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Bringing Research to Policy and Practice
POLICY RESEARCH REPORT: IERC 2005-3

The Demographics and Academics of College Readiness in Illinois

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Executive Summary

Evidence is growing that state and national economic strength is increasingly dependent on an educated workforce, and that some postsecondary education is needed for a growing number of employment opportunities. Furthermore, the skills and knowledge required in the workplace are no longer very different from those needed for success in college. Employers seek well-educated and committed employees. At the July 2005 National Commission for Teaching and America's Future annual meeting, Robert Wehling, former Global Marketing Officer for The Procter & Gamble Company, told the assembled audience in Denver that the exodus of U.S. jobs abroad was not to utilize cheap labor, but to access highly educated and conscientious workforces that were not available in the U.S. The federal government urges states to "leave no child behind" and requires them to monitor progress in raising levels of U.S. student performance over time. But performance gaps continue to persist between different economic and racial/ethnic groups, even among those who reach the bar of high school graduation. Such discrepancies threaten not only Illinois' and the country's economic strength, but also the social contract of our education system to provide all students with opportunities to maximize their learning potential (and thus their earning potential) unfettered by the economic or racial/ethnic characteristics of their families.

The skills and knowledge required in the workplace are no longer very different from those needed for success in college.

The Illinois Longitudinal Study of the Class of 2002

In order to help Illinois policymakers and education administrators assess whether its public high school graduates are ready to enter and succeed in college, and to pinpoint some opportunities for improvement, the Illinois Education Research Council is undertaking a six-year longitudinal study following the Illinois Class of 2002 from public high school to college. We will be providing results in a series of upcoming reports. This first report addresses the readiness of the Class of 2002 for college. The next report in this series will address who went to college in the first academic year after high school (2002-2003). A third report will provide results on persistence in college, transfer and discontinuation during the first two years after high school (through 2003-2004). Two additional reports are anticipated at the fourth and sixth years after high school graduation.

About one third of the Class of 2002 was ready for college

In this first report on the demographics and academics of college readiness in Illinois we show that about one third of the Class of 2002 was ready for college work at a four-year institution, about one third were not/least ready, and one third were in between – somewhat ready for college. It will not be surprisng to learn that readiness was not equally distributed by race/ethnicity and family income. About half or more of Native American, black and Latino students were in the not/least ready category compared to about one in five Asian and white students. We found that while readiness rates increased as family income increases for each racial/ethnic group, black and Latino students still lag behind. Even among black and Latino students from high-income families, almost one third fell into the not/least ready category, compared to 6% of Asians and 11% of white students. These simple descriptive statistics paint a picture that is familiar across the nation and underlie some of the concerns to close the achievement gap through initiatives such as No Child Left Behind nationally, and the recent legislation to increase Illinois' high school graduation requirements. But improvements are hard to accomplish in practice. We turned to a complementary line of inquiry regarding school quality and course-taking that sheds additional light on the achievement gap and may provide evidence to stimulate discussion about possible policy interventions.

While readiness rates increased as family income increased for each racial/ethnic group, black and Latino students still lag behind.

School characteristics are related to readiness

The IERC has recently developed a Teacher Quality Index (TQI)—an average composite of schools' teacher attributes that research has shown to be related to student performance (described in detail in *The distribution of teacher quality in Illinois*, IERC 2005-1 and available on our website). We used the TQI to ask whether teacher quality helped to explain some of the gap in college readiness for the Class of 2002. What we found was quite striking: black students experience the most extreme inequality of access to high schools with high TQIs—24% of the Class of 2002 were in the high schools with TQIs in the lowest 10% statewide. This is compared to 10% of Latino and Native American students and 1% of Asian and white students. Even black students from high income families are less likely to be enrolled in higher TQI schools than other racial/ethnic groups. We found that the proportion of students ready for college consistently increases for each racial/ethnic group as school TQI increases even when we took other school characteristics (percent poverty and minority) into account. Benefit even accrues by being in schools with TQIs above the lowest quartile. While the mal-distribution of students among schools with different TQI helps to explain the readiness gap overall, the gap persists at each TQI quartile.

Black students experience the most extreme inequality of access to high schools with high TQIs – 24% of the Class of 2002 were in the lowest 10% of TQI high schools statewide. This is compared to 10% of Latino and Native American students and 1% of Asian and white students.

The math ladder matters

In order to test whether course-taking patterns help to explain the readiness gap, we looked at outcomes for students at different steps on the 'math ladder' (from Algebra I or less to Calculus), and at schools with different TQIs, by race/ethnicity. Our research confirmed earlier findings that college readiness increases as students take increasingly higher-level math courses. But all students, especially minority

students, suffer from being in schools with low TQIs, and the importance of TQI increases the higher up the math ladder students climb. Higher level math courses offered by schools with lower TQIs do not carry the same benefits as courses with the same titles offered by schools with higher TQIs. Taking school TQI into account reduces but does not close the previously observed gap between white and black and Latino minorities who take higher-level math courses. But the high concentration of black and to some extent Latino students in schools with lower TQIs, together with the diminished benefit of taking higher levels of math courses in these schools is, at least partially, responsible for the weaker overall readiness outcomes for these students.

Higher level math courses offered by schools with lower TQIs do not carry the same benefits as courses with the same titles offered by schools with higher TQIs.

School differences explain some but not all of the readiness gap

The different types of schools in which high school students study, measured by their schools' Teacher Quality Index, explains some but by no means all of the readiness gap that we see between black and Latino students compared to Asian and white students. Even when students take higher level mathematics courses, their readiness boost is muted when they are in lower TQI schools. This is especially true for minority students and those in the lowest quartile of TQI schools. It is important to recognize that low TQI schools are also very likely to be high poverty/high minority schools. Students in these high schools often bring with them deficits in prior preparation that compound the challenges teachers face. There are other factors that may continue to influence students' performance, such as teachers' expectations even within school type, the types of courses into which students are placed within a school, how teachers are distributed to classrooms within schools, as well as external pressures, such as need to work, family responsibilities and opportunities to study at home. What is clear, however, is that all students benefit from the opportunity to be exposed to a stronger cadre of teachers in their schools.

Recommendations

- ***Better information to students about life beyond high school:*** High school students need more help in making the connections between their high school academic experience and what they need to know for success in college and the workplace. Teachers and counselors will need to help students make the connection between a strong academic preparation and success in employment and life.
- ***More academic rigor:*** School policy makers and administrators need to pay much closer attention to the content of high school courses, and ensure that all students have sufficient opportunity to learn demanding content.
- ***Better teaching:*** It is critical that high school teachers have substantial facility with the subject(s) they are teaching so that they can stretch their students beyond what is typically "expected" in many schools.
- ***Increased opportunities to revamp high schools:*** There are many ideas emerging for change, but most share the essential characteristics that high schools need to provide more personalized environments and provide opportunities for students to make connections to the next stage of their life.

- ***Stronger articulation between high-school and college curricula:*** The new Illinois high school graduation requirements still fall short of Illinois' recommended college admission requirements. A Center for the Study of Education Policy (2005) report makes some useful recommendations that include the joint development of course content guidelines, that high school graduation requirements be aligned with college and university high-school course requirements for admission and the college general education curriculum, and that the state seek continuation of the incremental improvement of high school graduation requirements beyond the new curriculum.
- ***Safer school environments:*** Safety registers high on the list of concerns, not only for teachers, but also for students. Illinois policy makers and school administrators need to pay even closer attention to this aspect of schools.

Illinois' high school students deserve the best opportunity to gain the knowledge and skills they will need to become successful adults, parents and employees. The suggestions included here can help to move us forward. But they will fail if we do not also address the educational experiences that students have prior to high school. Middle-school reform is critical—students should not arrive in high school already 'left behind'. School leadership is critical to building a professional community, district leadership is critical to ensuring that resources are available and distributed in ways that help teachers in all their schools meet high standards of instruction, and state leadership is critical to providing appropriate funding and regulations that facilitate excellence. We need all of the pieces of the system working in unison to crack the 'college readiness' challenge.

ACKNOWLEDGEMENTS

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Introduction

The income gap between those who have some postsecondary education and those who do not increasingly represents the difference between being able to earn a living wage or not.

Evidence is growing that state and national economic strength is increasingly dependent on an educated workforce, and that some postsecondary education is needed for a growing number of employment opportunities (Carnevale and Desrochers, 2004). Furthermore, the income gap between those who have some postsecondary education and those who do not increasingly represents the difference between being able to earn a living wage or not. One of the goals of our education system is to provide all students with opportunities to maximize their learning potential (and thus their earning potential) unfettered by the economic or racial/ethnic characteristics of their families. The federal government urges states to "leave no child behind," and requires them to monitor progress in raising levels of student performance over time. The plethora of data that are now available illuminate performance gaps between different economic and racial/ethnic groups. Data show that even when students reach the high school graduation bar, they are differentially prepared to enter the workforce or college; and when they are equally prepared, some groups are still less likely than others to continue into postsecondary education.

The first report addresses the readiness of the Class of 2002 for college.

The IERC is undertaking a six-year longitudinal study following the Illinois public high school Class of 2002 to examine, for Illinois, how high school graduates are prepared for the next stages of their lives, and whether patterns of differential preparation along with background characteristics and high-school characteristics are related to entry into and success in postsecondary education. We will be providing results in a series of upcoming reports. This first report addresses the readiness of the Class of 2002 for college. It is important to note that it has been increasingly recognized that college readiness is also work readiness. Skills and knowledge required in the workplace are no longer very different from those needed for success in college (Somerville & Yi, 2002; The American Diploma Project, 2004). The next IERC report in this series will address who went to college in the first academic year after high school (2002-2003). A third report will provide results on persistence in college, transfer, and discontinuation during the first two years after high school (through 2003-2004). Two additional reports are anticipated at the fourth and sixth years after high school graduation.

Methodology

Data

In 2001, Illinois began administering the ACT test to all 11th graders in Illinois public schools as part of the Prairie State Achievement Exam (PSAE). Scores and background information were, for the first time, available for most public-school students who would be completing high school one year later, rather than just those who elected to take the test because they were expecting to apply to a postsecondary institution that asked for ACT scores. Not only do we have information on those who were not college-bound, at least in the short run, but also those who planned to enter the postsecondary sector through two-year institutions, which typically do not ask for ACT scores. We were able to receive a copy of the 2002 senior class data from ACT under shared data agreements with the Illinois Board of Higher Education and ACT. We refer to this cohort of public high school graduates as the Class of 2002.

