



Postsecondary Success Begins with High School Preparation

Data Trend #33

John Winn, Commissioner

March 2005

J. David Armstrong, Jr., Chancellor

Abstract. This study examines the relationship between high school preparation and subsequent success at the community college. An in-depth analysis was conducted on students' level of courses taken in high school, Florida Comprehensive Assessment Test (FCAT) scores, Common Placement Test (CPT) scores, and their successful outcomes in postsecondary education of receiving an award, transferring to the State University System (SUS), or remaining enrolled.

Highlights:

- Students who take higher level reading and math courses more often score 3 or higher on the FCAT.
- Students who score 3 or higher on the FCAT more often pass the math and reading sections of the CPT.
- Students who pass the math and reading sections of the CPT are more successful academically than their College developmental education counterparts.

Therefore, academic success at the postsecondary level begins with higher level preparation at the secondary level. The need for more rigorous high school and middle school coursework has been recognized by both the Governor and the Department of Education. Initiatives to support this include the Governor's A+ Plan, and the State Board of Education's and Department of Education's middle school and high school reform proposals. The Governor's A+ Plan has been in place since 2000. The A+ Plan is designed to provide:

- Accountability;
- Choices for Parents;
- More resources;
- Rewards for improvement and success; and
- Change when students are not progressing.

In 2004, the Florida Legislature passed the "Middle Grades Reform Act." Since that time, the Division of Public Schools created a Task Force to explore the options for middle grades reform. In January 2005, the recommendations of the Task Force were presented to the Commissioner's Summit for Principals.

The Department of Education is also exploring options for high school reform. Recently, the Office of Equity and Access conducted a study on the rigor of high school coursework. In nine high schools, they are piloting a program to increase the rigor of high school coursework by partnering the high schools with College Board and the Department of Education.

FCAT vs. CPT Scores. A common misperception is that if you do not prepare for postsecondary education while in high school, you can attend a community college and be “OK.” ACT, Inc., a nationally recognized student achievement testing company, recently released a study titled *Crisis at the Core: Preparing All Students for College and Work* that found, “...a strong positive relationship exists between the amount and kind of high school coursework students take and their readiness for college. The more courses students take and the more challenging those courses, the more likely these students will be college ready and will persist to a college degree.”

This study examines the specific relationship between public high school preparation and subsequent success in the Florida Community College System (FCCS). Using students who completed high school in 2001-02, it will show there is a definite relationship between the rigor of high school courses taken and success on the CPT and in community college education. An in-depth analysis was conducted on students’ level of courses taken in high school, FCAT scores, CPT scores, and their successful outcomes in postsecondary education of receiving an award, transferring to the State University System (SUS), or continuing their enrollment in the FCCS.

Exhibit I shows, for each FCAT level, the percentage of community college students who passed the CPT. The majority of students who scored at least a 4 on the FCAT passed the mathematics section of the CPT. Those who scored at least a 3 on the FCAT passed the reading section of the CPT.

Exhibit I
Percentage of Community College Students Passing
the Mathematics or Reading Sections of the CPT, by FCAT Level

FCAT Levels	CPT Section	
	Mathematics ¹	Reading ²
1	5.5%	12.9%
2	15.0%	44.0%
3	31.1%	74.8%
4	60.1%	92.5%
5	90.4%	94.7%

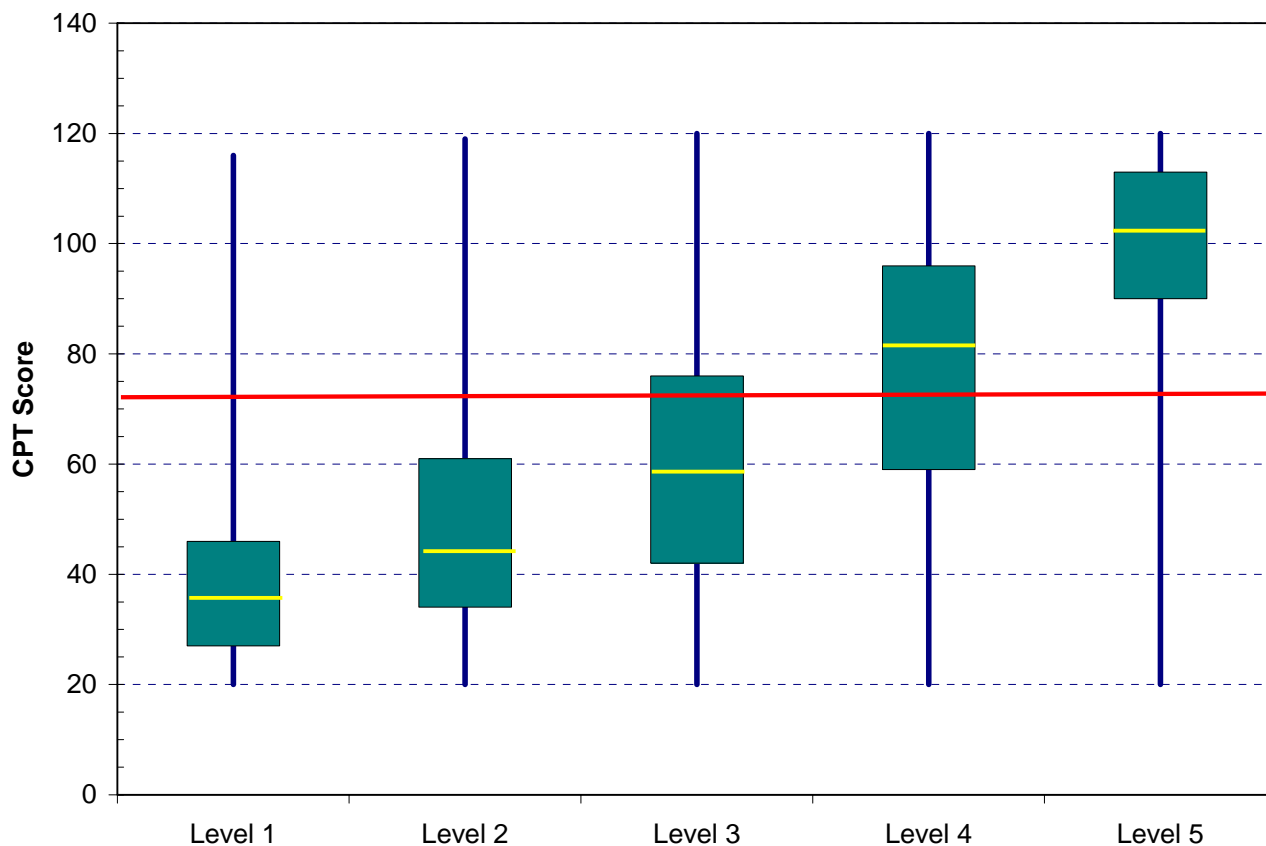
Source: Student Data Base and Education Data Warehouse, 2004.

¹CPT passing score for mathematics is 72.

²CPT passing score for reading is 83.

The boxplot charts seen in Exhibits II and III are a graphic representation of this phenomena. The red line represents the CPT passing score. The yellow lines represent the median score on the CPT for community college students who scored at that level on the FCAT. For instance, for students who scored a level 1 on the FCAT, the median score was 35; half of the students scored higher than that and half scored lower. The thick, vertical blue lines represent the highest and lowest CPT scores by a student within that FCAT level. Level 2 is the level required to graduate from high school.

