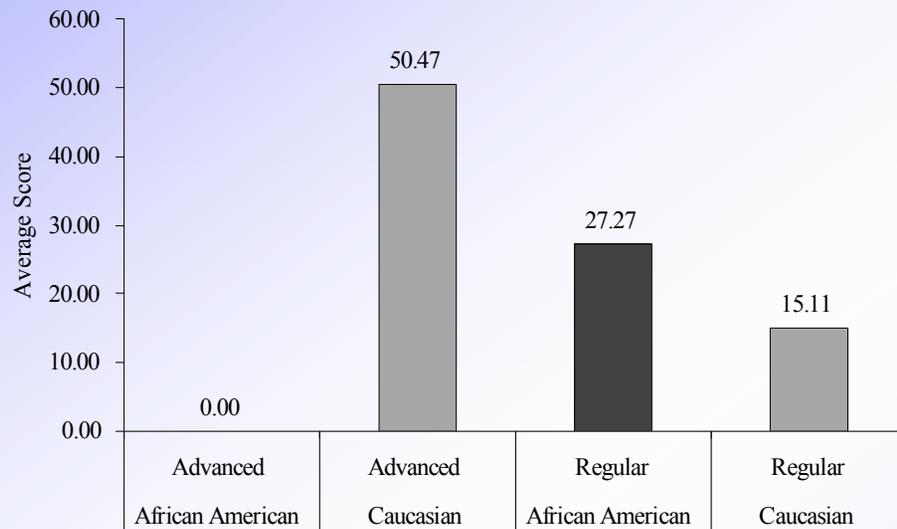
Our class stays busy and doesn't waste time.



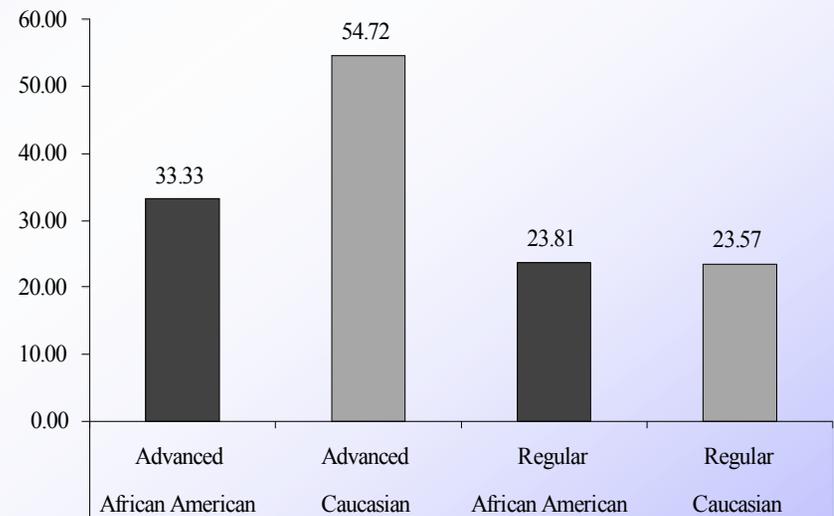
The students in the advanced course more strongly believes that their class stays busy and does not waste time, as compared to students in the regular course (classroom time management).

Content and Pedagogy

I like the topics we learn about in this class.



