



AP Scores: What Do They Really Tell Us?

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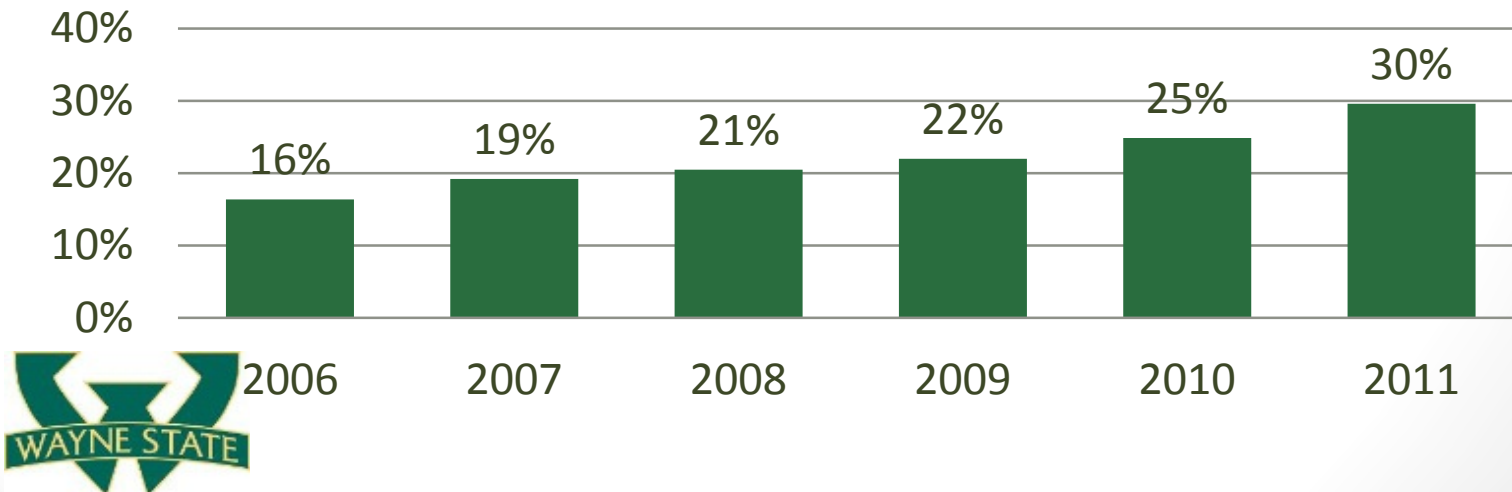


Wayne State University

is a public research university (RUVH) located in Midtown Detroit, the city's cultural center & historic district.

Last Year

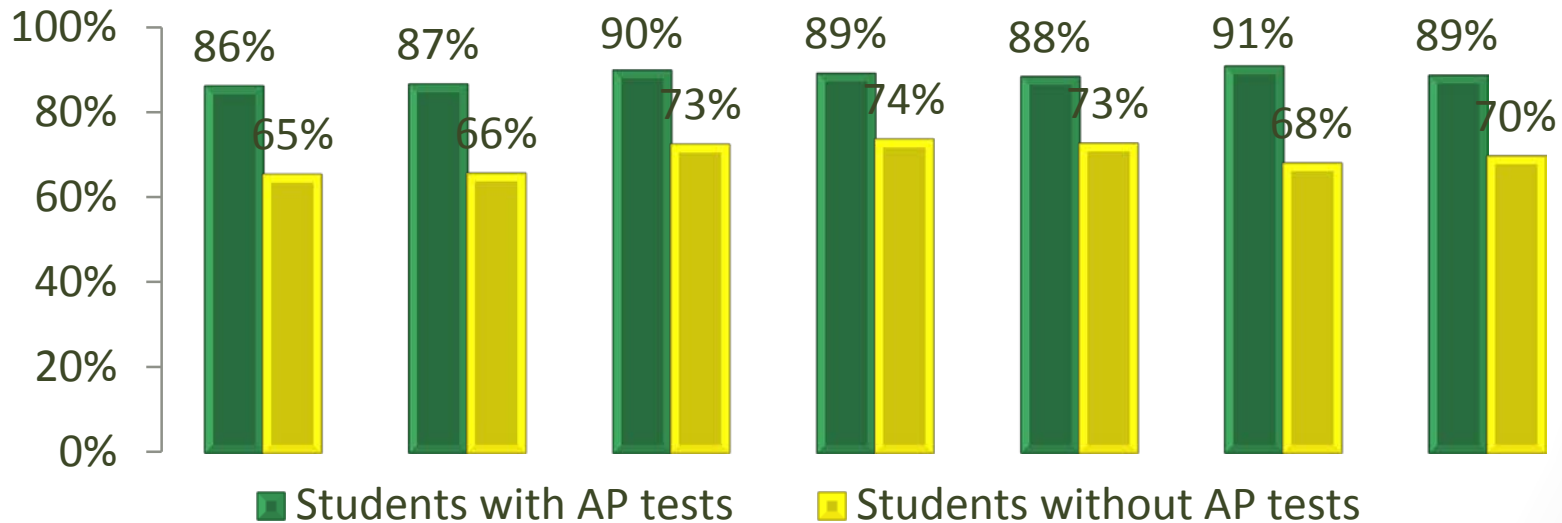
- In a presentation to MIAIR last year, we showed that the number of FTIAC students with AP test scores dramatically increased at Wayne State from 2006-2011.