Key Measures

➢ *Readiness Index*

The IERC readiness index is modeled on the work of Berkner and Chavez (1997) who categorized academic characteristics of high school seniors of 1992 from a national sample dataset (NELS:88) who were attending four-year institutions by 1994.[1] The IERC readiness index is a simplified version of this approach that combines information on students' ACT scores and GPA.[2] We apply the readiness index to all students in the cohort, not just those who attended a four-year institution in 2002-2003. The index has five levels—from not/least ready, through minimally ready, somewhat ready, more ready and most ready. In most tables, we combine "minimally" and "somewhat" ready into a single minimally/somewhat ready category, and "more" and "most" ready into a single more/most ready category to simplify the display of results. Figure 1 shows how the Class of 2002 is distributed within the matrix. Leaving the large percentage of students with low ACT scores who were also missing GPA data in the least-ready category was confirmed as appropriate when we examined college-going rates. They were less likely to continue than the minimally-ready group.

Some studies label all students above the "not-ready" category as "ready for college" (e.g., Cabrera and LaNasa, 2001). Others set a higher bar, one that more closely aligns with our more/most ready category (Greene and Forster, 2003; Greene and Winters, 2005). In practice, it may be that the first benchmark sets a threshold for success at any college, including two-year institutions, while the higher benchmark represents preparation needed to be successful at the four-year level. As we follow the Class of 2002 for six academic years (2002-03 through 2007-08), we will be able to empirically test these benchmarks in a large population of students.

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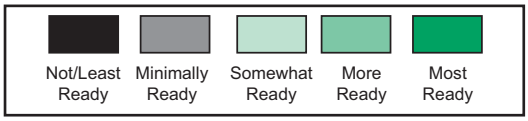
[1] Berkner and Chavez (1997) developed an approach to measuring students' readiness for college by attempting to model college admissions to four-year institutions. They looked at five measures of academic aptitude and achievement among graduating seniors in the National Education Longitudinal Study of 1988 (NELS:88) who attended four-year colleges or universities by 1994. Because of missing data, they classified seniors according to the highest level they had achieved on any of the five criteria (GPA, class rank, NELS test, SAT/ACT combined score) for which data were present. Thus they explained that their index approximated an admissions process that would only take into consideration applicants' strongest measure of academic performance. They categorized seniors based on whether any of their academic characteristics fell into the top 10%, 25%, 50% or 75% of four-year college students for that criterion. Those who had no score among the top 75% of four-year college students were labeled "marginally or not qualified." They adjusted placement among some categories for those who had taken or not taken a rigorous core academic program (four years of English, three years each of science, mathematics and social studies, and two years of foreign language). Their calculation yielded 36% not ready for college.

[2] We excluded high school rank since a growing number of schools, especially in Chicago, no longer provide high school rank. We did not adjust for those taking the ACT-recommended core courses because analysis showed that it added very little to patterns of college going after including ACT and GPA information. The distribution of students using the IERC Readiness Index is consistent with results from other studies that have examined college readiness.

Figure 1.
Index of College Readiness

	Self-Reported High School GPA				
	<=2.4	2.5 - 2.9	3.0 - 3.4	3.5 - 4.0	Missing
ACT <20	19.7%	8.0%	6.5%	1.9%	14.6%
20-22	3.1%	3.5%	5.2%	2.9%	4.0%
23-25	1.1%	1.7%	4.2%	4.8%	2.7%
26+	0.4%	0.8%	2.7%	9.5%	2.8%

Percentages show the distribution of the Class of 2002 within the matrix



➢ *Family Income*

Students who completed the ACT background questionnaire were also asked about their family income (defined as combined family income before taxes). About two-thirds of test-takers completed this question. We divided the known responses into four approximately equal quartiles as follows: lowest quartile (low income) = $0-$30,000; second quartile (lower-middle income) = $30,000-$50,000; third quartile (upper middle income) = $50,000–$80,000 and the highest quartile (high income) = $80,000 and above.

When we compared these categories to the distribution of income among the Illinois population, we found that the three lowest quartiles roughly aligned with the three lowest quintiles for the state as a whole. We also checked the accuracy of the self-reported family income at the regional level by comparing the percentage of students reporting that they were from low income families within a region to the percentage of students eligible for free or reduced-priced lunch reported in the Common Core of Data (CCD). We found that the two measures were very close in all six regions except Chicago Public Schools (CPS), where a substantially lower percentage of students reported that they were from low income families than indicated by the CCD (i.e., they were more poor than they reported). Research has shown that students tend to inflate their parents' income, but that the tendency is least for black and Latino students, and greatest for white and Asian students (Massey et al., 2003).

We would have liked to include a measure of students' parents' highest education level, since this has been found to be an important correlate of students' own academic success. Unfortunately, the ACT questionnaire did not ask for this information.

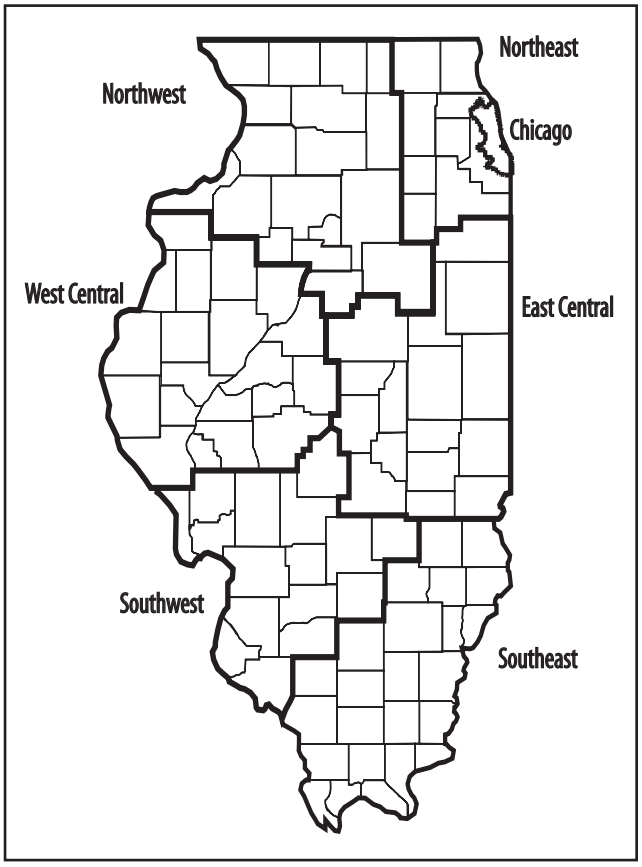
➢ *Race/Ethnicity*

Students in the Class of 2002 took the ACT as part of the PSAE and many completed a background questionnaire that asked them for their racial/ethnic background.

➢ *Region*

Since the data used for this study represent the population of Illinois public high school graduates statewide, we are able to compare and contrast results for different regions of the state. We use the six education regions of the Illinois State Board of Education, but in addition, we separate out Chicago Public Schools from the Northeast region because of that district's unique size. Figure 2 shows these regions.

Figure 2.
Education Regions in Illinois



➢ *School Quality*

In order to assess the "quality" of a student's school, we used a measure of teacher quality that has recently been developed by the IERC and based on previous research (DeAngelis et al., 2005). The measure is a composite school-level index for schools' average teacher quality (TQI), constructed using principal components analysis and including the percentage of teachers with bachelor's degrees from more-competitive colleges, percentage of teachers with less than four years of teaching experience, percentage of teachers with emergency or provisional credentials, percentage of teachers who failed the Illinois Basic Skills Test on the first attempt, average ACT composite score of teachers, and average ACT English scores of teachers. A higher TQI indicates stronger average teacher quality attributes in a school. The teacher quality index is strongly correlated with other school characteristics—r=-.63 for percent school poverty, and r=-.58 for percent school minority. Teachers with more of the desirable attributes we include in the TQI are much more likely to be in less-poor/less-minority schools (Presley et al., 2005). In this report, we divided public high schools into quartiles based on their TQI scores.

We considered using a measure of school funding as well, but since those data are only available at the district level, we decided that it did not provide the fine-tuned metric that we needed in this study.

Part I: Who Are the Illinois High School Class of 2002?

Student Demographics

We begin by describing some of the demographic characteristics of the Class of 2002. Remember that we are only including seniors from Illinois' public high schools that academic year.

➢ *Family Income*

Of all students in the cohort, 69% provided combined parents' income before tax on the ACT Questionnaire. By design we divided the Class of 2002 into family income quartiles. The second-to-last row in Table 1 shows that, using the categories described in the methodology section, among those who provided family income information, 25% were low-income, 27% lower-middle income, 25% upper-middle income and 24% high income. (We include the 31% who did not provide this information on the ACT Questionnaire in the "missing" category separately in subsequent tables.)

➢ *Race/Ethnicity*

The last column on Table 1 shows that of the 113,660 students in the cohort, 59% are white, 10% black, 8% Latino, 4% Asian, and less than 1% Native American. Another 4% identified themselves as multiracial/other, and 15% did not provide this information on the ACT Questionnaire.

➢ *Race/Ethnicity and Family Income*

Table 1 also shows the family-income quartiles into which each racial/ethnic group falls. We see that those who declined to provide racial/ethnic information were also quite likely not to have provided income information. Findings that we provide later in this report suggest that those who do not report family income may be more likely to be from lower-income families.

Black and Latino students in the Class of 2002 are about three times as likely to be from families with incomes in the lowest income quartile compared to white students.

Using the data we have, we can see that black students and Latino students in the Class of 2002 are about three times as likely to be from families with incomes in the lowest income quartile compared to white students. About half of black and Latino students who provided family income information fell into the lowest income quartile (55% and 48% respectively), and about 80% were in the lower half of the income distribution. Asian students, and the 4% of students reporting multi-racial and "other" race/ethnicities, while not as likely to fall into the lowest income quartile, are still about twice as likely to be in the lowest income quartile as white students. There are very few Native American students among the Class of 2002, less than 1%, and about two out of five fell into the lowest family income quartile (42%).