Exhibit II
FCAT Levels by CPT Mathematics Scores



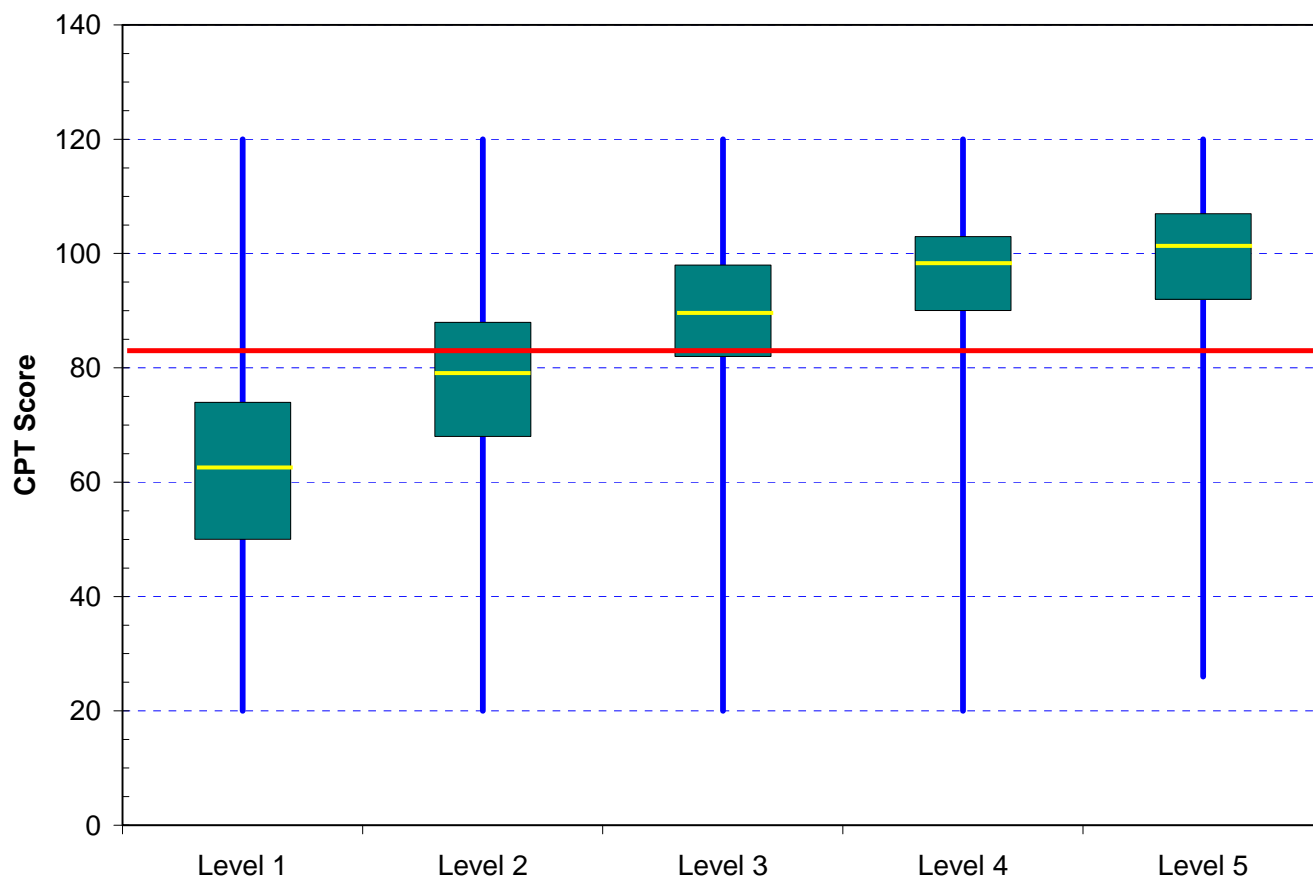
Source: Student Data Base and Education Data Warehouse, 2004.

Exhibit II (Math) shows that the knowledge required to achieve a level 2 score to graduate from high school is not enough for most students to enter college without needing remediation. Students earning a level 4 on the FCAT are the first group to have a median CPT score higher than that required to pass the math section of the CPT.

Exhibit III (Reading) is similar to that of Exhibit II. However, with reading, the median score of level 2 students is very close to the passing score for the reading section of the CPT. Students scoring a level 3 or higher on the FCAT generally pass the reading section of the CPT.

One important point for both Exhibits II and III is that the FCAT is a test taken in the 10th grade. Students do have the opportunity in grades 11 and 12 to fulfill courses that will help them succeed in postsecondary education. This helps explain why a few students scoring low on the FCAT will pass the reading and/or math sections on the CPT.

Exhibit III
FCAT Levels by CPT Reading Scores



Source: Student Data Base and Education Data Warehouse, 2004.

FCAT and High School Courses. How does high school coursework affect FCAT scores? One question to consider when analyzing the relationship between FCAT scores and high school courses taken is how did a student taking accelerated math score on the FCAT versus a student taking general math? To analyze this question, the Division of Community Colleges and Workforce Education (DCCWE) developed a course leveling system.

Exhibit IV shows the course leveling system for both mathematics and language arts ("reading") high school courses. Courses listed in the Florida Course Code Directory as "Basic Education Senior High/Adult" were categorized to create the leveling system. However, courses that are traditionally low enrollment courses were excluded from the analysis so that it would represent the "typical" high school experience. For a complete listing of the courses used and the levels assigned, please see Appendix A.

Exhibit IV High School Course Leveling System for Mathematics and Reading

MATHEMATICS

General Math – Courses that are Algebra I and below. None of these courses have the “Honors” designation.

Honors Math – Courses that are Algebra I and below have the “Honors” designation.

Higher Level Math – Courses that are Algebra II and above, but do not have “Honors,” “AP¹,” or “IB” designations. These courses generally include Geometry, Trigonometry, Pre-Calculus, Calculus, and AICE Math Courses.

Honors Higher Level Math – Courses that are Algebra II and above with the “Honors” designation, but do not have “AP” or “IB” designations. These courses generally include Geometry, Trigonometry, Pre-Calculus, and Calculus.

Accelerated Math – Courses that have an “AP” or “IB” designation, allowing students to earn college credit.

READING

Basic/Remedial Reading – Courses that are designated “English Skills.”

General Reading – Courses that are English I-IV and literature courses. These courses do not have the “Honors” or “AICE” designation.

Honors Reading – Courses that are English I-IV and literature courses. These courses have the “Honors” or “Pre-AICE” designation.

Accelerated Reading – Courses that have the “AP,” “IB,” or “AICE” designation, allowing students to earn college credit.

Source: Florida Department of Education, Division of Community Colleges and Workforce Education, 2004.

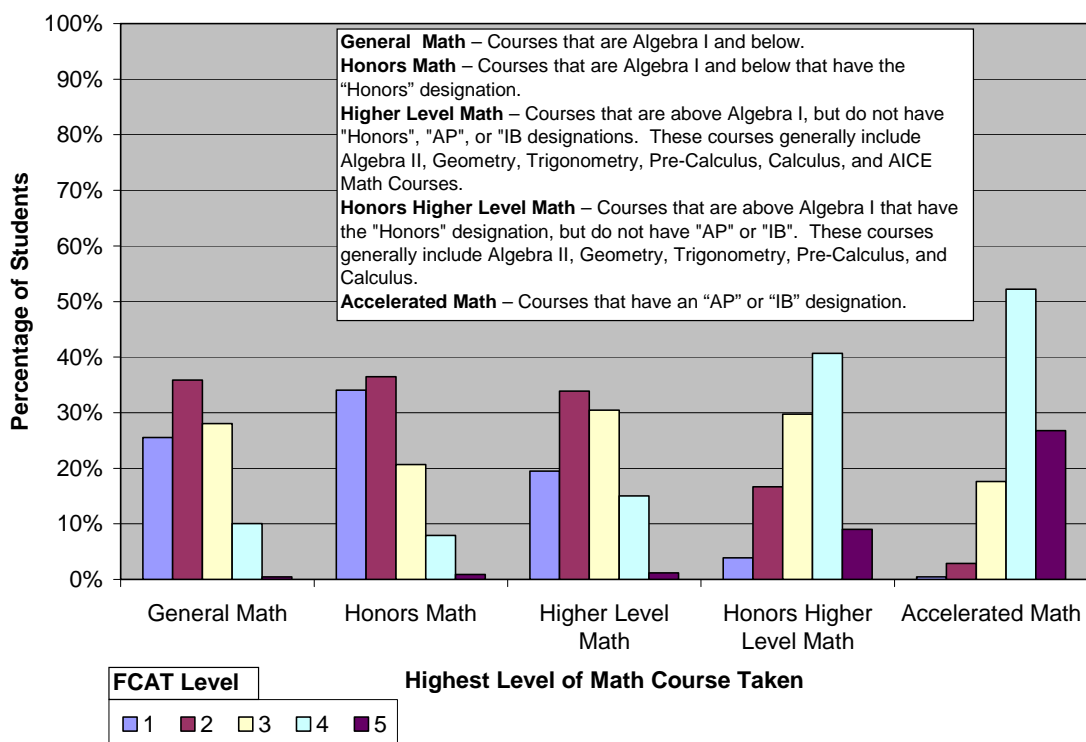
After leveling the courses, each course taken by a student was assigned the corresponding level. The courses were then analyzed against the FCAT score to determine what level of courses students took who scored high on the FCAT versus those who scored low. The theory was that those students who scored low took more basic/remedial and general courses and those who scored high took the higher level and accelerated courses.