Last Year

- We also found students who took AP test has higher one year retention than those did not take any AP test.

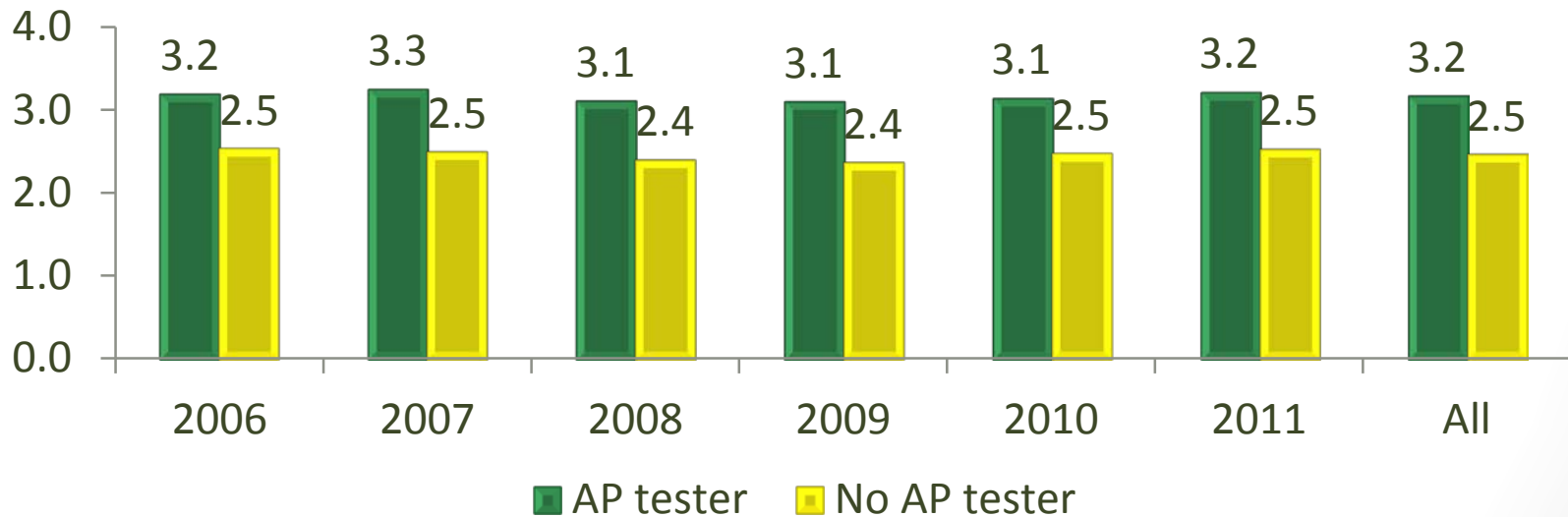
One Year Retention



Last Year

We also found students who took AP tests have higher first year GPAs than those did not take any AP tests.

First Year GPA



Last Year

- Discussions from our presentation:
 - *Is using an AP score as a replacement for a course ultimately beneficial for a student?*
 - *Although AP scores indicate student quality, is it better to receive course credit through a test or through class work?*



This Year

- This year, we will continue our investigation of institutional data. Our research question is:

Do students receiving AP credit for a subject perform as well in the course to which they placed compared with their peers who took the prerequisite at the university?