Table 1.
Distribution of the Illinois Class of 2002 by Race/Ethnicity and Family Income

	% Low Income	% of Known Income who are Low Income	% Lower Middle Income	% Upper Middle Income	% High Income	% Missing Income	Total N	% of Total
Black	40%	55%	19%	9%	5%	27%	11,819	10%
Latino	36%	48%	23%	10%	6%	25%	8,761	8%
Asian	24%	32%	20%	17%	17%	26%	4,707	4%
White	13%	17%	21%	22%	21%	23%	67,090	59%
Native American	36%	42%	28%	12%	9%	15%	581	<1%
Other	29%	38%	23%	13%	11%	24%	2,157	2%
Multi-racial	26%	33%	24%	16%	13%	21%	1,827	2%
Missing race/ethnicity	8%	33%	6%	5%	5%	76%	16,718	15%
Total N	20,644		21,443	18,806	17,436	35,331	113,660	
% of known income	25%	25%	27%	25%	24%			
% of Total	18%		19%	17%	15%	31%		100%

Regional Demographics

Because Illinois is a large and complex state, it is useful to look at similarities and differences among the six education regions plus the Chicago Public School District (CPS) (see Figure 1 for location of regions). Table 2 (last column) shows that almost half of the Class of 2002 were from one region—Northeast-minus-CPS (NE minus CPS). An additional 14% were from CPS, with other regions contributing between 9% and 4% of the cohort. Table 2 also provides the race/ethnic distribution of students within each region. A much larger proportion of CPS students (29%) chose not to provide race/ethnic information than students from other regions. Seven percent (7%) of CPS students reported that they were white, compared to between 75% and 80% in all but one of the other regions (the NE-CPS registered 60% white). Even taking into account missing information, the differences among regions, based on race/ethnicity, is small in comparison to CPS.

Even taking into account missing information, the differences among regions, based on race/ethnicity, is small in comparison to CPS.

Table 2.
Distribution of the Illinois Class of 2002 by Race/Ethnicity and Region

Region	Black	Latino	Asian	White	Native American	Other	Multi-racial	Missing	% of Total
Chicago Public Schools	34%	20%	6%	7%	1%	2%	2%	29%	14%
Northeast (minus CPS)	8%	8%	6%	60%	0%	2%	2%	14%	49%
Northwest	3%	5%	1%	75%	1%	2%	1%	13%	9%
West Central	5%	2%	1%	80%	1%	1%	1%	9%	8%
East Central	6%	2%	1%	78%	1%	1%	1%	10%	8%
Southwest	7%	2%	1%	77%	1%	1%	1%	11%	8%
Southeast	4%	2%	1%	80%	1%	1%	1%	11%	4%

Table 3 shows that CPS students were much more likely than students in other regions to be from low-income families. Again, however, CPS students were also the most likely not to provide this information (44%). Among the other six regions, the percent of students not reporting is quite similar. The 34% of CPS students who reported family income in the lowest quartile represent 61% of those who provided information in the group. In addition, the Southeast stands out as having a somewhat larger proportion of low-income students (26% of all, 36% of known), while the NE-CPS has the largest proportion of students from high-income families (22% of all, 30% of known).

Table 3.
Distribution of the Illinois Class of 2002 by Family Income and Region

Region	Low Income Within Region	Low Income Among Known Within Region	Lower Middle Income Within Region	Upper Middle Income Within Region	High Income Within Region	Missing Income Within Region
Chicago Public Schools	34%	61%	14%	5%	3%	44%
Northeast (minus CPS)	13%	18%	17%	18%	22%	29%
Northwest	17%	25%	22%	19%	10%	32%
West Central	19%	27%	23%	18%	11%	30%
East Central	18%	25%	23%	20%	12%	27%
Southwest	18%	25%	24%	19%	12%	27%
Southeast	26%	36%	25%	15%	7%	27%

We showed earlier that 14% of the Class of 2002 were from CPS. But Table 4 shows almost one quarter of the cohort from low-income families came from CPS schools (among those who provided information) compared to only 2% of those from families in the high-income category. With regard to minority status, CPS's share of the Class of 2002 represents more than two in five of the black students and about one third of the Latino students, compared to just 2% of white students.

In summary, we have shown that, for the Class of 2002, race/ethnicity and family income are strongly related. We will show in subsequent sections how these demographic, economic and school characteristics are co-related to student academic performance for this cohort of high school seniors.

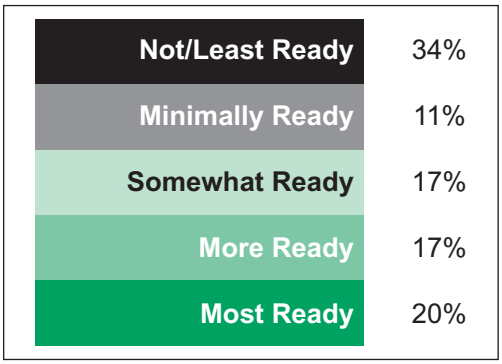
Table 4.
Share of the Illinois Class of 2002 from Chicago Public Schools

		CPS	Non-CPS
Family Income Quartile	Low	23%	77%
	Lower Middle	9%	91%
	Upper Middle	4%	96%
	High	2%	98%
Race/Ethnicity	Black	44%	56%
	Latino	35%	65%
	White	2%	98%
	Asian	18%	82%
Total		14%	86%

Part II: How Prepared Was the Illinois Class of 2002 for College?

In order to examine whether the Class of 2002 was ready for college, we used the IERC College Readiness Index described in the methodology section. We found that 34% of the Class of 2002 fell into the category we have identified as not/least ready for college, another 28% were minimally/somewhat ready, and 37% were more/most ready (Table 5). This result is consistent with other research using various student samples. For example, ACT (2004) found 29% of high school graduates were not ready for college course work in English, mathematics and science. Greene and Winters (2005), using a somewhat different methodology, found that 34% of a national sample of the high school Class of 2002 leave high school "college ready."

Table 5.
Distribution of College Readiness Among the Illinois Class of 2002



Student Demographic Characteristics and College Readiness

In this section, we examine the relationship between several background characteristics of the Class of 2002, and their readiness for college.

Graduates from high-income families are about three times as likely to be college ready as those from low-income families. Within each income quartile, females are more likely than males to be more/most ready.

➢ *Family Income and Readiness*

Figure 3 shows the distribution of readiness of the Class of 2002 from different family income quartiles for those for whom family income information was available. (We also show the distribution for those that did not provide this information. More than half fell into the not/least ready category, suggesting that this group may be more likely to be from lower-income groups.) Forty-two percent (42%) of those from families in the lowest family income quartile are not ready for college, while 20% are more/most ready. In contrast, only 13% of the cohort from families in the highest income quartile are not ready for college, while 65% are more/most ready. In other words, graduates from high-income families are about three times as likely to be college ready as those from low-income families. The companion Table 6 shows that within each income quartile, females are more likely than males to be more/most ready.

Figure 3.
Readiness of the Illinois Class of 2002 by Family Income Quartile

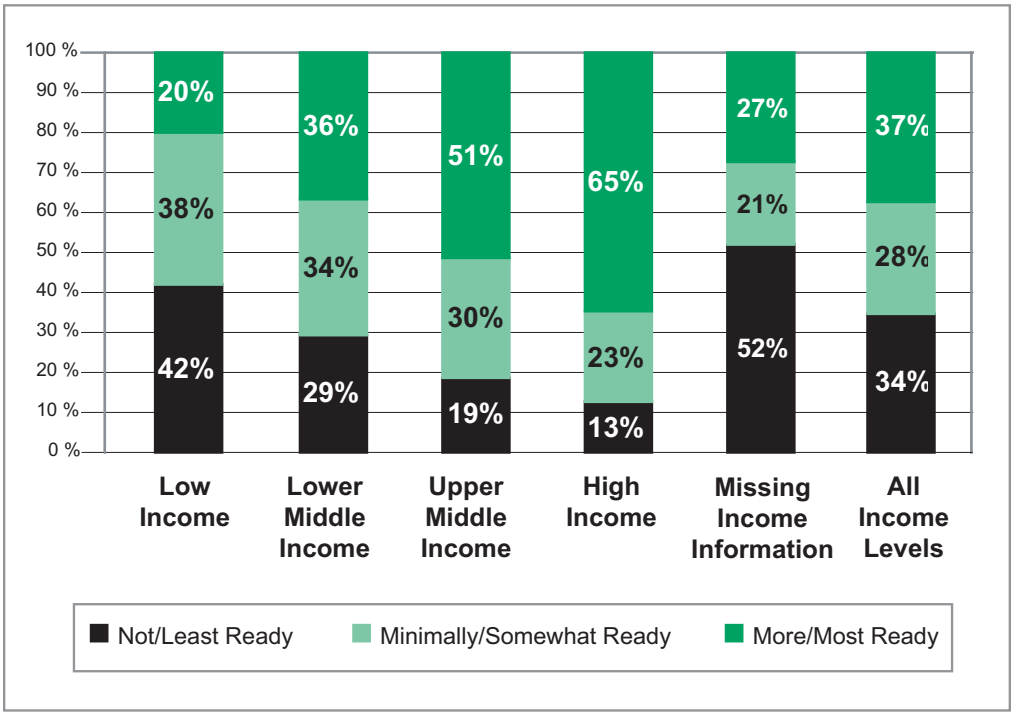


Table 6.
Readiness of Illinois Class of 2002 by Family Income Quartile and Gender

	Not/Least Ready		Minimally/ Somewhat Ready		More/ Most Ready	
Income Quartiles	Female	Male	Female	Male	Female	Male
Low Income	38%	46%	40%	35%	22%	19%
Lower Middle Income	25%	34%	36%	33%	39%	33%
Upper Middle Income	15%	22%	29%	31%	56%	47%
High Income	9%	16%	21%	24%	70%	60%
Missing Income information	49%	56%	23%	20%	29%	25%
All Income Levels	31%	37%	29%	27%	39%	35%

➢ *Race/Ethnicity and Readiness*

Results by race/ethnicity also show significant differences, with 54% of black students and 49% of Latino students falling into the not/least ready category, compared to 22% of white students, and 17% of Asian students (Figure 4). In contrast, only 11% of black students and 17% of Latino students in the cohort were more/most ready, compared to 48% of white students, and 55% of Asian students. (Note that 63% of those who did not provide race/ethnic information

fell into the not/least ready category, suggesting that they may be more likely to be black, Latino or Native American.) Again we see in the companion Table 7 that females are more likely than males to be more/most ready for college for all racial/ethnic groups.