Exhibits V (Math) and VI (Reading) show that for both math and reading, the theory holds true. In math, the majority of students who took honors higher level math or accelerated math scored a 4 or 5 on the FCAT. Students who took general math or honors math for Algebra I or lower generally scored a 1 or 2 on the FCAT.

Exhibit VI shows this premise even more clearly. No one in basic/remedial reading scored a 4 or 5 on the FCAT. Those students generally scored a 1 or 2 and a few scored a 3. On the flip side, the majority of students who were in accelerated reading scored 3 or higher.

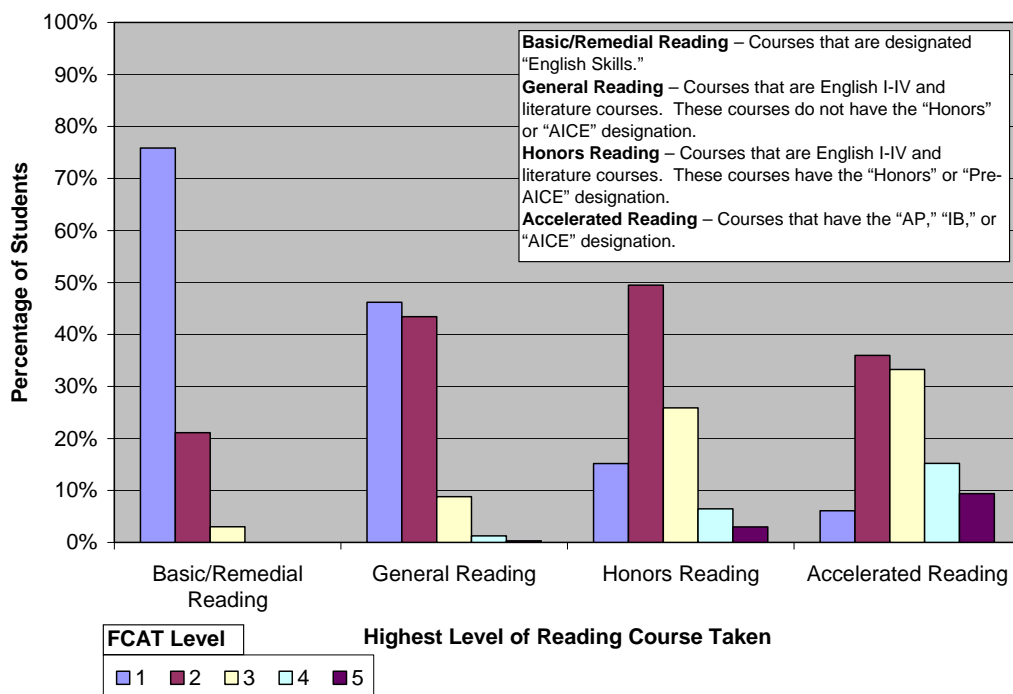
¹ “AP” refers to Advanced Placement, “IB” refers to International Baccalaureate, and “AICE” refers to Advanced International Certificate of Education.

Exhibit V FCAT Level, by High School Mathematics Courses



Source: Student Data Base and Education Data Warehouse, 2004.

Exhibit VI FCAT Level, by High School Language Arts Courses



Source: Student Data Base and Education Data Warehouse, 2004.

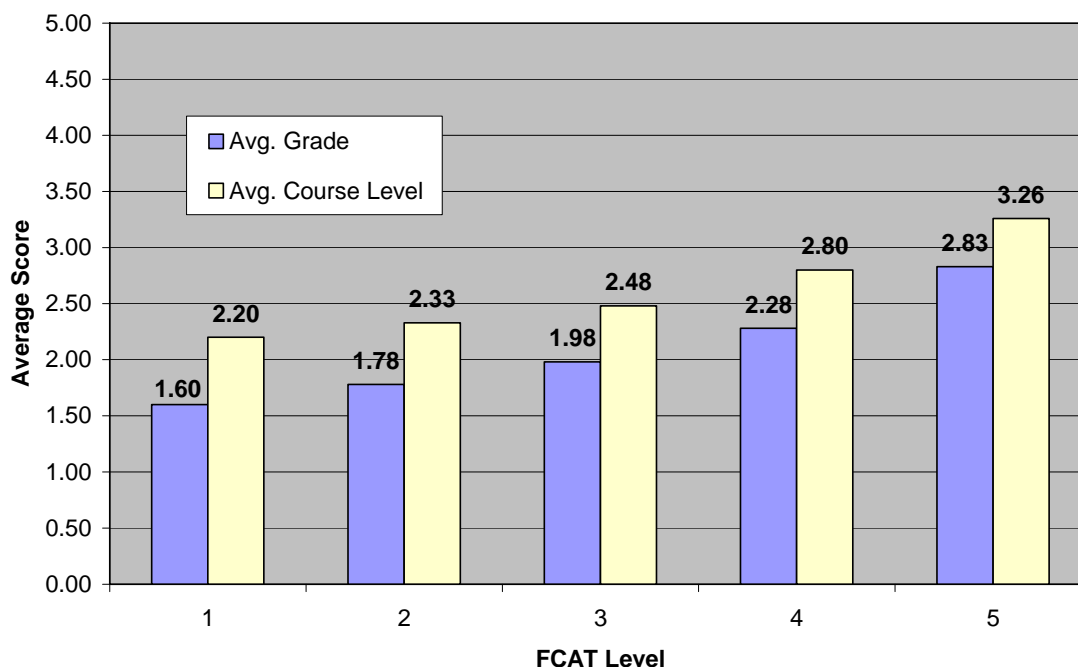
Additional analysis of course levels was conducted. An overall picture of grades and course levels by FCAT level was developed. The average grade was calculated on a 4-point scale where A=4, B=3, C=2, D=1, and F=0. Additionally, the average course level was calculated. For math, the course levels were on a 5-point scale where Accelerated=5, Honors Higher Level=4, Higher Level=3, Honors=2, and General=1. For reading, the course levels were on a 4-point scale where Accelerated=4, Honors=3, General=2, and Basic/Remedial=1.

As expected, in math, the average grade and average course level increases as the FCAT level increases (see Exhibit VII). The average grade for FCAT level 1 is 1.60. For a student scoring level 5, the average grade is up to 2.83. That is more than a one letter grade increase. The same holds true for the courses. Level 1 students have a 2.20 level of difficulty (between Honors and Higher Level) on math courses. Whereas, level 5 students have a 3.26 level of difficulty (between Higher Level and Honors Higher Level) on math courses.