AP courses studied:

Biology

Calculus



Methods & Analysis

- The data included in this study were FITIAC students from Fall 2006-2011.
- The independent variable is AP category.
- The outcome variable is the students' grade in the advanced level courses.
- For each subject area, we performed statistical analyses to elucidate differences between groups.



$$\frac{\partial}{\partial a} \ln f_{a, \sigma^2}(\xi_1) = \frac{(\xi_1 - a)}{\sigma^2} f_{a, \sigma^2}(\xi_1)$$

$$\int \mathcal{T}(x) \cdot \frac{\partial}{\partial \theta} f(x, \theta) dx = M \left(\mathcal{T}(\xi) \cdot \frac{\partial}{\partial \theta} \ln L(\xi, \theta) \right)$$

$$\int \mathcal{T}(x) \cdot \left(\frac{\partial}{\partial \theta} \ln L(x, \theta) \right) \cdot f(x, \theta) dx = \int \mathcal{T}(x) \left(\frac{\frac{\partial}{\partial \theta} L(x, \theta)}{L(x, \theta)} \right) f(x, \theta) dx$$

$$\frac{\partial}{\partial \theta} \int \mathcal{T}(x) f(x, \theta) dx = \int \frac{\partial}{\partial \theta} \mathcal{T}(x) f(x, \theta) dx$$



Calculus

AP Policy for Granting Math Credit

- Placement into Calc2 with AP score 3, 4, 5
- Score of 2 or better satisfies Math Competency general education requirement.
 - 28% of AP Calc test takers
 - (n = 321 of 1126)



Grouping Definitions

- *AP Credit* students
 - Are those who have received credit for the prerequisite course for their score on the AP test. They placed out of Calculus 1.
- *AP Test & Class* students
 - Are those who took the AP test, but did not score high enough and therefore took the prerequisite course, Calculus 1.
- *NO AP* students
 - Are those who did not take the AP exam and completed the prerequisite course, Calculus 1.



Descriptives for Students Taking Calculus 2

Total (N = 1137)

• Preparation Type

- AP Credit
(n = 231, 20%)
- AP Test & Class
(n = 239, 21%)
- No AP
(n = 667, 59%)

• Racial Identity

- Asian (n = 199, 18%)
- Non-Resident (n = 66, 6%)
- URM (n = 130, 11%)
- Unknown (n = 69, 6%)
- White (n = 673, 59%)

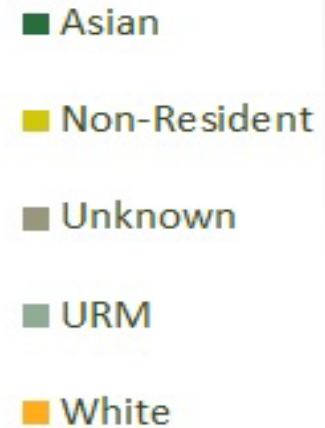
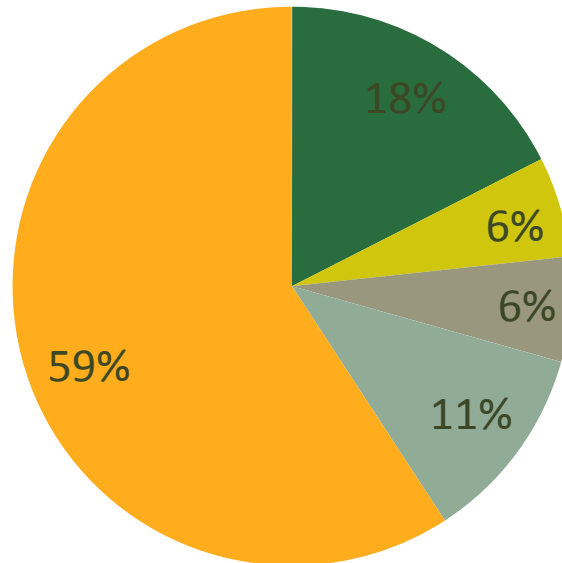
• Gender Identity

- Men (n = 688, 60%)
- Women (n = 449, 40%)