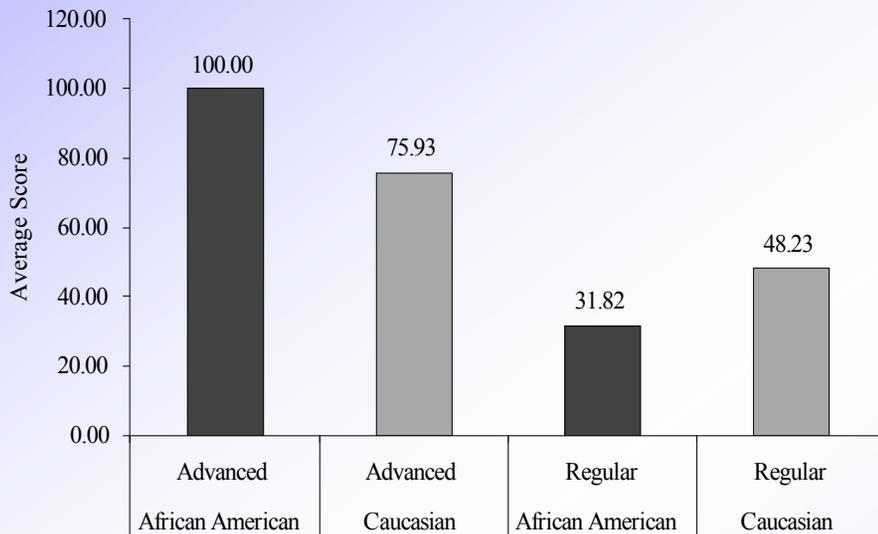
My teacher makes learning enjoyable.



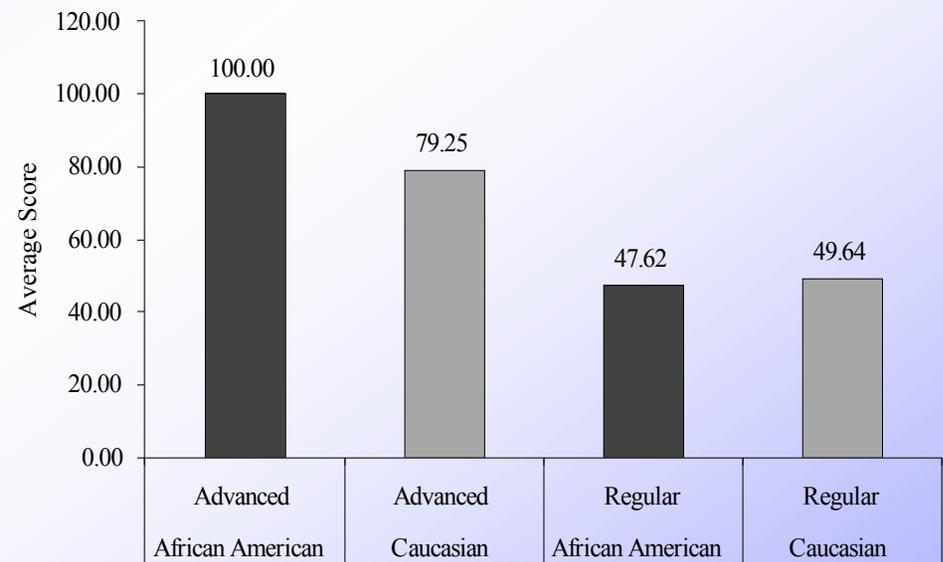
Students in the advanced courses are more likely than the students in the regular courses to affirm feelings of enjoyment in class. It appears as if enjoyment of work is a phenomenon mainly experienced by Caucasian students in the advanced math course (student's enjoyment).

Content and Pedagogy

My teacher in this class likes it when we ask questions.



The teacher in this class welcomes questions if anyone gets confused



The students in the advanced courses responded more positively than the students in the regular courses, regardless of race. However, the African Americans in the regular course responded more negatively than did the Caucasians in the regular course (Adult Support).

A Personalized and Differentiated Professional Development Model: Essential “Gap Busters”

Continue to narrow the achievement gap for African American students, in this study, by tending to the following tasks:

Teacher-student relationships

- My teacher in this class makes me feel that he/she truly cares about me.
- I feel close to my teacher in this class.
- My teacher in this class treats the students with respect.
- My teacher really tries to understand how students feel about things.

Teacher’s emphasis on mastery of material

- My teacher in this class cares a lot about how much all of us learn.

Enjoyment and adult support.

- When I work hard for this class, an important reason is because I enjoy it.
- My teacher makes learning enjoyable.
- My teacher is enthusiastic about what he/she is teaching.
- My teacher in this class likes it when we ask questions.
- The teacher in this class welcomes questions if anyone gets confused.