Reading grades and course levels follow a similar pattern (see Exhibit VIII). Students who scored a level 1 on the FCAT had an average grade of 2.15 and, on average, took courses in the "general" category. Whereas, students who scored a level 5 on the FCAT had an average grade of 2.76 and, on average, took courses in the "general" and "honors" categories.

Exhibit VII

Average Grade and Average Course Level in Mathematics High School Courses, by FCAT Level

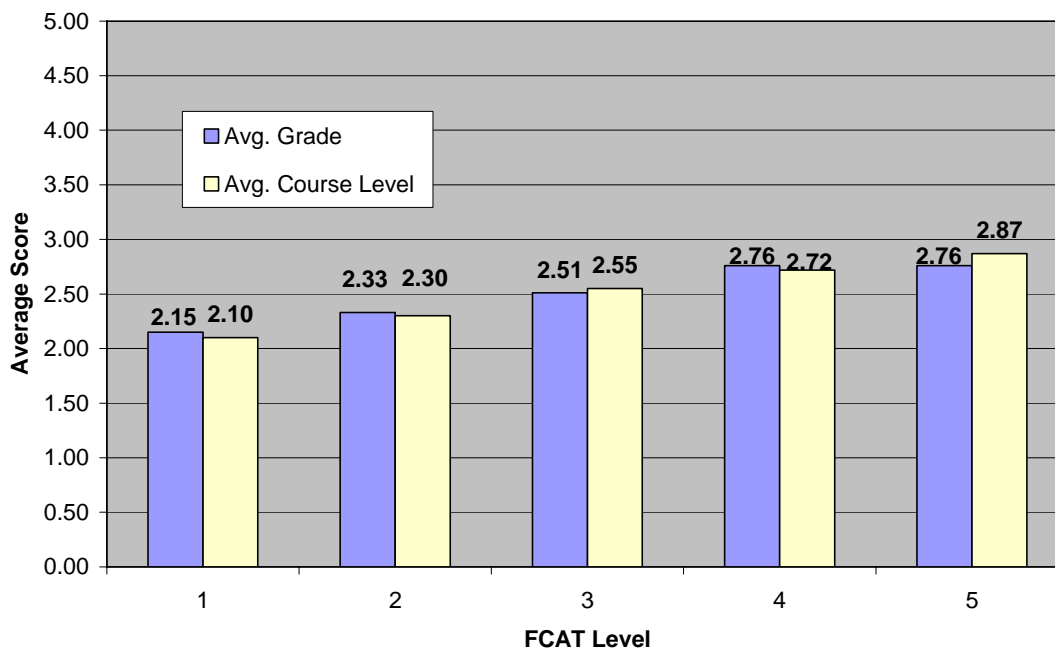


Grade Categories are: A=4, B=3, C=2, D=1, F=0

Course Levels are: General=1, Honors=2, Higher Level=3, Honors Higher Level=4, Accelerated=5

Source: Student Data Base and Education Data Warehouse, 2004.

Exhibit VIII
Average Grade and Average Course Level in Reading High School Courses, by FCAT Level



Grade Categories are: A=4, B=3, C=2, D=1, F=0

Course Levels are: Basic/Remedial=1, General=2, Honors=3, Accelerated=4

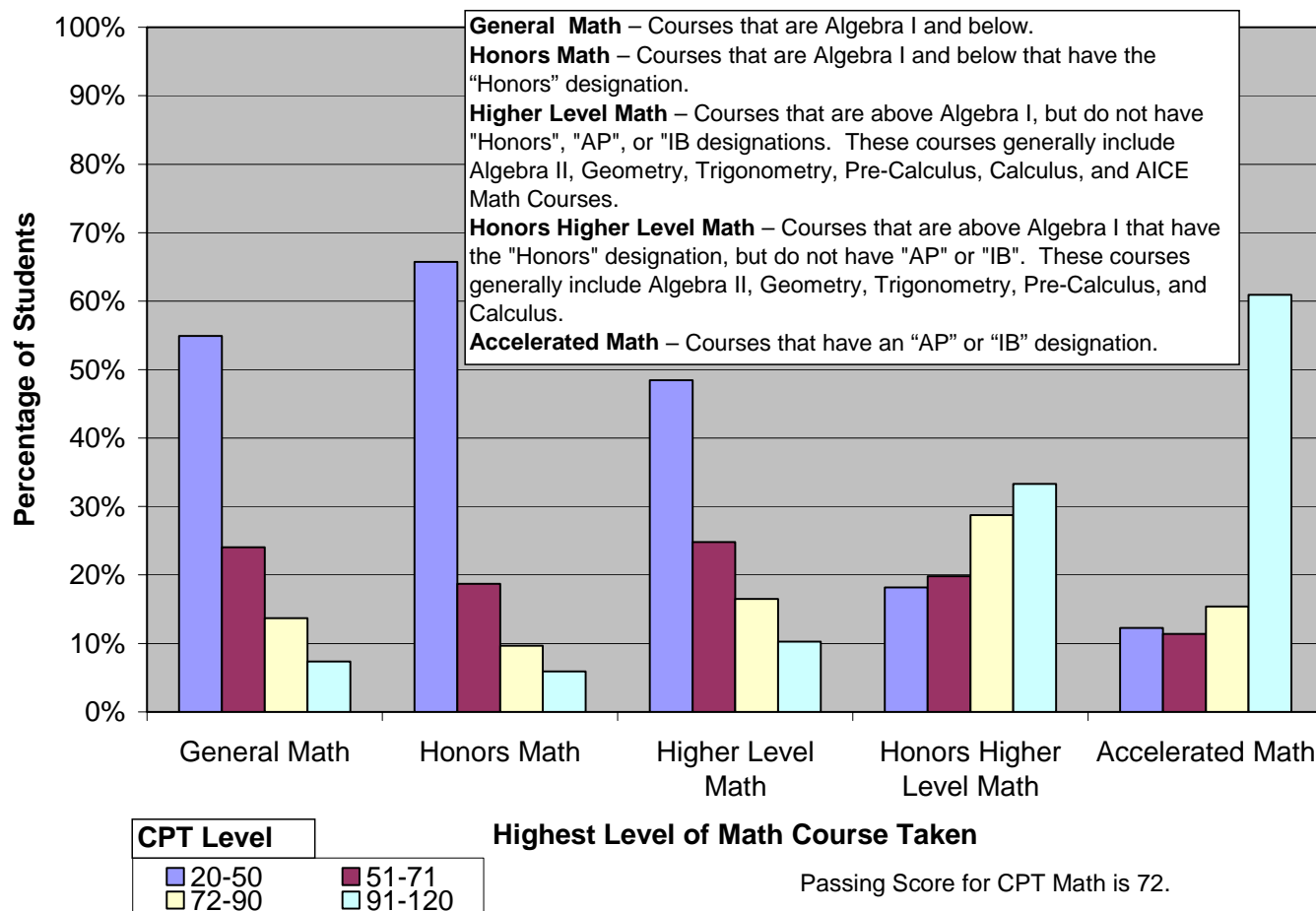
Source: Student Data Base and Education Data Warehouse, 2004.

CPT, High School Courses, and the FCAT. When students begin their postsecondary education at a community college, they must take the CPT, unless they exempt out via ACT/SAT scores, to determine if remediation is required. Students scoring at or above the required score for an area can begin immediately taking credit courses in that area. Students scoring below the cut score for an area must successfully complete the required college preparatory (College Prep) classes in that area before taking credit courses in that area. Two parts of the CPT—mathematics and reading—were examined in this analysis. This section will show the relationship between the CPT, high school courses, and the FCAT.

CPT and High School Courses. Much like the analysis conducted at the FCAT level, the course leveling system was used to determine the relationship between the level of high school courses taken and the subsequent score on that section of the CPT. The passing score for the math section of the CPT is 72 and for the reading section is 83.