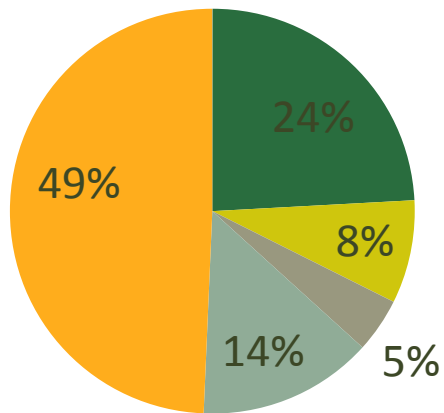


Racial Identity by Preparation Type

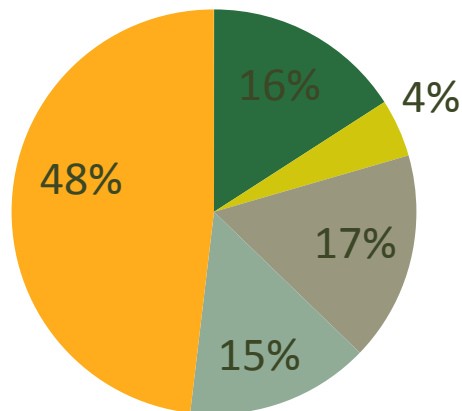
All Calc2 Students



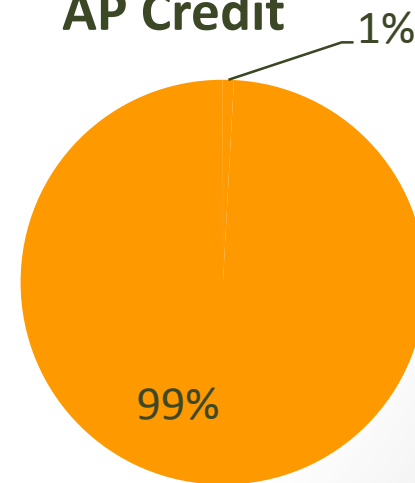
No AP



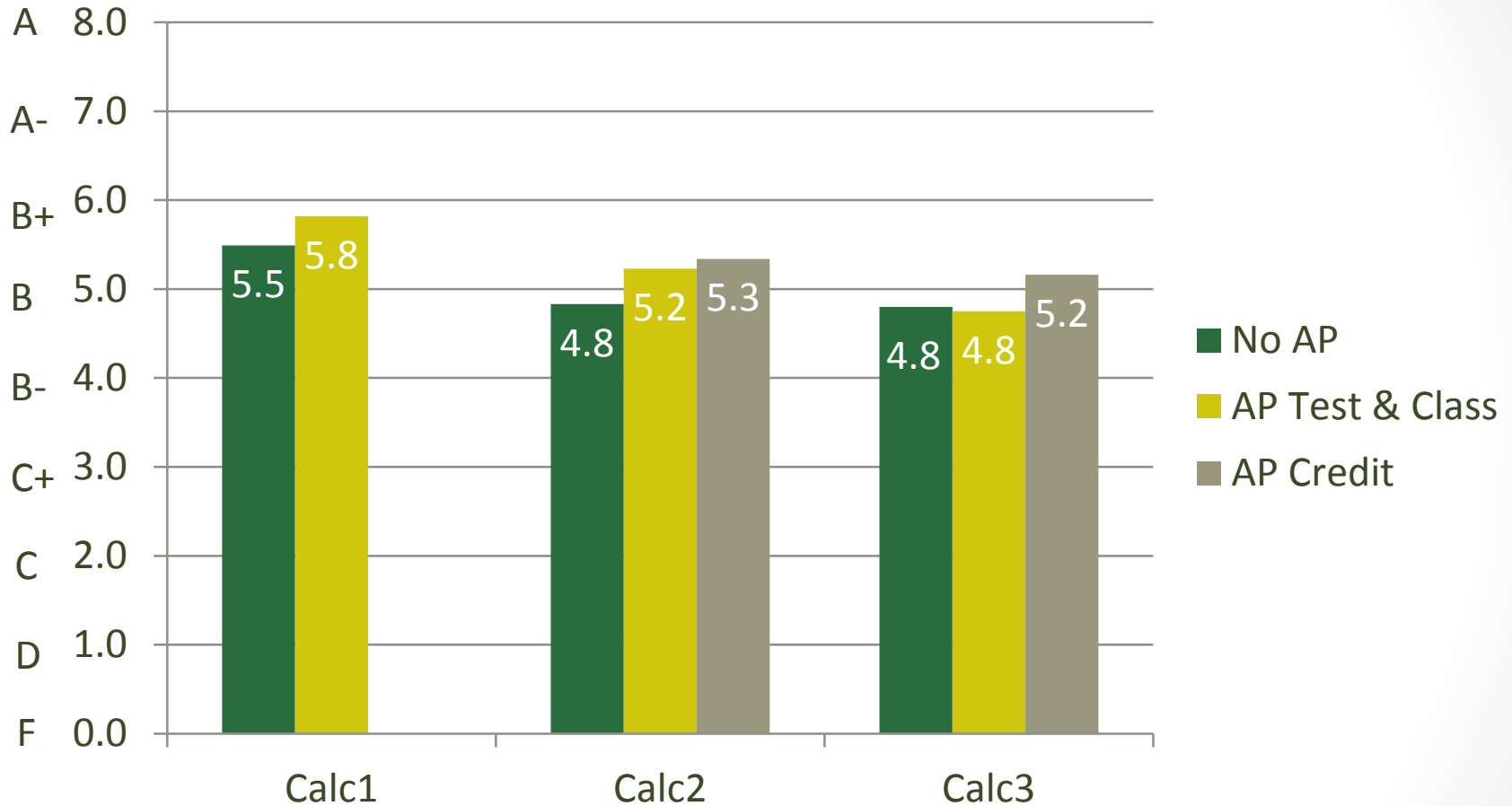
AP Test & Class



AP Credit



Comparison of Mean Calculus Scores by Preparation

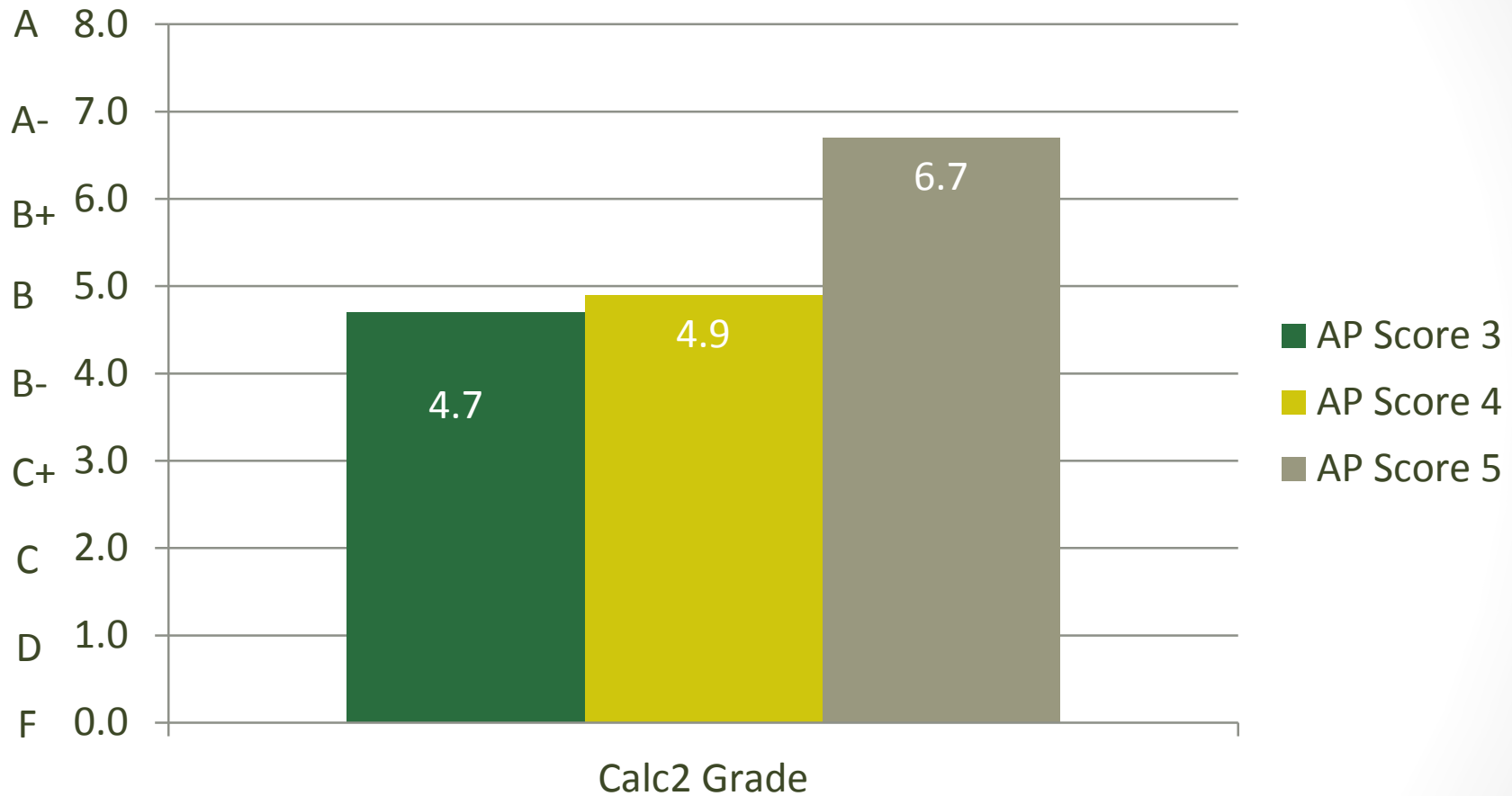


Results from Calculus 2 Analysis

- Students who skipped Calculus 1 did significantly better than students who had no AP test, and took Calculus 1 (4.8 vs 5.3)
- For all students who took the AP test ($n = 381$), the score on their AP exam explains about 3% of the variance in their Calculus 2 grade.