Figure 4.
Readiness of Illinois Class of 2002 by Race/Ethnicity

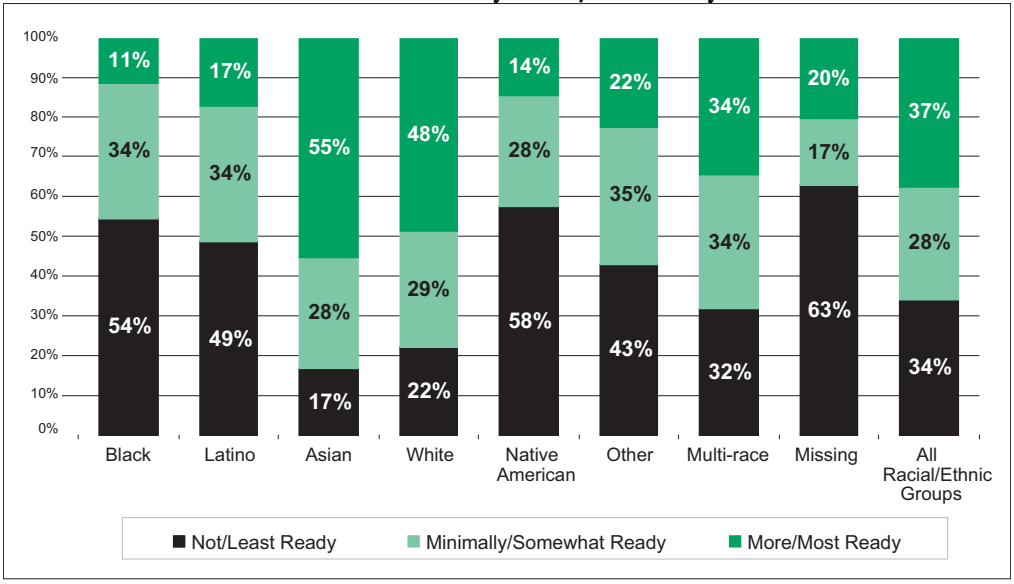


Table 7.
Readiness of Illinois Class of 2002 by Race/Ethnicity and Gender

	Not/Least Ready		Minimally/ Somewhat Ready		More/ Most Ready	
Race/Ethnicity	Female	Male	Female	Male	Female	Male
Black	50%	60%	37%	30%	13%	10%
Latino	45%	53%	36%	31%	18%	16%
Asian	14%	20%	28%	28%	58%	52%
White	20%	25%	29%	29%	51%	45%
Native American	52%	62%	30%	27%	18%	11%
Other	39%	48%	38%	31%	23%	21%
Multi-race	30%	35%	34%	34%	37%	31%
Missing	61%	65%	18%	16%	21%	19%
All Racial/Ethnic Groups	31%	37%	29%	27%	39%	35%

➢ *Interrelationship of Family Income, Race/Ethnicity and Readiness*

Family income and race/ethnicity continue to be highly related in American society, and the Class of 2002 is no exception, as we showed in Table 1. Black and Latino students are much more likely to be from lower-income families. In this section, we explore this relationship further through the lens of college readiness.

Table 8 shows that about half of low-income black and Latino students in the Class of 2002 were not ready for college, compared to one third of white and 20% of Asian low-income students.[3] While readiness rates increased as family income increases, black and Latino students still lag behind. Even among black and Latino students from high-income families, almost one third fell into the not/least ready category, compared to 11% of white students and 6% of Asians from high-income families.

While readiness rates increased as family income increases, black and Latino students still lag behind. Even among black and Latino students from high-income families, almost one third fell into the not/least ready category, compared to 11% of white students and 6% of Asians from high-income families.

We note that the results reported here are consistent with other studies that find that race/ethnicity continues to be related to academic performance, even after taking family income into account (Berends and Koretz, 1996; Phillips et. al., 1998; Jencks, 1972). In a later section we explore additional conditions that may contribute to these different outcomes.

Table 8.
College Readiness of Illinois Class of 2002 by Family Income Quartile for Selected Racial/Ethnic Groups

	Low Income Quartile	Lower Middle Income Quartile	Upper Middle Income Quartile	High Income Quartile	Family Income Data Missing
Black					
Not/Least Ready	52%	48%	40%	31%	72%
Minimally/Somewhat Ready	40%	39%	36%	37%	21%
More/Most Ready	8%	13%	24%	32%	7%
Latino					
Not/Least Ready	51%	42%	34%	29%	63%
Minimally/Somewhat Ready	40%	37%	35%	26%	23%
More/Most Ready	10%	21%	31%	45%	13%
Asian					
Not/Least Ready	20%	16%	10%	6%	28%
Minimally/Somewhat Ready	42%	30%	23%	13%	26%
More/Most Ready	38%	54%	67%	81%	46%
White					
Not/Least Ready	33%	24%	16%	11%	32%
Minimally/Somewhat Ready	36%	34%	30%	22%	27%
More/Most Ready	30%	42%	55%	67%	41%

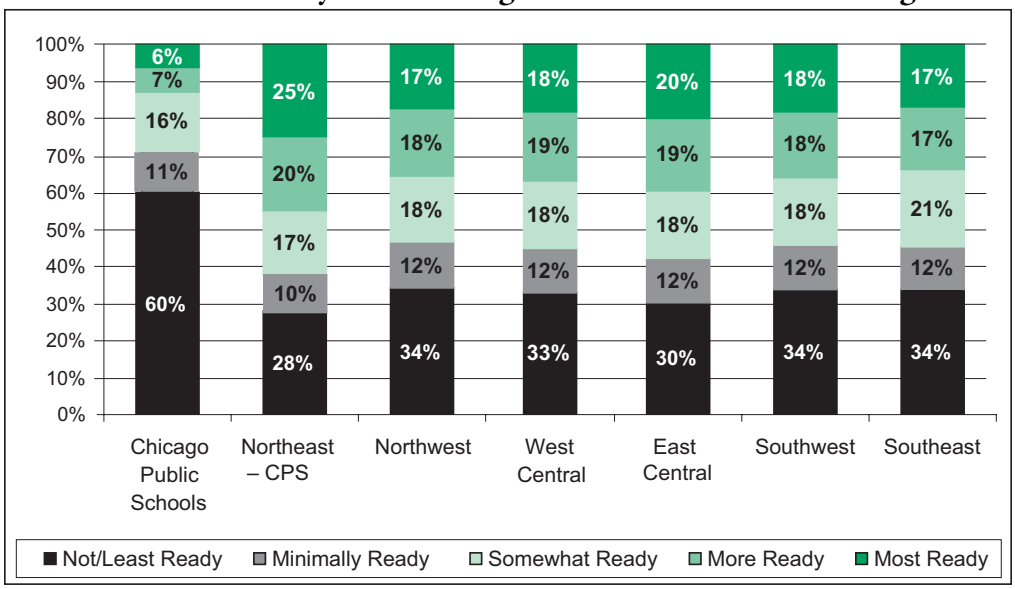
[3] Native American, multi-racial and "other" students are not included in analyses by readiness and income because of small cell sizes.

Illinois Regions and College Readiness

CPS students are much less ready and students in the NE minus CPS are somewhat more ready than other regions. College readiness is not just a CPS issue.

We now look at whether students are differentially ready for college depending on the region in which their high school is located. CPS students are much less ready and students in the NE minus CPS are somewhat more ready than other regions (Figure 5).

Figure 5.
Illinois Class of 2002 by IERC College Readiness Index Within Region



The NE minus CPS region shows the strongest results (28% not/least ready, 45% more/most ready), followed by the East Central region (30% not/least ready, 39% more/most ready). The Northwest and Southeast regions show somewhat weaker results (34% not/least ready, 35% and 34% more/most ready respectively). CPS seniors are much less ready for college overall, with 60% falling into the not/least ready category, and just 13% meeting the more/most ready standard. And these CPS students are the 'success stories'—just 50% of CPS 9th graders in 1998 completed high school (Allensworth, 2005). But college readiness is not just a CPS issue—note again that about one third of the Illinois Class of 2002 from each of the other regions was not college ready, another third were in the intermediate categories, and only 34% (SE) to 45% (NE minus CPS) were more/most ready.

Part III: Curriculum, Schools and College Readiness

In this section, we examine conditions external to the student that we also expect to be related to their academic performance, and thus their college readiness. We examine readiness first in the context of two separate curricular measures—whether students took the ACT-recommended core set of courses, and their score on a "math ladder" to assess the highest type of math course taken. We then examine readiness in the context of schools' teacher quality, using an index for Illinois schools recently developed by the IERC (DeAngelis et al., 2005).

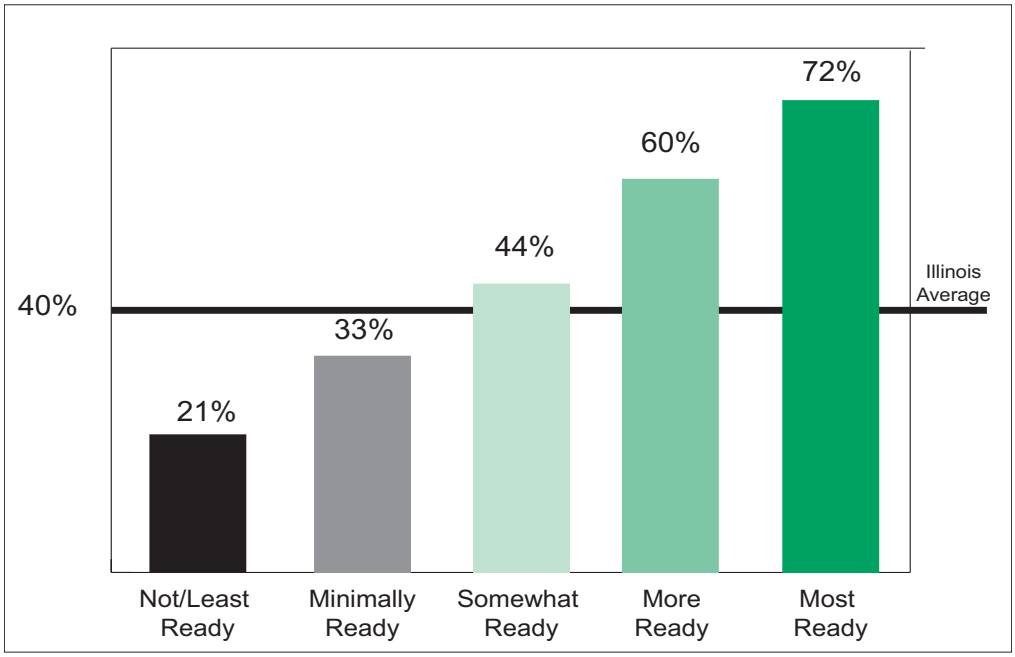
Core Courses and College Readiness

The ACT recommends a certain number of courses in key subject areas as a minimum program of study—or core—in preparation for entry into college. Recent research has shown that even taking the core number of courses does not necessarily result in students being prepared for college. After studying the relationship between courses taken and success in college, the ACT recently increased its recommendations to include specific levels of content, i.e., the nature and quality of the courses that students need in order to be prepared for college and work. The new recommendations, called *The Courses for Success*, include one or more advanced math course beyond Algebra II (e.g., Trigonometry), Biology, Chemistry, and Physics (ACT, 2004). Illinois does not require the basic ACT Core program of study for high school graduation.[4]

We found that only 40% of the Class of 2002 completed the ACT recommended core number of courses in all subjects. Not surprisingly, taking a core set of courses was strongly related to college readiness — 21% of those who we classify as not/least ready took the core number of courses, compared to 72% of those in the most-ready category (Figure 6). Figure 6 also shows that some students who reported taking the recommended core still fall into the not/least ready category, and some who reported not taking the full set of core courses still were more or most ready for college. In the next section we show that taking core courses is differentially related to ACT scores (a major component of the IERC Readiness Index) depending upon the race/ethnicity of students and the locale of their high school.