Exhibit IX demonstrates that students taking lower level math courses (Algebra I or lower) generally score below the cut score in math. More students taking higher level math (Algebra II or higher) score above the cut score. However, the trend of *most* students scoring above the cut score does not occur until the honors higher level math and accelerated math course levels. For success on the math section of the CPT, students need to take the most advanced math courses offered in high school.

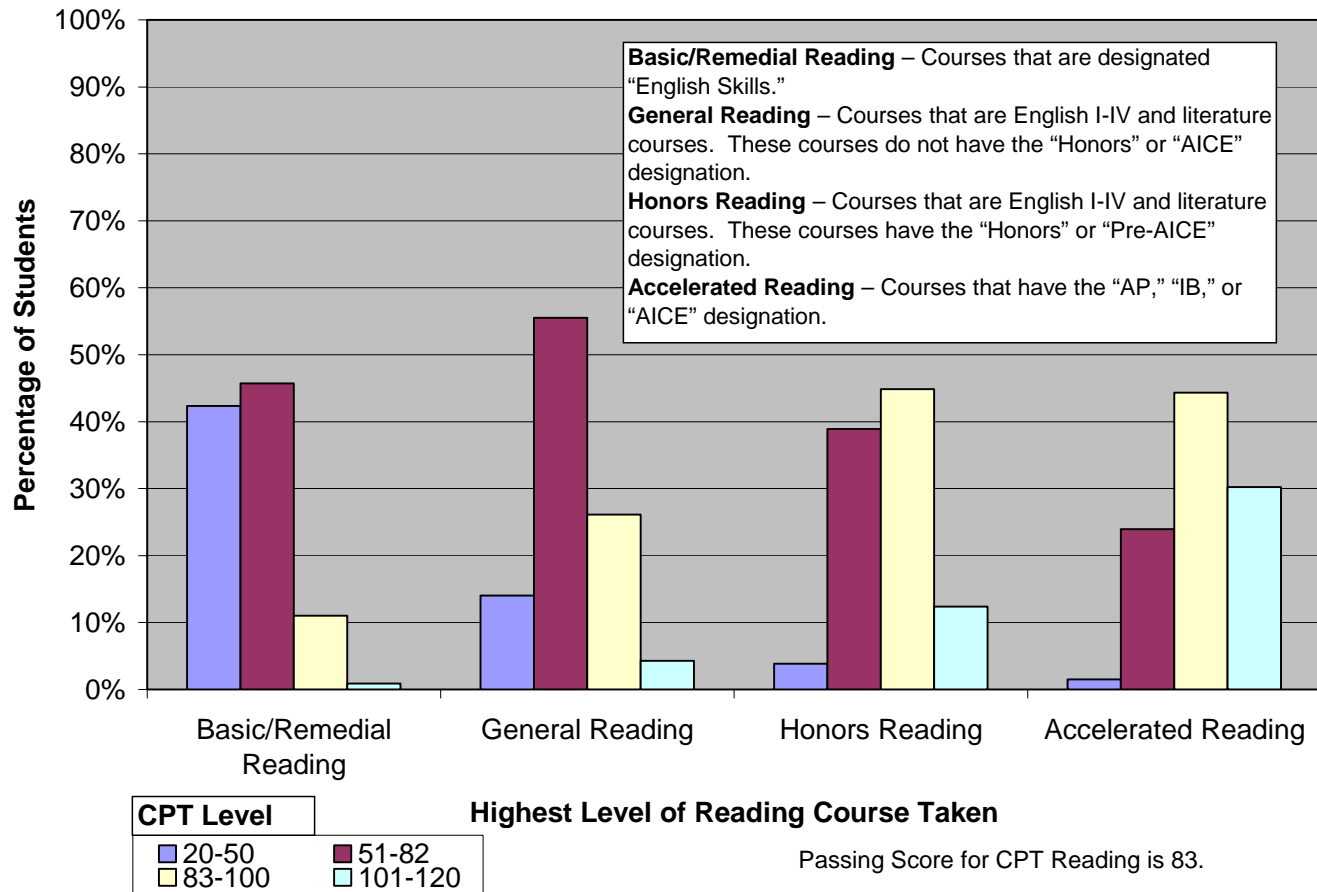
Exhibit IX CPT Level, by High School Mathematics Course Level



Source: Student Data Base and Education Data Warehouse, 2004.

A similar situation occurs for students in reading courses. Those taking basic/remedial courses and general reading courses tend to score below the reading cut score, while those taking honors and accelerated reading courses tend to score above the reading cut score (see Exhibit X).

Exhibit X CPT Level, by High School Reading Course Level



Source: Student Data Base and Education Data Warehouse, 2004.

Just like with the FCAT, an overall analysis was conducted on the average grade and average course level taken for each CPT level. As expected, for both math and reading, the average grade increases as the score level on the CPT increases. For math, the average grade is 1.67 for students scoring 20-50 on the CPT. For those scoring 72-90 (the cut score range), the average grade is up to 2.15 and for those scoring well above the cut score (91-120), the average grade is 2.49. Similarly, in reading, the average grade for students scoring 20-50 was 2.14, while the average grade of those scoring well above the cut score (scores of 101-120) was 2.47.

The average course level taken in high school also increases as the scores on the CPT increase. In math, the range is from 2.28 (20-50 on CPT) to 2.84 (91-120 on CPT). For reading, the range is from 2.08 (20-50 on CPT) to 2.58 (101-120 on CPT). See exhibits XI and XII for a graphical representation.

Exhibit XI
Average Grade and Average Course Level in Mathematics High School Courses, by CPT Level