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General Implications For P-12/University Partnerships

- In order for educators to provide an optimum learning environment, it is essential for educators to have extensive content knowledge of the subject area being taught and demonstrate effective pedagogical instructional strategies.
- Teachers must possess multiple pedagogical methods in order to achieve the teacher quality standards, students in this study, identified as the essential attributes of an optimum learning environment.
- Most students seek to establish meaningful relationships with educators during the teaching and learning process.
- Schools must provide systemic initiatives to ensure students enroll in advanced math courses (Ohio Core).
- Standardized summative assessments do not provide educators with tangible indicators necessary to engage in short-cycled self assessments of educational best practices (Instructional Quality Value Added Model). *
- Provide teachers with a personalized differentiated professional development model in order to foster a learning culture that meets the socio-emotional and academic needs of all students.

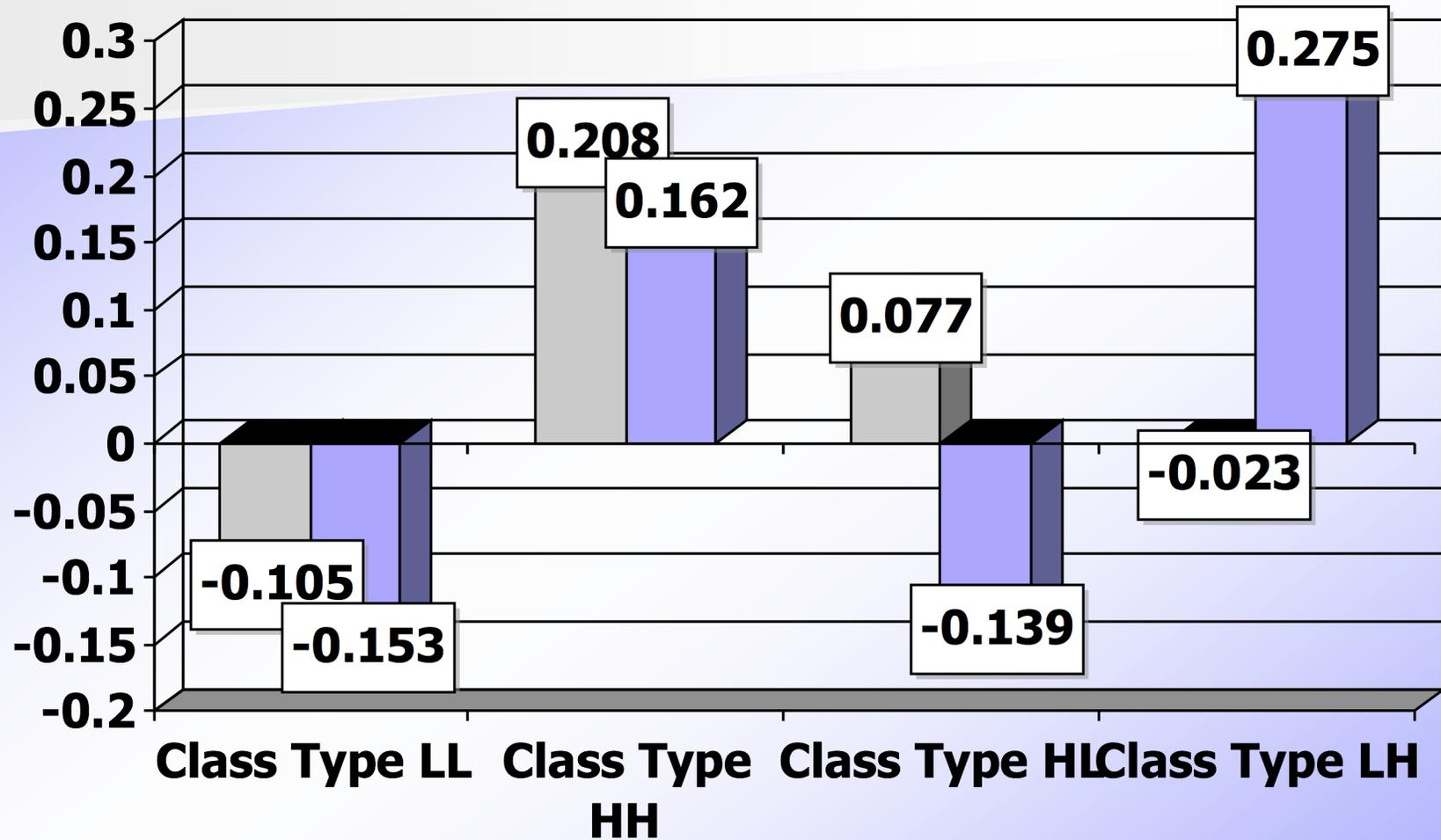
Instructional Quality As Value-Added Predictor