[4] In 2005, legislation increased Illinois' high school graduation requirements by 2012 from three years to four years of English with at least two years of writing-intensive courses (ACT Core calls for four years of English); increasing mathematics from two years to three years, including Algebra and Geometry, (ACT calls for three years, and its new *Courses for Success* recommends four years, including Algebra I and II, Geometry and Trigonometry and/or another advanced math course); Science from one year to two years (ACT Core calls for three years).

Figure 6.
Percent of the Illinois Class of 2002 Taking ACT-Recommended Number of Core Courses, by College Readiness



➢ *Core Courses, ACT Scores and Region*

In general, the pattern of course-taking by subject area is quite similar across the regions, as seen in Table 9. The resulting subject ACT scores, however, are lower for CPS, as is the size of the score difference between those who reported taking the core number of courses and those who did not. Of particular interest is the high percentage of CPS students reporting taking a Science core (74%), and the small difference in scores (1.4) for those who did and did not take that core. The ACT scores of CPS students who took the ACT-recommended number of core courses in science are consistently below those of students in other regions who did not take them. In English and mathematics, the ACT scores of CPS students who took the core courses are just slightly higher than those of students in other regions who took less than the recommended number of courses. It appears that, in general, subject course taking in CPS has a weaker impact on ACT scores, suggesting that the type of course taken, and/or the content of courses is less rigorous than is typical in other regions.[5] It may be that pockets of weakness exist in other districts, and we encourage all districts to pay close attention not only to the availability of courses, but also their rigor and content.

We encourage all districts to pay close attention not only to the availability of courses, but also their rigor and content.

[5] Chicago's Mayor and Chicago Public School officials recently announced a ten-year plan that may address some of the issues raised by this analysis. The new plan, developed with the assistance of The Boston Consulting Group, aims to transform the city's high schools. Proposals are being sought for comprehensive new high school English, mathematics and science instructional support programs that will include learning materials, teacher training programs and intensive classroom coaching. Schools will be able to choose from two or three instructional models that will be aligned to state standards and college entrance requirements (Mayor Daley press release, Chicago Public Schools, September 20, 2005).

Table 9.
Percent of the Illinois Class of 2002 Students Taking Core Courses, and Mean ACT Scores for English, Mathematics and Science

	CPS	Northwest	Northeast (w/o CPS)	West Central	East Central	Southwest	Southeast	All Regions (w/o CPS)	All IC 2002
English									
% meeting/exceeding English Core	*72%*	*73%*	*80%*	*74%*	*76%*	*76%*	*73%*	*78%*	*77%*
Mean ACT English Score with Core	*16.3*	*19.7*	*20.9*	*19.9*	*20.3*	*19.7*	*19.3*	*20.5*	*19.9*
*Mean ACT English Score without Core**	*13.3*	*15.5*	*16.2*	*15.7*	*15.9*	*15.6*	*15.2*	*15.9*	*15.6*
Difference in ACT English score	*3.0*	*4.2*	*4.7*	*4.2*	*4.4*	*4.1*	*4.1*	*4.6*	*4.3*
Mathematics									
% meeting/exceeding Math Core	*62%*	*63%*	*74%*	*64%*	*66%*	*61%*	*57%*	*69%*	*68%*
Mean ACT Math Score with Core	*17.5*	*21.4*	*22.5*	*21.3*	*21.9*	*21.6*	*20.9*	*22.1*	*21.5*
*Mean ACT Math Score without Core**	*15.7*	*16.2*	*16.7*	*15.9*	*16.2*	*16.1*	*15.8*	*16.4*	*16.3*
Difference in ACT Math score	*1.8*	*5.2*	*5.8*	*5.4*	*5.7*	*5.5*	*5.1*	*5.7*	*5.2*
Science									
% meeting/exceeding Science Core	*74%*	*50%*	*69%*	*48%*	*47%*	*46%*	*44%*	*60%*	*62%*
Mean ACT Science Score with Core	*17.1*	*21.6*	*22.0*	*21.7*	*22.1*	*21.6*	*21.1*	*21.9*	*21.1*
*Mean ACT Science Score without Core**	*15.7*	*17.9*	*17.6*	*17.9*	*18.4*	*17.9*	*17.6*	*17.8*	*17.7*
Difference in ACT Science score	*1.4*	*3.7*	*4.4*	*3.8*	*3.7*	*3.7*	*3.5*	*4.1*	*3.4*

** Those without course taking information were excluded.*

Math Courses and College Readiness

➢ *The Math Ladder and College Readiness*

With the exception of Native American students, more than 60% of students in each racial/ethnic group reported taking a math course beyond Algebra II. More than half of the Asian students reported that they took calculus.

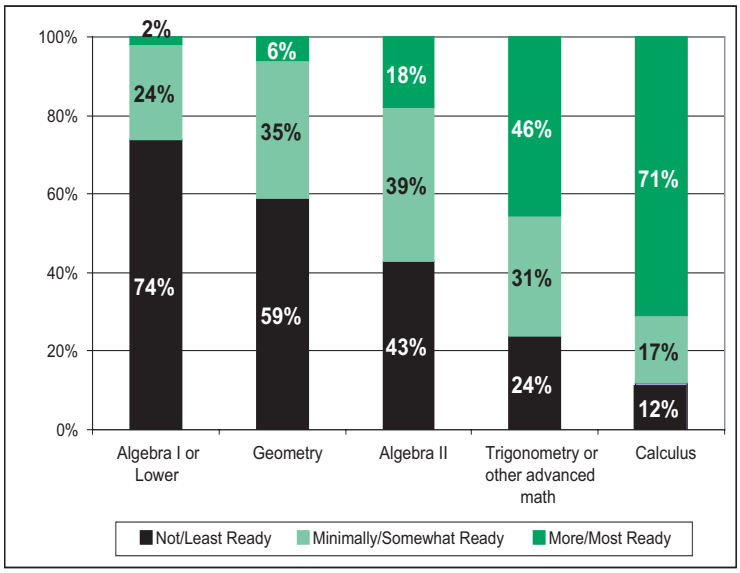
The kind of mathematics courses taken by students is directly related to their readiness for college. Adelman (1999) has shown that Algebra II is a critical hurdle over which students must pass in order to be ready for college success. ACT (2004), in its new recommendations for *The Courses for Success,* includes one or more advanced mathematics course(s) beyond Algebra II. Following the methodology of Adelman (1999) the IERC created a five-step math ladder—ranging from Algebra I or less to Calculus—to assess the types of mathematics courses that the Class of 2002 students took. Table 10 shows the distribution of the cohort by the highest math step taken for each racial/ethnic group. With the exception of Native American students, 85% or more students in each racial/ethnic group reported taking at least Algebra II, and more than 60% reported taking a math course beyond Algebra II. Even among these high levels of math-taking, Asian students stand out, with more than half reporting that they took calculus.

Table 10.
Highest Mathematics Step for the Illinois Class of 2002 by Race/Ethnicity

Race/Ethnicity	Math Level				
	Algebra I or Lower	Geometry	Algebra II	Trigonometry or other Advanced Math	Calculus
Black	6%	7%	24%	47%	16%
Latino	7%	8%	25%	44%	16%
Asian	2%	2%	10%	34%	51%
Native American	21%	9%	28%	31%	11%
White	7%	7%	24%	38%	23%
Total	7%	7%	24%	40%	22%

For all students (Figure 7) and for each racial/ethnic group (Table 11), the further up the math ladder students went, the less likely they were to be in the not/least ready category, and the more likely to be in the more/most ready category. But the amount of change is much less for black and Latino students than for Asian and white students.[6]

Figure 7.
Readiness of the Class of 2002 by Highest Math Level Taken in High School



The Algebra II benchmark: Overall, only 18% of students who stop at the Algebra II benchmark reach the more/most ready category. About 60% of black and Latino students who stopped with Algebra II were still in the not/least ready category, as were about a third of Asian and white students. White students demonstrated the strongest results, with about a quarter (24%) being more/most ready at this step in the math ladder. This corroborates the recent ACT report (2004) that Algebra II is at best a minimal step for moving on to college.

Algebra II is at best a minimal step for moving into college.

[6] Native American, multi-racial and "other" students are not included in analyses by readiness and math level because of cell sizes.

Table 11.
Readiness of the Class of 2002 by Race/Ethnicity and Highest Math Level Taken in High School

	Algebra I or Lower	Geometry	Algebra II	Trigonometry or other advanced math	Calculus
Black					
Not/Least Ready	77%	70%	61%	47%	34%
Minimally/Somewhat Ready	23%	28%	35%	38%	39%
More/Most Ready	0%	2%	4%	15%	26%
Latino					
Not/Least Ready	78%	66%	57%	38%	27%
Minimally/Somewhat Ready	21%	32%	36%	40%	32%
More/Most Ready	1%	2%	7%	23%	40%
Asian					
Not/Least Ready	66%	52%	37%	17%	7%
Minimally/Somewhat Ready	27%	47%	49%	37%	17%
More/Most Ready	7%	1%	14%	46%	76%
White					
Not/Least Ready	70%	52%	32%	11%	4%
Minimally/Somewhat Ready	27%	40%	43%	29%	12%
More/Most Ready	3%	7%	24%	60%	84%

Taking mathematics courses beyond Algebra II is strongly related to improvement on college readiness.

Additional steps on the math ladder beyond Algebra II: We can see from Figure 7 that taking mathematics courses beyond Algebra II is strongly related to improvement on the college-readiness index. Almost half (46%) of those stopping at the trigonometry or other advanced math step reach the more/most ready category as do 71% of those taking calculus.

The proportion in each racial/ethnic group being more/most ready for college increases about threefold by taking trigonometry or another advanced math course beyond Algebra II, and five fold by taking calculus (Table 11). But much larger proportions of black and Latino students taking higher-level mathematics remain in the not/least ready category compared to Asian and white students. Clearly, there is great advantage to all students who participate in higher-level mathematics, but the outcomes are much weaker for black students and to some extent Latinos as well. *What might explain these differences?* Schools at every level that enroll high percentages of poor and minority students generally have much weaker learning outcomes—even after taking account of their teacher quality. Additional conditions that impact performance will include constrained resources, facilities, and student bodies who generally begin school behind and never have a chance to catch up. By the time students reach high school they bring with them accumulated learning experiences that makes them differentially prepared academically. Furthermore, perhaps schools provide differential instructional quality or learning environments even when students take courses with similar titles.