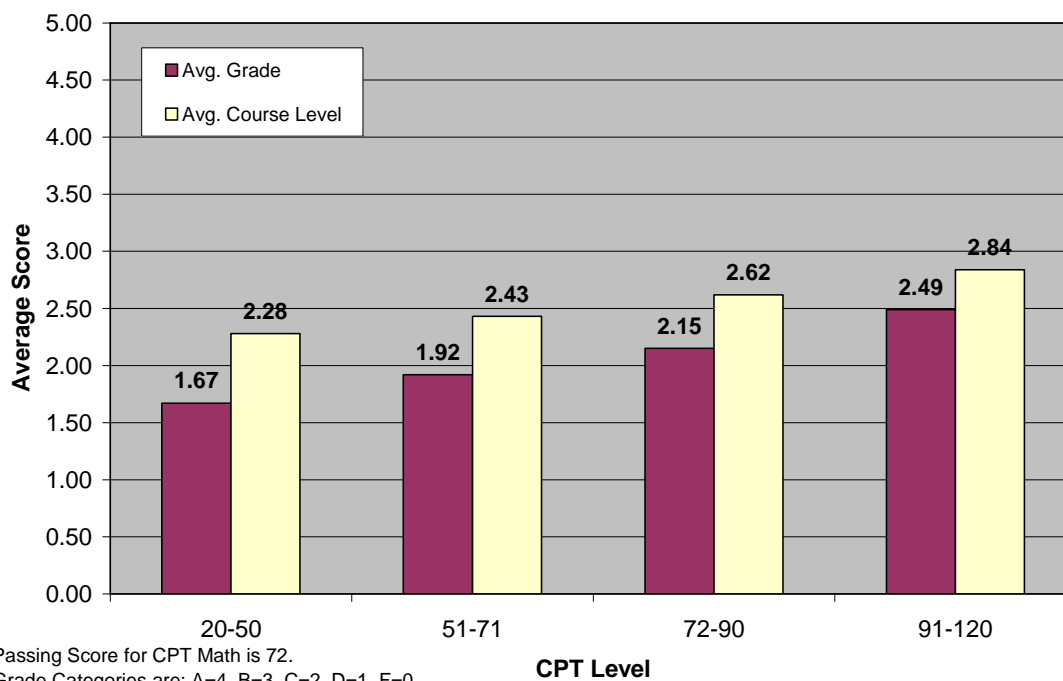
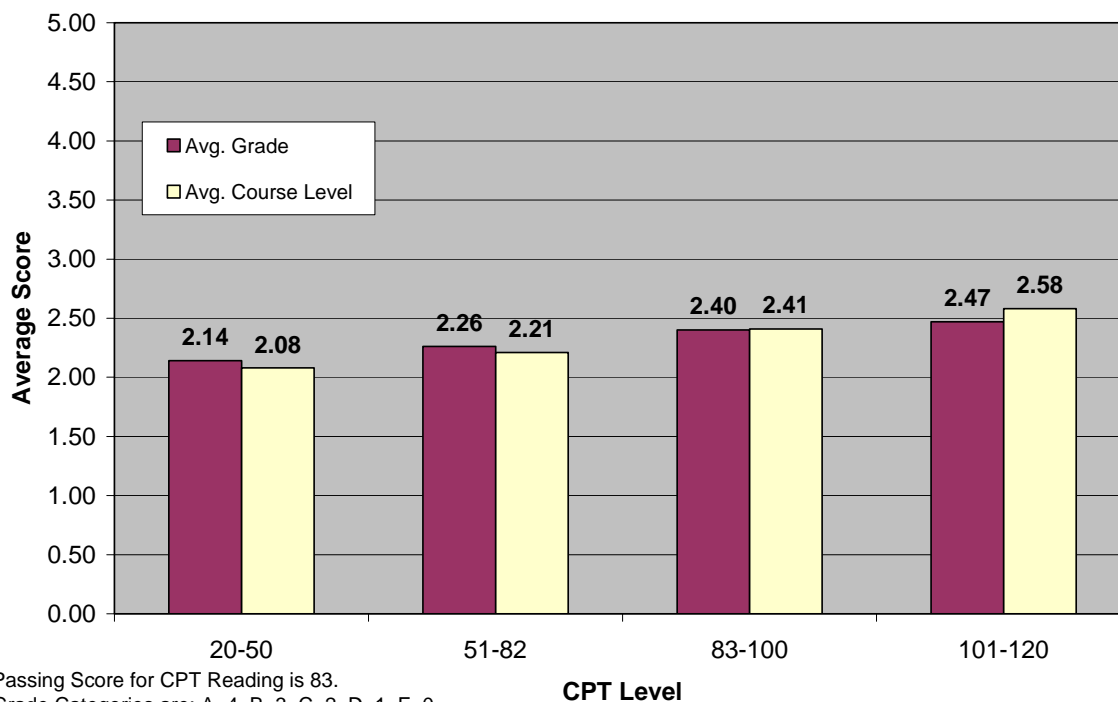


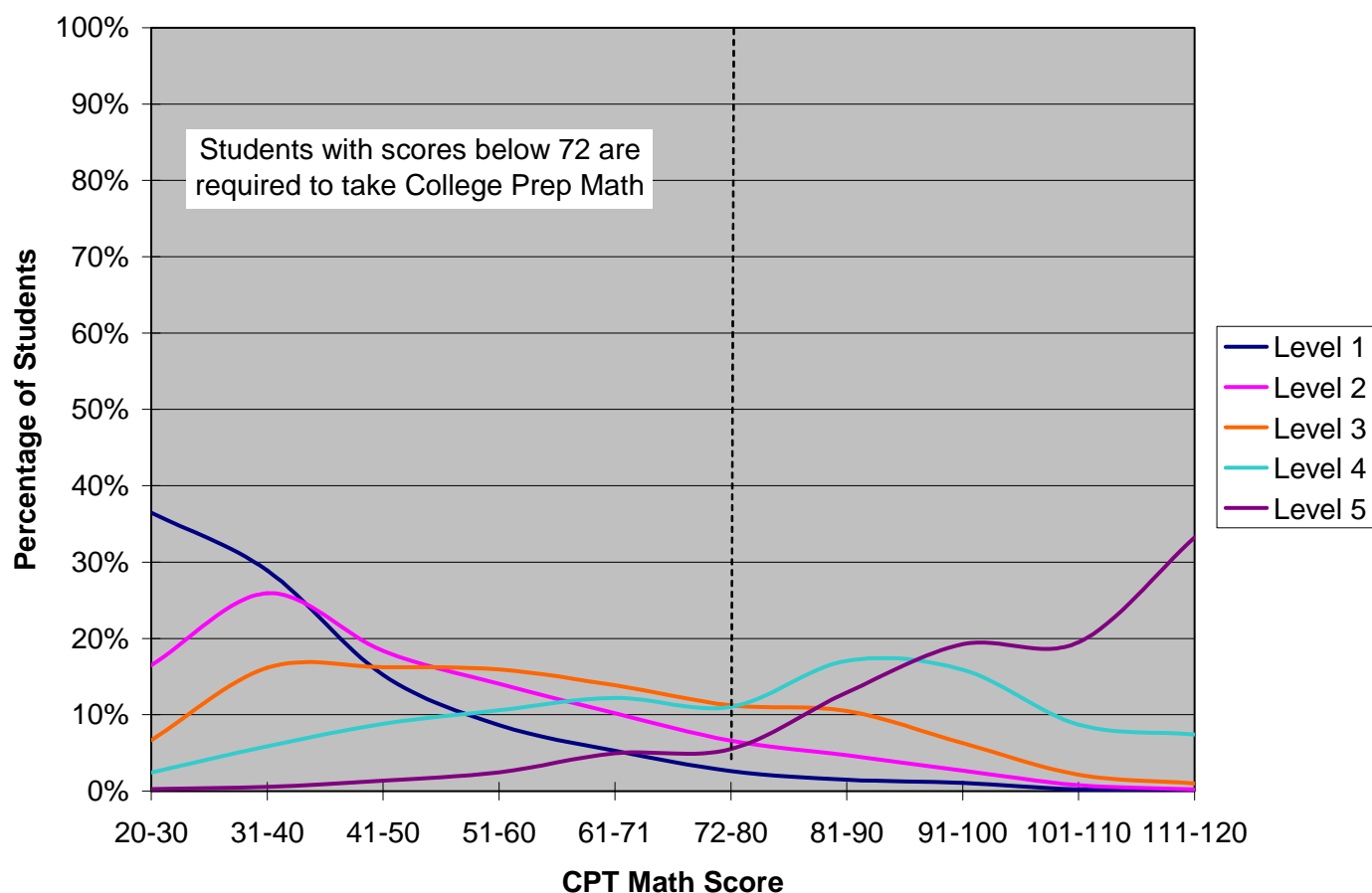
Exhibit XII
Average Grade and Average Course Level in Reading High School Courses, by CPT Level



CPT and FCAT Relationship. The relationship between a student's score on the FCAT and subsequent score on the CPT was discussed briefly at the beginning of this report. Exhibits XIII and XIV show that the higher levels earned on the FCAT tend to lead to higher levels earned on the CPT.

In Exhibit XIII, Level 1 (the blue line) starts out high on the left of the chart and then trends downward as the CPT score range increases. Level 5 (the purple line), conversely, starts out low on the left of the chart and gradually increases. The dotted line represents the cut score for the math section of the CPT. Students to the right of the dotted line are the students who do not require remediation in math.