- For students who skipped Calculus 1, their score on the AP test is influential on their grade in Calculus 2, particularly for students who scored a 5.



Comparison of Calculus 2 Scores by AP Test Score



ANVOA: $F(2, 228) = 15.69, p < .001, \eta^2 = .121$



Biology

Biology Policy

- AP score of 3, 4
 - Placement into BIO 1500- “Basic Life Diversity”
 - Granting 4 Credits
- AP score of 5
 - Placement into BIO 2200 – “Introductory Microbiology” or BIO 2600 – “Introduction to Cell Biology”
 - Granting 8 Credits



Grouping

- *Take AP and scored a 5*
 - Are those who have received 8 credit for the prerequisite course for their score on the AP test. They placed out of 1500/1510.
- *Take AP and scored a 3 or 4*
 - Are those who have received 4 credit, placed to 1500.
- *Take AP and scored 1 or 2 or NO AP*
 - Are those who have receive no AP credit or did not take the AP exam. Will need to completed the prerequisite courses, BIO 1510 or BIO 1500.



Descriptives for Students Taking BIO 2000

Total (N = 2892)

- AP Type

- AP 5
(n = 127, 4.4%)
- AP 3 or 4
(n = 278, 9.6%)
- No AP
(n = 2487, 86%)

- Racial Identity

- Asian (n = 641, 22%)
- Non-Resident (n = 149, 5%)
- URM (n = 252, 9%)
- Unknown (n = 298, 10%)
- White (n = 1552, 54%)