There is great advantage to all students who participate in higher-level mathematics, but the outcomes are much weaker for black students and to some extent Latinos as well.

We will examine this possibility later in the report by looking at the relationship between school TQI—an indicator of school quality in this study—and student readiness for college depending on where they landed on the math ladder.

School Quality and College Readiness

Evidence is growing that the quality of students' teachers is related to their learning outcomes, but studies to date have shown only a modest, although positive, relationship to learning outcomes (Rice, 2003; Wayne and Youngs, 2003). Other studies using a "value-added" approach have shown that individual teachers can have a strong impact on students' learning outcomes (Sanders and Horn, 1998), but the research has not yet been published that can identify measurable characteristics of these 'successful' teachers.

The IERC recently published the results of a study to examine the distribution of teacher quality among schools in Illinois (DeAngelis et al., 2005). In that study we developed a Teacher Quality Index (TQI) for each school based on teacher characteristics that have been shown in other research to be related to student performance and are detailed in the methodology section. We found that the majority of the variation among all schools' TQI occurs between schools within districts in the state, regardless of whether CPS was included or excluded from the analysis. A smaller but substantial amount of variation occurred between districts within regions, and a very small amount was attributable to between region differences. We also found, however, that high-minority and high-poverty schools generally have much lower school TQIs than other schools in the state. As a high-minority/high-poverty district, Chicago schools, too, have much lower school TQIs than the state as a whole. We use the high school TQI to examine the relationship between school quality and college readiness.

➢ *Access to School Quality*

We divided Illinois public high schools into quartiles based on their TQI scores. Within the lowest quartile, we further separated out the lowest 10% of schools. We see in Table 12 and Table 13 that students from different racial/ethnic backgrounds and family income levels do not have equal access to high schools with high TQIs. Black students, even those from higher-income families, are much less likely to be in schools whose Teacher Quality Index falls into the highest quartile of high schools statewide (12% overall, and 28% for high family-income students) and are more likely to be in schools with lowest-quartile TQIs (45% overall, and 23% for high family-income students). Twenty-four percent (24%) of all black students—and indeed 8% of high-income black students—are in the lowest 10% of schools. Latino students are somewhat more likely to be in higher-TQI schools (22% in the highest quartile, Table 12), and family income appears to give Latino students a greater advantage for enrolling in high-quartile TQI schools (49% of high-family-income Latino students in highest quartile TQI schools). In contrast to both of these student groups, more than half of all Asian students are in top-quartile TQI schools, with only 12% of those even from the lowest-income quartile being enrolled in lowest-quartile TQI schools (2% in lowest 10% of schools). White students fall in between, with 41% in top-quartile TQI schools, and 15% of those from the lowest-income quartile enrolled in lowest-quartile TQI schools. Increased family income is much less likely to lead to black students being enrolled in higher TQI schools than is the case for other racial/ethnic groups.

Increased family income is much less likely to lead to black students being enrolled in higher TQI schools than is the case for other racial/ethnic groups.

Table 12.
Distribution of the Illinois Class of 2002 by Race/Ethnicity and High School TQI

	Lowest TQI Quartile		Lower Middle TQI Quartile	Upper Middle TQI Quartile	Highest TQI Quartile
	Lowest 10%	11-25%			
Black	24%	21%	27%	16%	12%
Latino	10%	13%	28%	27%	22%
Asian	1%	5%	13%	21%	59%
Native American	10%	12%	26%	26%	26%
White	1%	7%	20%	30%	41%
Total	6%	10%	21%	27%	36%

Table 13.
Distribution of the Illinois Class of 2002 by Race/Ethnicity, Family Income and High School TQI

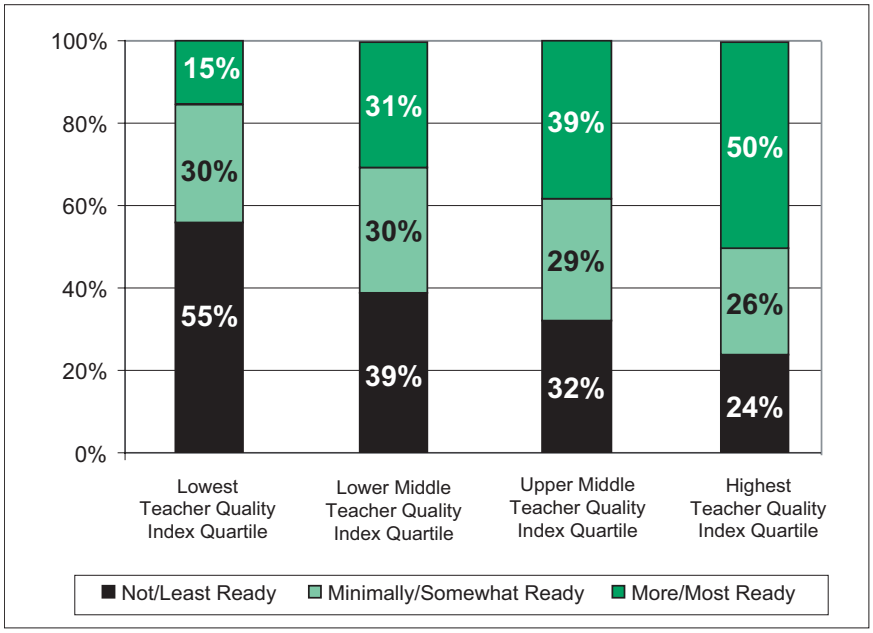
	Lowest TQI Quartile		Lower Middle TQI Quartile	Upper Middle TQI Quartile	Highest TQI Quartile
	Lowest 10%	11-25%			
Black					
Low income	31%	22%	24%	14%	9%
Lower middle income	18%	19%	31%	19%	13%
Upper middle income	10%	21%	33%	19%	16%
High income	8%	15%	28%	21%	28%
Latino					
Low income	15%	16%	30%	24%	16%
Lower middle income	9%	13%	28%	27%	23%
Upper middle income	3%	7%	24%	33%	32%
High income	3%	3%	17%	28%	49%
Asian					
Low income	2%	10%	21%	22%	45%
Lower middle income	2%	4%	12%	23%	59%
Upper middle income	<1%	<1%	13%	22%	64%
High income	<1%	<1%	7%	17%	74%
White					
Low income	3%	12%	27%	30%	28%
Lower middle income	2%	9%	25%	32%	32%
Upper middle income	1%	6%	21%	33%	40%
High income	<1%	3%	12%	27%	57%
Total					
Low income	12%	15%	26%	24%	22%
Lower middle income	5%	10%	25%	30%	31%
Upper middle income	2%	7%	21%	31%	40%
High income	1%	3%	13%	26%	56%
Missing income	9%	11%	20%	24%	36%

➢ *Relationship of School Quality to Students' College Readiness*

As we mentioned earlier, the teacher attributes included in the Teacher Quality Index (TQI) were chosen because they have been shown to be associated with student performance (DeAngelis et al., 2005). So we might expect to see some variation in student performance outcomes based on the cadre of teachers available in particular schools. And indeed, this is what we find. Overall, the percentage of students who are not/least ready for college consistently decreases, and the percentage of students who are more/most ready consistently increases if they are enrolled in schools with higher Teacher Quality Indexes (Figure 8).

We might expect to see some variation in student performance outcomes based on the cadre of teachers available in particular schools. And indeed, this is what we find.

Figure 8.
Distribution of College Readiness by High School TQI



TQI is closely related to other school characteristics such as school poverty level and school minority concentration. Schools with higher levels of poverty and higher concentrations of minority students typically have lower TQI scores (DeAngelis et al., 2005). It is well known that student body characteristics are associated with student performance (Coleman et al., 1966; Jencks & Mayer, 1990; Rumberger & Palardy, 2005). In order to test whether TQI is related to student performance independent of these school characteristics, we grouped Illinois high schools into different categories based on the percentage of students eligible for free- or reduced-price lunch (FRL, as a measure of poverty level) and percentage of minority students in the student body. Schools falling into the same category share similar student body characteristics. We then examine the relationship of TQI to student performance within each type of school.

CPS schools are predominantly high poverty, highly segregated minority schools and have much lower TQIs than other regions.

We begin by describing the distribution of high schools by region and school characteristics (Table 14).[7] Two thirds (46 out of 68) of CPS high schools are high poverty and highly segregated minority schools (hereafter referred to as HH schools), accounting for 88% (46 out of 52) of such high schools in Illinois. High schools in the Northwest, West Central and East Central regions are almost exclusively low poverty and low minority schools. Student body characteristics are also related to the qualifications of teachers (their TQI). Of the HH schools, 79% have a TQI that is in the lowest quartile and only 2% (1 out of 52) is in the top quartile. In contrast, just 17% of low poverty and low minority schools (hereafter referred to as LL schools) are in the lowest TQI quartiles and 30% are in the top quartile. As a result, most, but not all, CPS high schools are HH schools and have much lower TQIs than other regions.

Table 14.
Distribution of Different Types of High Schools by Geographic Region and TQI Quartiles

	High School Type					Total
	Poverty < 50%		Poverty ≥ 50%			
	Minority <50% (LL)	Minority ≥50%	Minority <50%	Minority 50-89.9%	Minority ≥90% (HH)	
Total	**520**	**21**	**7**	**31**	**52**	**631**
Geographic Region - Number of Schools						
CPS	0	4	0	18	46	68
Northeast minus CPS	123	16	0	5	2	146
Northwest	89	0	0	1	0	90
West Central	94	1	0	2	0	97
East Central	87	0	2	2	0	91
Southwest	72	0	1	2	3	78
Southeast	55	0	4	1	1	61
TQI Quartiles - Number of Schools						
Lowest TQI Quartile	86	7	3	17	41	154
Lower Middle TQI Quartile	135	7	1	8	8	159
Upper Middle TQI Quartile	143	7	2	5	2	159
Highest TQI Quartile	156	0	1	1	1	159
TQI Quartiles – Percent of Schools						
Lowest TQI Quartile	17%	33%	43%	55%	79%	24%
Lower Middle TQI Quartile	26%	33%	14%	26%	15%	25%
Upper Middle TQI Quartile	28%	33%	29%	16%	4%	25%
Highest TQI Quartile	30%	0%	14%	3%	2%	25%

Note: LL = low poverty, low minority; HH = high poverty, high minority

[7] Table 14 includes Illinois public high schools with grades 11 and 12 in 2001-2002.