Predictors of Class-to-Class Differences in *Adjusted* Math-Score
Gains at one Westerville School: A Preliminary Analysis
Using Student Survey Responses
(One Sample)

Ronald F. Ferguson
Wiener Center for Social Policy
John F. Kennedy School of Government
Harvard University

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One Westerville City School's Adjusted Math Gains



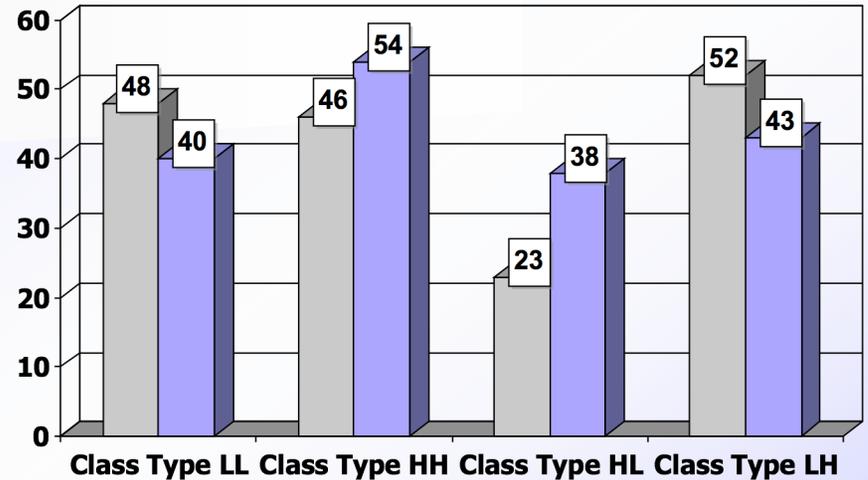
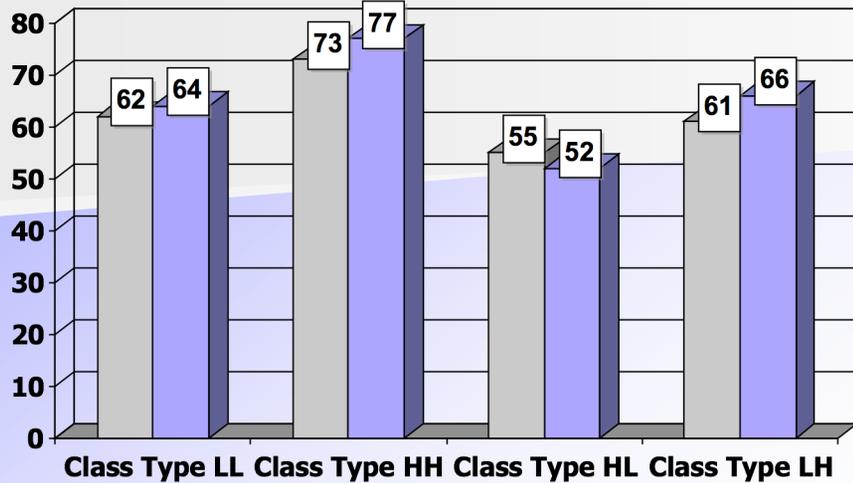
1st&2nd Baseline Quintiles

3rd&4th Baseline Quintiles

Working Hard and Staying Busy

“I have pushed my self hard to completely understand my lessons in this class.”