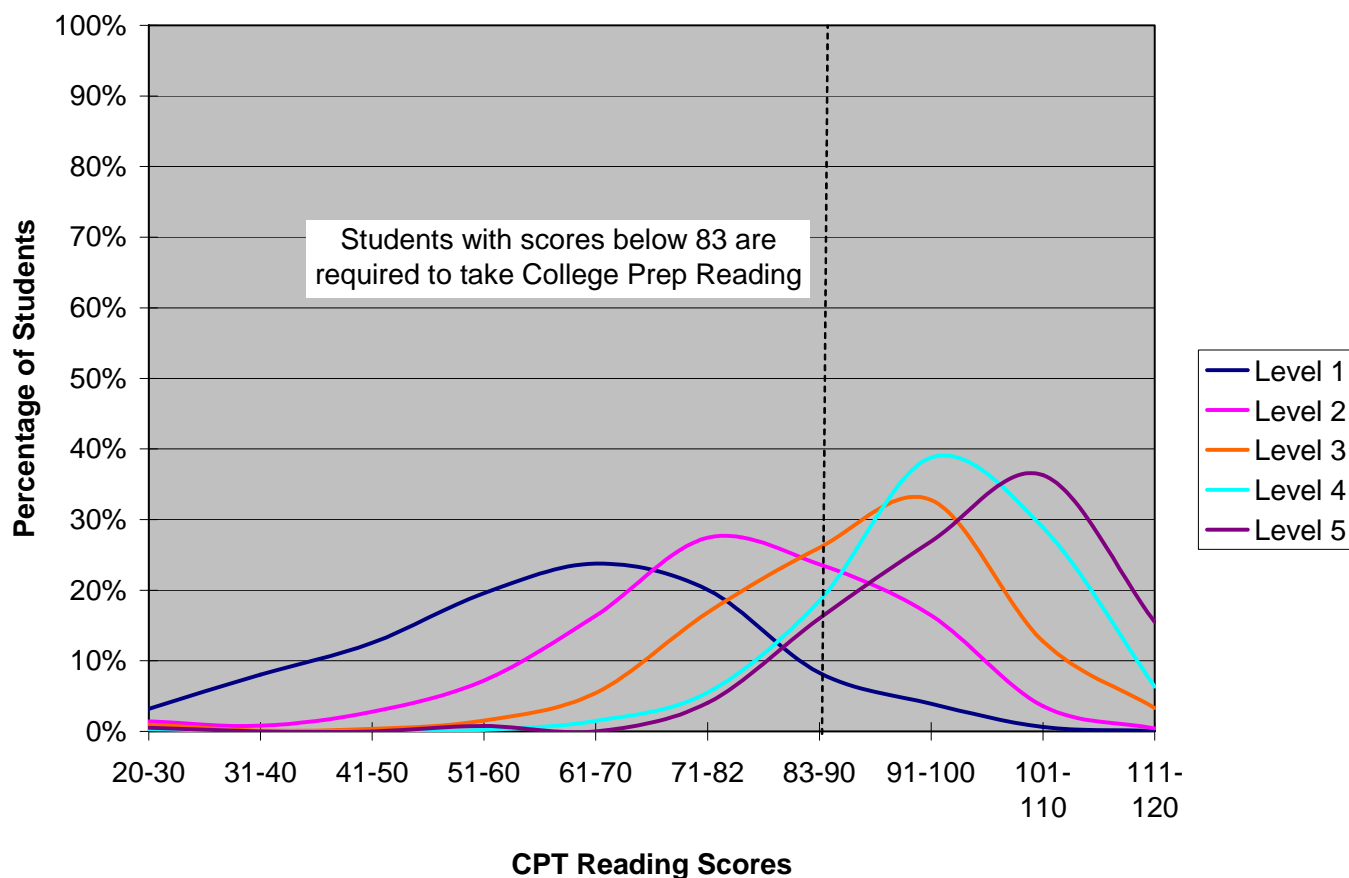
Exhibit XIII
CPT Math Scores by FCAT Math Levels



Source: Student Data Base and Education Data Warehouse, 2004.

Reading looks somewhat different from math, but the expectations still prove true. Almost no one (at any FCAT level) scored in the 20-30 range (see Exhibit XIV). All of the students, regardless of FCAT level, tended to trend upward as the scores increased towards the cut score of 83. However, in reading, the picture after the cut score (to the right of the dotted line) is the interesting portion. Those students scoring level 1 (blue line) or level 2 (pink line) begin trending downward just before the cut score so that only a few students are passing the CPT. Whereas, those scoring level 3 or above on the FCAT did not peak until after the cut score, meaning that those scoring level 3 or above tend to pass the CPT.

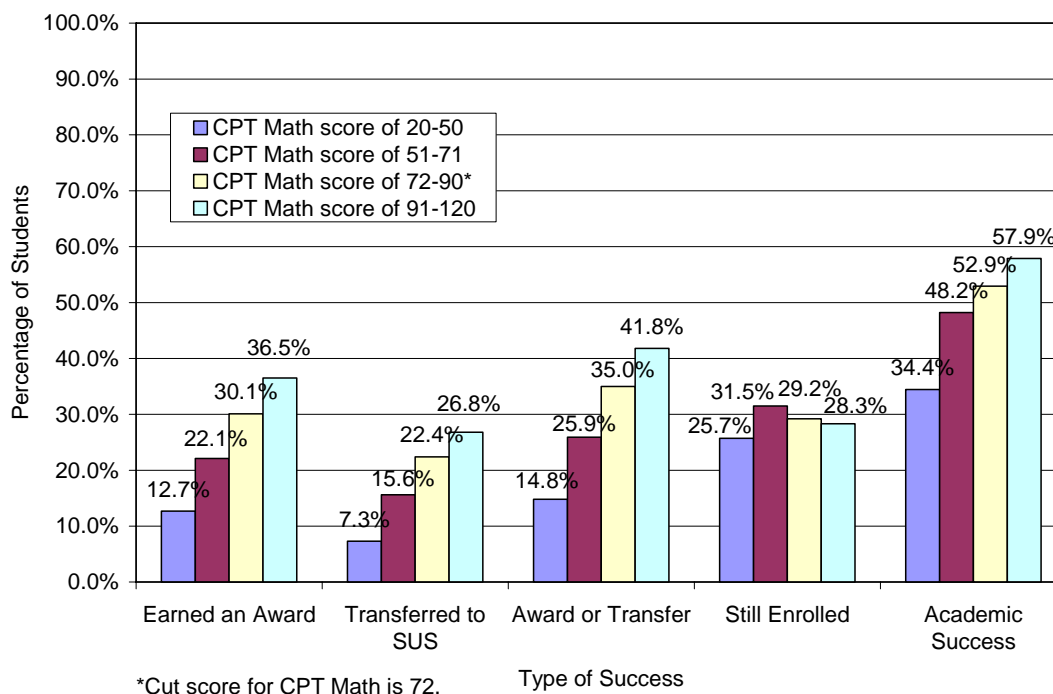
Exhibit XIV
CPT Reading Scores by FCAT Reading Levels



Source: Student Data Base and Education Data Warehouse, 2004.

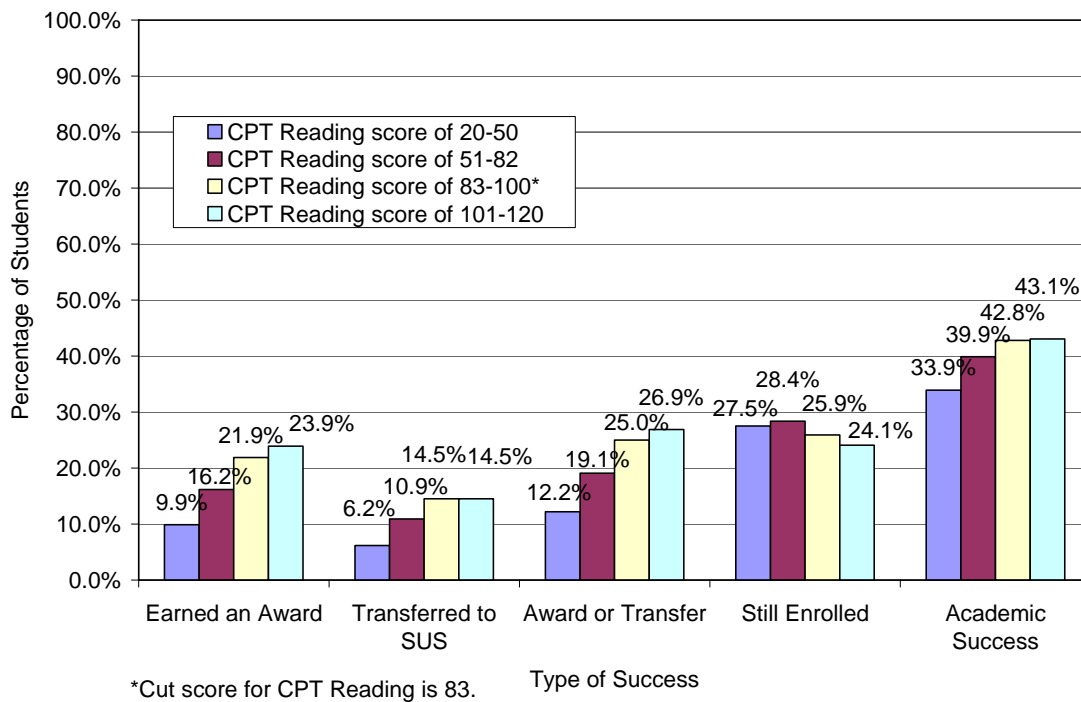
CPT and Academic Success at the Community College Level. Academic success at the community college level is defined as earning an award (degree or certificate), transferring to the SUS, or still enrolled. An analysis of a cohort of 1999 first-time-in-college students will show the relationship between the score on the CPT and academic success at the community college level. The expectation is that students who pass the CPT (72 or higher for math and 83 or higher for reading) are more academically successful than their counterparts who require remediation. Exhibits XV and XVI provide evidence that the expectation is correct.