Table 15 shows the relationship between TQI and college readiness for the total cohort and for major racial/ethnic groups. For simplicity, we present results for LL and HH schools only. These two types of schools account for 91% of Illinois public high schools in 2002-2003.

Table 15.
College Readiness of the Class of 2002 by High School TQI, Race/Ethnicity and School Type

	Low Poverty/Low Minority (LL) (FRL<50%, Minority <50%)				High Poverty/High Minority (HH) (FRL ≥50%, Minority ≥90%)			
	Lowest Teacher Quality Quartile	Lower Middle Teacher Quality Quartile	Upper Middle Teacher Quality Quartile	Highest Teacher Quality Quartile	Lowest Teacher Quality Quartile	Lower Middle Teacher Quality Quartile	Upper Middle Teacher Quality Quartile	Highest Teacher Quality Quartile
Black								
Not/Least Ready	61%	56%	53%	45%	63%	61%	*	*
More/Most Ready	8%	11%	16%	21%	3%	10%	*	*
N	144	778	822	1,214	3,255	717	87	61
Latino								
Not/Least Ready	48%	48%	48%	44%	60%	54%	*	*
More/Most Ready	13%	16%	21%	25%	4%	12%	*	*
N	95	796	1,212	1,785	800	579	0	15
Asian								
Not/Least Ready	34%	23%	18%	12%	44%	46%	*	*
More/Most Ready	36%	42%	57%	63%	12%	14%	*	*
N	44	264	624	2,613	52	95	0	2
White								
Not/Least Ready	30%	27%	24%	18%	*	*	*	*
More/Most Ready	35%	41%	46%	56%	*	*	*	*
N	4,700	12,185	18,258	26,253	71	67	2	1
Total								
Not/Least Ready	34%	33%	30%	24%	73%	64%	38%	*
More/Most Ready	32%	36%	41%	50%	3%	9%	26%	*
N	5,532	16,110	24,504	39,076	6,888	2,117	130	87

* less than 1% of subgroup.

First, by definition, there are almost no white students in the HH schools. What is more striking is that of the 9222 students served by the HH schools less than 1% (87 out of 9222) have access to highest TQI-quartile schools and 1.4% (130 out of 9222) to the upper middle-quartile schools, whereas 75% attend lowest-quartile schools.

No matter what the student body characteristics are, student performance improves as school TQI increases.

Secondly and certainly most relevant to the topic here, is that within each type of school, we see a pattern that is similar to the overall pattern shown in Figure 8. To reiterate, no matter what the student body characteristics are, student performance improves as school TQI increases (bottom panel of Table 15). Even in schools with a majority of students being poor and at least 90% being non-white, the higher the TQI is, the higher the percentage of students who are more/most ready (moving from 3% to 26% as TQI changes from the lowest quartile to the upper middle quartile) and the lower the percentage being not/least ready (from 73% to 38%).

TQI matters more for schools serving mostly disadvantaged students.

The bottom panel of Table 15 also provides evidence that TQI matters more for schools serving mostly disadvantaged students. When TQI improves from the lowest to upper middle quartile, the change in percentage more/most ready is 23 percentage points (26%–3%) in HH schools, whereas the change is 9 percentage points (41%-32%) in LL schools. When given access to schools with TQI in the upper middle quartile, student performance at HH schools is much closer to both state average (34% not/least ready, 37% more/most ready) and student performance at LL schools in the same TQI quartile. In schools with TQI in the bottom two quartiles, students at HH schools are lagging behind much more than students at LL schools. The advantage of being in high schools with higher TQIs holds true for all major racial groups, regardless of school student body characteristics (first four panels of Table 15).

All students benefit from the opportunity to be exposed to a stronger cadre of teachers in their schools.

However, we can also see from Table 15 that schools' TQIs explain only a small part of the lower performance of black and Latino students. Other factors that may continue to influence students' performance are prior preparation especially in high poverty/high minority schools, teachers' expectations, the types of courses into which students are placed within a school, how teachers are distributed to classrooms within schools, as well as external pressures such as student work, family responsibilities and opportunities to study at home. What is clear, however, is that all students benefit from the opportunity to be exposed to a stronger cadre of teachers in their schools.

➢ *Math Courses, School TQI and Readiness for College*

We have shown in the last section that students' readiness for college increases as they move up the math ladder with regard to course taking, but that the outcomes are weaker for some groups, especially black students and to some extent Latino students. We hypothesized that these differences in the impact of math taking may reflect differential teacher quality, among other possible influences on learning, including students' prior preparation. Using school TQI as a indicator of school quality, we now look at the relationship between math taking patterns, student college readiness and schools' TQIs. We show the results for the total cohort in Figures 9 and 10 and for each major racial/ethnic group in Table 16.

Figures 9 and 10 show again the benefit of taking higher level mathematics courses, as discussed in the previous section. What is more interesting in these figures is the different gains associated with math-course taking in different types of schools as measured by school TQI. For students who stop at the geometry step or below, school TQI and, indirectly, the other school attributes of high poverty and high minority that are strongly related to school TQI, appear to have little if any relationship to readiness for college. For example, of students who stopped at geometry, the proportions not ready for college are all around 60% (Figure 9) while the proportions more/most ready are around 5% (Figure 10), regardless of the type of schools students are in.

The Algebra II benchmark: Being in the lowest TQI quartile schools appears to begin to be associated with readiness at the Algebra II step. The proportion of students not/least ready for college drops from 66% (for those who were in lowest decile TQI schools) and 50% (for those who were in 11th to 25th percentile TQI schools) to 42% in lower-middle TQI quartile schools. Correspondingly, the proportion more/most ready jumps from 6% and 11% to 18% or more (Figure 10).

This pattern weakens when we look at the results by race/ethnicity (Table 16). At the Algebra II level, school TQI generally has a weak or no relationship to student readiness when we control for race/ethnicity. The apparent relationship between TQI and readiness at the Algebra II level is actually explained by the mal-distribution of students by race/ethnicity among schools with different TQIs, combined with the systematic differences in readiness among these groups of students across TQI categories.

When we move beyond Algebra II to Trigonometry, other advanced math, and calculus, school TQI is more closely related to student readiness.

Advanced mathematics steps beyond Algebra II: When we move beyond Algebra II to Trigonometry, other advanced math, and calculus, school TQI is more closely related to student readiness. The percent of students ready for college at these higher math steps increases dramatically for the total cohort and for each racial group as TQI increases from lowest-quartile to the lower-middle quartile. For some groups (Latino and Asian), readiness continues to improve considerably as school TQI moves to higher quartiles.

Even though all students benefit from being at higher math steps, and in higher TQI schools, the achievement gap persists. The percent of black and Latino students in the more/most ready category still lags behind that of Asian and white students at advanced math levels in the highest TQI schools (28% and 35% vs. 52% and 63% for trigonometry or other advanced math; 40% and 57% vs. 81% and 86% for calculus). Asian students also experience less benefit than white students when they take these courses in lowest-quartile TQI schools.

Importantly, however, we can see that taking school TQI into account reduces the gain gap between white and non-Asian minorities who take higher-level math courses. We saw in Table 11 that differences in percent more/most ready for college between white and black students are 45 and 58 percentage points at the trigonometry and calculus levels, respectively. The difference decreases to 35 and 46 percentage points, or about 20%, in schools with TQIs in the highest quartile. Similarily, the difference between white and Latino students decreased from 37 and 44 percentage points to 28 and 29, respectively, a 24% or more reduction.

The importance of school TQI increases the higher up the math ladder students climb. The high concentration of black and Latino students in schools with lower TQIs together with the diminished benefit of taking higher levels of math courses in these schools is, at least partially, responsible for the weaker readiness outcomes associated with taking math courses that we observed for these students.

In summary, all students benefit from taking higher steps on the math ladder. All students, especially minority students, suffer from being in schools with low TQIs, schools that are also very likely to be high poverty/high minority. It appears that the importance of school TQI increases the higher up the math ladder students climb. Higher level math courses offered by schools with lower TQIs do not carry the same benefits as courses with the same titles offered by schools with higher TQI. The high concentration of black and Latino students in schools with lower TQIs together with the diminished benefit of taking higher levels of math courses in these schools is, at least partially, responsible for the weaker readiness outcomes associated with taking math courses that we observed for these students.

Figure 9.
Percentage of the Class of 2002 Not/Least Ready by High School TQI and Highest Math Level