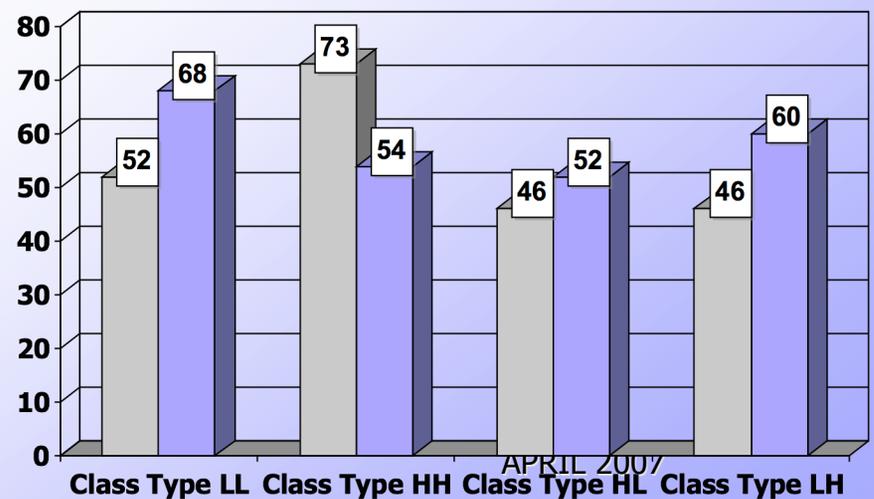
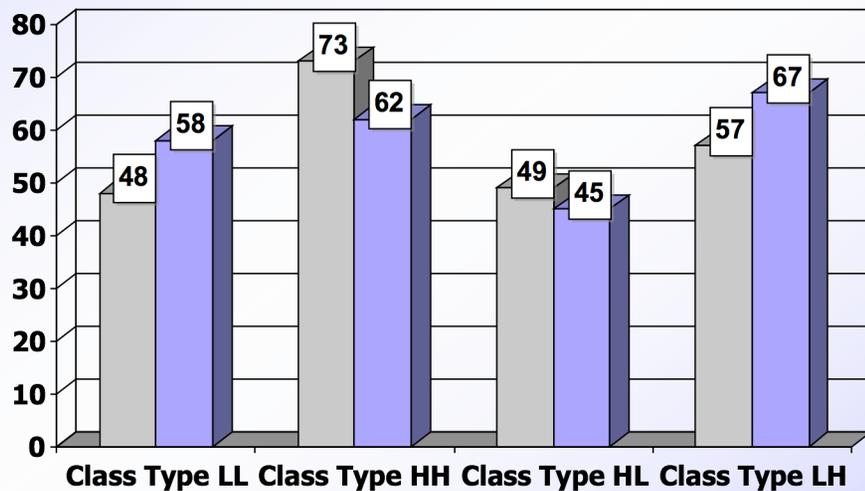
“Our class stays busy and doesn’t waste time.”



Performance and Satisfaction

“I have done my best quality work in this class all year long.”

“I am satisfied with what I have achieved in this class.”



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What's most different about the HH classroom?

✓ *Teacher Demands for Hard Work*

➤ *Teacher Encouragement to Do their Best*

➤ *Teacher Sensitivity to Students' Feelings*

➤ *Teacher Responsiveness to Questions*

➤ *Teacher's Use of Multiple Effective Explanations*

✓ *Classroom Goal Orientations: Real Comprehension and/or Getting Good Grades*

➤ **Possibilities for why Low Achievers Gain more in HH than in LH classrooms.**

✓ *Working Hard* and *Staying Busy*

✓ *Performance* and *Satisfaction*