Exhibit XV Academic Success by CPT Math Scores



Source: Student Data Base and Education Data Warehouse, 2004.

Exhibit XVI Academic Success by CPT Reading Scores



Source: Student Data Base and Education Data Warehouse, 2004.

Exhibit XV shows that 30.1% of students who scored 72-90 on the math section of the CPT and 36.5% of students who scored 91-120 earned an award after 5 years. Conversely, less than one-fourth of students who failed the math section of the CPT earned an award in the same time period. Additionally, a greater percentage of students who passed the math section transferred to the SUS than of those who failed that section. Overall, 35% of those who scored 72-90 and 42% of those who scored 91-120 either earned an award or transferred to the SUS. This is compared to 15% of those who scored 20-50 on the math section. It is a positive that the percentage of students still enrolled does not vary much among the math CPT score ranges because this means that even those students who require additional help at the beginning of their community college experience are being retained in the FCCS.

Exhibit XVI demonstrates a similar situation for reading. Less than 10% of students who scored 20-50 on the reading section of the CPT earned an award after 5 years. Conversely, more than 20% of those who passed the reading section of the CPT earned an award during the same time period. The same phenomena occurs for transferring to the SUS—6% of students with reading scores of 20-50 juxtaposed against 14.5% of students with passing reading scores. The biggest difference, however, is the overall picture. Only 12% of students with reading scores of 20-50 either earned an award or transferred to the SUS. More than 25% of students with passing reading scores had at least one of these academically successful outcomes. Much like the percentages for math, the percentage of students still enrolled does not vary much among the different reading CPT score ranges.

Conclusion. This report provides evidence to the theory that high school preparation matters. In this study, we found that:

- Students who take higher level reading and math courses more often score 3 or higher on the FCAT.
- Students who score 3 or higher on the FCAT more often pass the math and reading sections of the CPT.
- Students who pass the math and reading sections of the CPT are more successful academically than their College developmental education counterparts.

Therefore, academic success at the postsecondary level begins with higher level preparation at the secondary level. The need for more rigorous high school and middle school coursework has been recognized by both the Governor and the Department of Education. Initiatives to support this include the Governor's A+ Plan, and the State Board of Education's and Department of Education's middle school and high school reform proposals. The Governor's A+ Plan has been in place since 2000. The A+ Plan is designed to provide:

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This study relates to Florida Department of Education's *Strategic Imperative 2: Set, Align and Apply Academic Curricular and Testing Standards*, and to *Strategic Imperative 3: Improve Student Rates of Learning*.

For more information on this study, please contact Dr. Pat Windham via telephone at (850) 245-9482 or via email at Pat.Windham@fldoe.org.

Crisis at the Core: Preparing All Students for College and Work, Executive Summary, ACT, 2004.
<http://www.act.org/path/policy/index.html>

More information on the Governor's A+ Plan can be found at
<http://www.myflorida.com/myflorida/government/governorinitiatives/aplusplan/index.html>.

More information on Middle School Reform can be found at www.flmiddlegradesreform.com.

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Appendix A Course Leveling System

LANGUAGE ARTS COURSES

Course Number	Course Title	Course Level
1001300	English Skills I	1
1001310	English I	2
1001320	English Honors I	3
1001330	English Skills II	1
1001340	English II	2
1001350	English Honors II	3
1001360	English Skills III	1
1001370	English III through ESOL	2
1001380	English Honors III	3
1001390	English Skills IV	1
1001400	English IV	2
1001410	English Honors IV	3
1001420	AP English Lanaguage and Composition	4
1001430	AP English Literature and Composition	4
1001440	Business English I	2
1001450	Business English II	2
1001500	Pacesetter Language Arts	3
1001510	Pacesetter English I	3
1001520	Pacesetter English II	3
1001530	Pacesetter English III	3
1001540	Pacesetter English IV	3
1001550	AICE English Language	4
1001560	Pre-AICE English Language	3
1001800	English I - Pre IB	3
1001810	English II - Pre IB	3
1001820	English III - IB	4
1001830	English IV - IB	4
1002300	English I through ESOL	2
1002310	English II through ESOL	2
1002320	English III through ESOL	2
1002520	English IV through ESOL	2
1004310	AICE Thinking Skills	4
1005300	World Literature	2
1005310	American Literature	2
1005320	British Literature	2
1005330	Contemporary Literature	2
1005370	AICE English Literature	4
1005380	Pre-AICE English Literature	3
102081A	American Literature Honors	3
102081B	British Literature Honors	3
102081D	Contemporary Literature Honors	3
102081E	World Literature Honors	3

English Levels

1	Basic/Remedial
2	General
3	Honors
4	Accelerated

Appendix A Course Leveling System

MATHEMATICS COURSES

Course Number	Course Title	Course Level
1200400	Intensive Math	1
1200300	Pre-Algebra	1
1200310	Algebra I	1
1200320	Algebra I Honors	2
1200330	Algebra II	3
1200340	Algebra II Honors	4
1200370	Algebra IA	2
1200380	Algebra IB	2
1200500	Pacesetter Mathematics I	3
1200510	Pacesetter Mathematics III	3
1202300	Calculus	3
1202310	AP Calculus AB	5
1202320	AP Calculus BC	5
1202340	Pre-Calculus	3
1202350	Pacesetter Mathematics IV	3
1202360	AICE Mathematics	5
1202370	AICE Further Mathematics	5
1202800	Calculus - IB	5
122081B	Multivariate Calculus	3
122081A	Differential Equations	3
1205400	Applied Mathematics I	1
1205410	Applied Mathematics II	1
1205420	Applied Mathematics III	1
1206300	Informal Geometry	3
1206310	Geometry	3
1206320	Geometry Honors	4
1206330	Analytic Geometry	3
1206400	Pacesetter Mathematics III	3
1206800	Analytic Geometry - IB	5
1207310	Integrated Mathematics I	1
1207320	Integrated Mathematics II	1
1207330	Integrated Mathematics III	1
129830A	Advanced Topics in Mathematics	3
1209800	Mathematics Studies - IB	5
1210300	Probability & Statistics with Applications	3
1210320	AP Statistics	5
1210330	AICE Mathematics Statistics	5
1211300	Trigonometry	3
1211800	Trigonometry - IB	5
122091A	Discrete Mathematics	3

Math Levels

1	Regular
2	Honors
3	Higher Level Math
4	Honors Higher Level Math
5	Accelerated Math