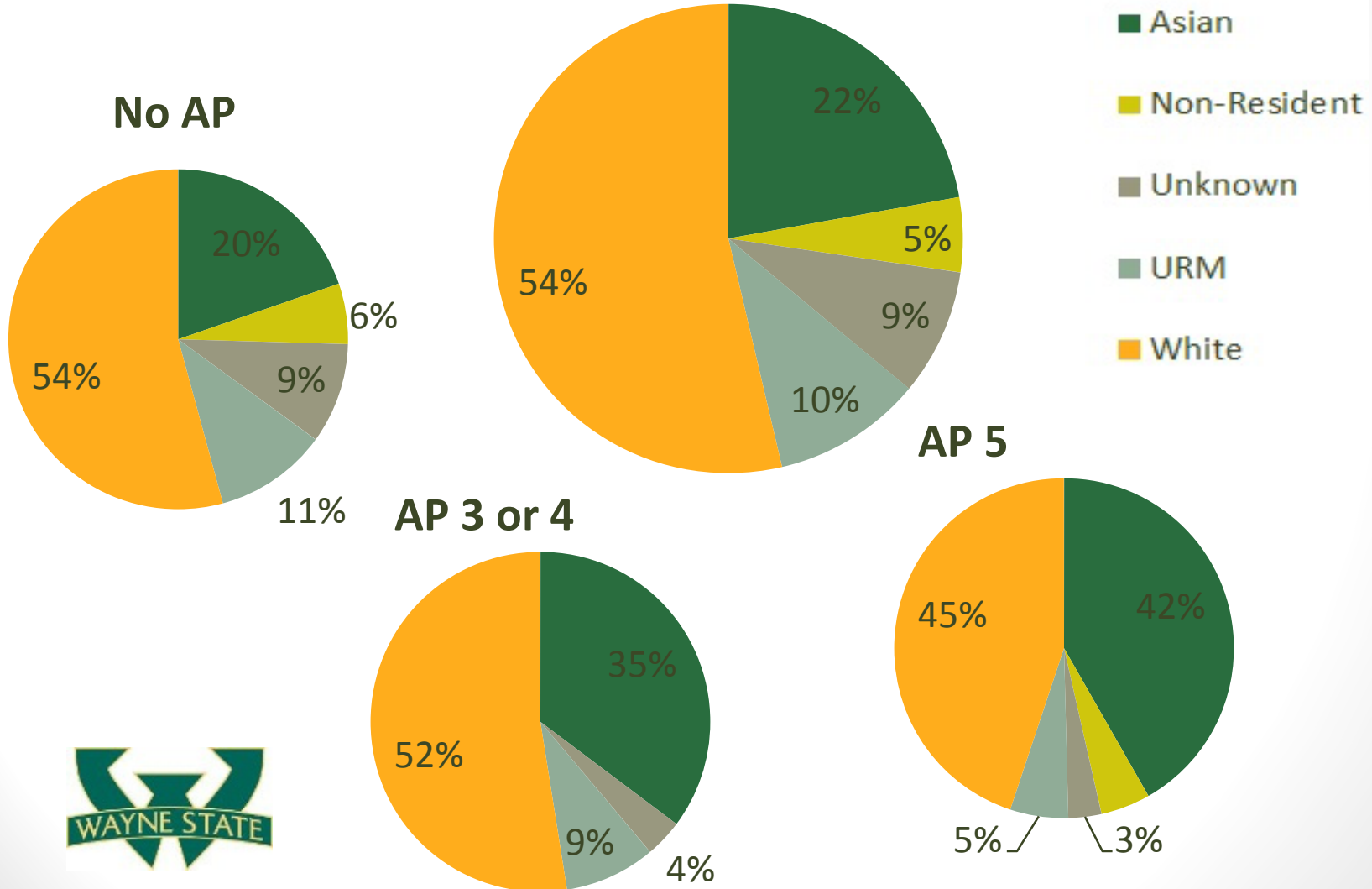
- Gender Identity

- Men (n = 1168, 40%)
- Women (n = 1724, 60%)



Racial Identity by Preparation Type

All BIO 2000 Students



Results from Biology 2000 Analysis

Group	Mean	Std. Deviation
No AP	3.89	2.38
AP 3 or 4	4.78	2.41
AP 5	6.36	2.03

ANOVA	Sum of Squares	F	Sig.
Between Groups	855.8	76.23	.00
Within Groups	14745.9		
Total	15601.8		



Results from Biology 2000 Analysis

- Students with AP 5 and skipped BIO 1500/1510 did significantly better than students who took prerequisite courses.
- Students with AP 3 or 4 did significantly better than their peers who took the same prerequisite course.



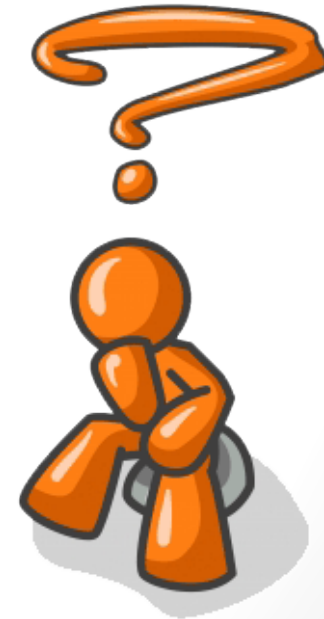
Summary

- From last year:
 - The number of students with AP test scores is increasing both nationally and at our institution.
 - Having taken an AP test is positively correlated with one year retention and first year GPA.
- From this year: High AP scores are particularly predictive of success in Biology and Calculus.
 - In Calculus 2, those who use the AP test to skip Calculus 1 performed better than those who took the prerequisite. However, there were no significant differences in Calculus 3.
 - In Biology 2000 and above, students with AP scores of 5 have a very high course grade compared to those who take the prerequisite, 1500.
- Our AP policy works as expected.
 - Students who skip the prerequisite perform well in the subsequent course.
 - Students arrive prepared for the academic rigor of the university.



Discussion

- How does your institutions use AP scores?
- Do you find them useful as predictors for higher education outcomes.
- What would this look like at your university?



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