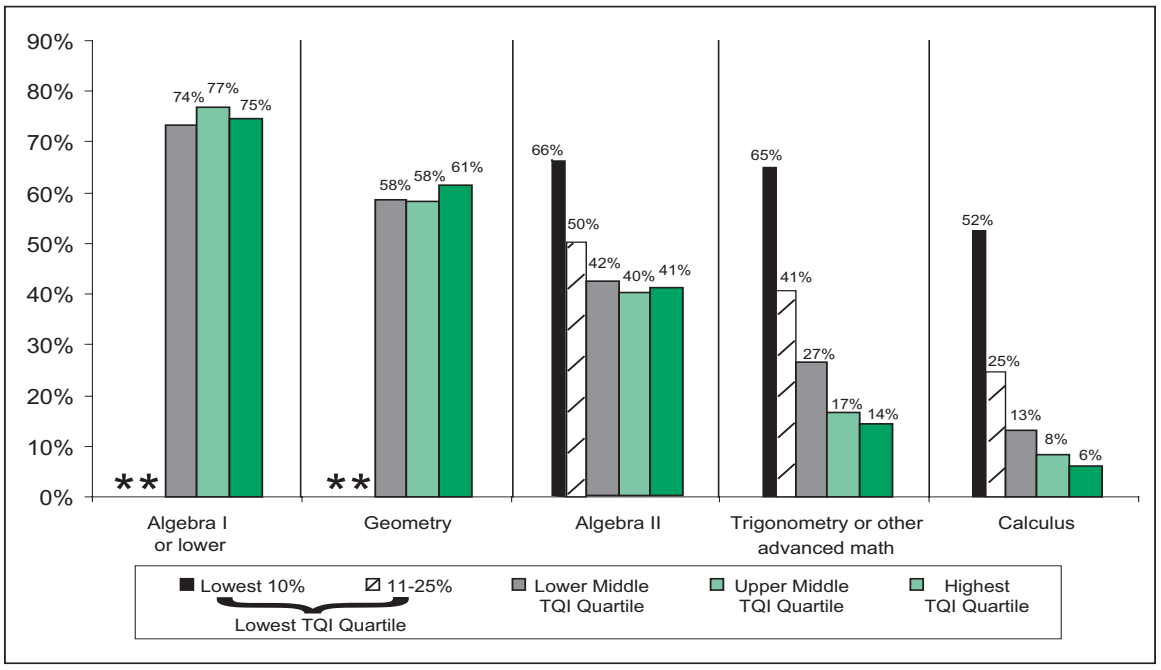
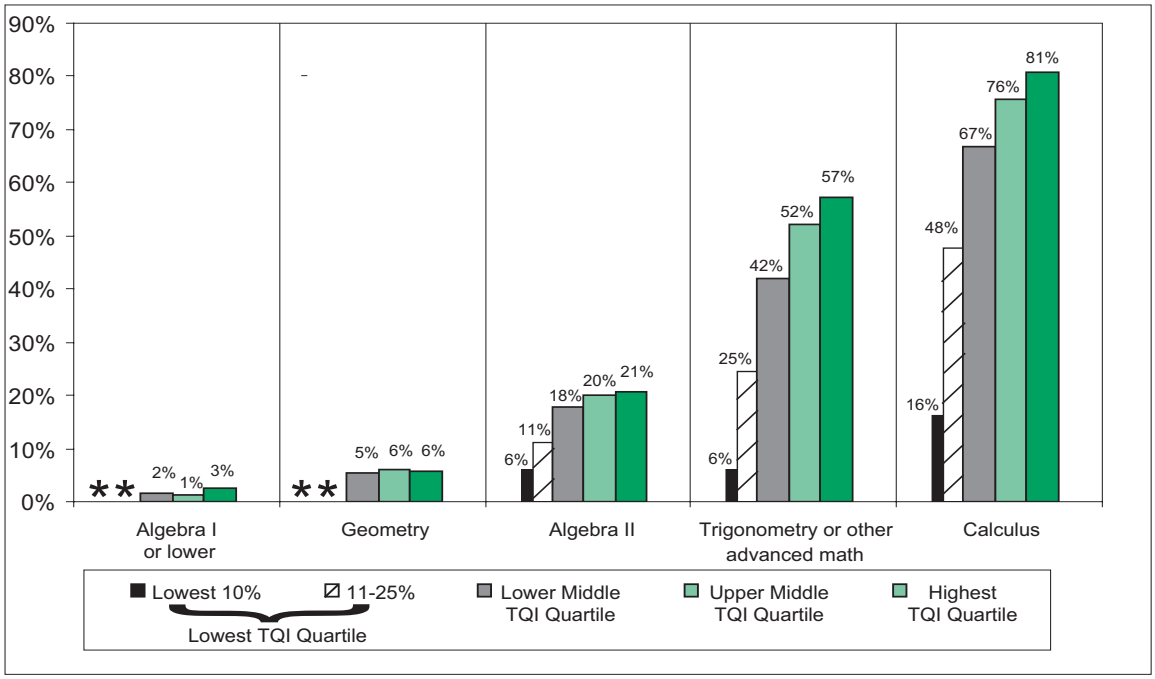


Figure 10.
Percentage of the Class of 2002 More/Most Ready by High School TQI and Highest Math Level



* less than 1% of cohort

Table 16.
Readiness of Students by High School TQI and Highest Math Level for Selected Racial/ Ethnic Groups

School TQI Quartiles		Percent Not/Least Ready					Percent More/Most Ready				
		Algebra I or lower	Geometry	Algebra II	Trigonometry or other advanced math	Calculus	Algebra I or lower	Geometry	Algebra II	Trigonometry or other advanced math	Calculus
Black											
Lowest TQI Quartile	Lowest 10%	*	*	68%	60%	50%	*	*	1%	3%	8%
	11-25%	*	72%	62%	47%	33%	*	1%	2%	14%	28%
Lower-Middle Quartile		76%	72%	58%	43%	27%	0%	1%	5%	21%	36%
Upper Middle Quartile		82%	69%	59%	36%	26%	0%	2%	5%	22%	35%
Highest Quartile		*	*	62%	33%	25%	*	*	5%	28%	40%
Latino											
Lowest TQI Quartile	Lowest 10%	*	*	57%	49%	42%	*	*	3%	7%	17%
	11-25%	*	*	59%	50%	39%	*	*	4%	11%	24%
Lower-Middle Quartile		79%	57%	54%	42%	24%	1%	2%	8%	21%	40%
Upper Middle Quartile		80%	70%	60%	28%	25%	1%	3%	9%	31%	45%
Highest Quartile		80%	73%	58%	28%	21%	0%	0%	8%	35%	57%
Asian											
Lowest TQI Quartile	Lowest 10%	*	*	*	*	*	*	*	*	*	*
	11-25%	*	*	*	39%	24%	*	*	*	14%	35%
Lower-Middle Quartile		*	*	38%	21%	14%	*	*	10%	35%	60%
Upper Middle Quartile		*	*	28%	17%	6%	*	*	16%	52%	78%
Highest Quartile		*	*	40%	12%	4%	*	*	14%	52%	81%
White											
Lowest TQI Quartile	Lowest 10%	*	*	*	*	*	*	*	*	*	*
	11-25%	69%	52%	36%	14%	6%	2%	6%	19%	47%	73%
Lower-Middle Quartile		70%	52%	32%	12%	5%	2%	8%	25%	58%	81%
Upper Middle Quartile		73%	53%	32%	10%	4%	2%	7%	24%	61%	83%
Highest Quartile		69%	55%	33%	10%	3%	4%	7%	25%	63%	86%

* *less than 1% of subgroup*

Highlights of Findings

- Students are differentially ready for college based on race/ethnicity and poverty. The education system is especially weak in preparing minority and/or students from low-income families for the next stages of their lives after high school.
  - One third of the Class of 2002 was ready to take on four-year college-level work, one third were minimally or somewhat ready, and one third were not/least ready to make the transition into postsecondary education or the workplace.
  - Two-in-five (42%) of low-income students were not/least ready, compared to 13% of those from the highest family income quartile.
  - About half or more of Native American, black and Latino students were in the not/least ready category, compared to 17% of Asians and 22% of white students.
  - We found that while readiness rates increased as family income increases for each racial/ethnic group, black and Latino students still lag behind. For these two groups, even among those from high-income families, almost one third fell into the not/least ready category, compared to 6% of Asians and 11% of white students.
- The benefits of taking the ACT core-recommended set of courses varies.
  - Taking the core set of courses recommended by ACT, Inc was strongly related to college readiness, with 21% of those who we classify as not/least ready taking the core number of courses, compared to 72% of those in the most ready category.
  - Subject course taking in CPS had a weaker impact on ACT scores, suggesting that the type of course taken, and/or the content of courses is less rigorous than is typical in other regions. We note that it may be that pockets of weakness exist in other districts, and we encourage all districts to pay close attention not only to the availability of courses, but to their rigor and content.
- Students attending high poverty/high minority high schools are likely to be in schools with the lowest Teacher Quality Indexes (TQIs). And school TQI has an independent relationship to students' college readiness.
  - It is black students who experience the most inequality, with 24% of the Class of 2002 in the lowest ten percent of TQI schools, compared to 10% of Latino and Native American students, and 1% of Asian and white students. Just 12% of black students are in highest-quartile TQI schools, compared to 22% of Latino students, 26% of Native American students, 41% of white students and 59% of Asian students.
  - Furthermore, increased family income is much less likely to lead to black students being enrolled in higher TQI schools than is the case for other racial/ethnic groups.
  - The advantage of being in schools that have a higher TQI holds true for all major racial/ethnic groups, and especially for students attending high poverty/high minority schools.

- Many students across racial/ethnic groups take higher-level mathematics courses (beyond Algebra II), but the readiness boost is much less for black students, and to some extent Latino students as well.
  - With the exception of Native American students, more than 60% of students in each racial/ethnic group reported taking a math course beyond Algebra II. More than half of the Asian students reported that they took calculus.
  - Beyond Algebra II, school TQI is quite closely related to student readiness for college.
  - The high concentration of black and Latino students in schools with lower TQIs, together with the diminished benefit of taking higher levels of math courses in these schools, is at least partially responsible for the weaker readiness outcomes associated with taking math courses that we observed for these students.

Recommendations

Illinois has many miles to go before it can claim that all of its high school graduates are ready for the next phase of their lives, whether that is college or the workplace. The spotlight nationally is being focused on high schools, and the results we show for Illinois are not unique. But the solutions for Illinois' students rest with Illinois' policy makers and education leaders, so here we provide some suggestions for action that can help to improve our high schools.

- ***Better information to students about life beyond high school:*** In a recent national survey 65% of college students and 77% of non-college students reported that "knowing what they know now, [they] would have worked harder and chosen a more rigorous curriculum [in high school]… even if it had meant less time for other activities" (Hart, 2005). And a new report from Indiana University (2005) says that most high school students in their survey believe that athletics receive more attention than academics. High school students need more help in making the connections between their high school academic experience and what they need to know for success in college and the workplace. The recently enacted increases in Illinois' high school graduation requirements will help to reinforce the importance of academic work. But teachers and counselors will also need to help students make the connection between a strong academic preparation and success in employment and life.
- ***More academic rigor:*** We showed in this study that even when Illinois students take what appears to be a set of college-preparatory courses (the ACT core), they are often still not ready for college-level work. While this is especially true for students in the highest-poverty/highest-minority schools, we also showed that college-readiness is an issue for high schools across the state. School policy makers and administrators need to pay much closer attention to the content of high school courses to ensure that all students have sufficient opportunity to learn demanding content.

- ***Better teaching:*** We showed in this study that the quality of the cadre of teachers available to students is related to students' academic performance. It is critical that high school teachers have substantial facility with both the pedagogy and content of the subject(s) they are teaching so that they can stretch their students beyond what is typically 'expected' in many schools. Teacher preparation programs must continue to strengthen the rigor of preparation in subject areas as well as subject pedagogy. High schools need to ensure that teachers' assignments match teachers' academic training, and districts may need to provide additional support, such as coaches and curricular models, to help some teachers in the courses they are teaching.

- ***Increase opportunities to revamp high schools:*** The many reports that have recently been issued regarding high schools share a common theme—the current structure does not work for many students. There are many ideas emerging for change, but most share the essential characteristics that high schools need to provide more personalized environments and opportunities for students to make connections to the next stage of their lives. Chicago, for example, is moving in this direction by creating smaller high schools. Dual enrollment can provide opportunities for students to experience college-level work and climate—a strategy that is available in Illinois. Some other reform models have yet to be tried in Illinois. Early College High Schools, for example, are designed so that all students can achieve two years of college credit at the same time as they are earning a high school diploma (within four to five years of entering 9th grade), and all students prepare to complete a Bachelor's degree. The program is aimed not at the highest-achieving students, but those who have not had access to the academic preparation needed to meet college readiness standards (www.earlycolleges.org). What will work best will depend on local conditions and needs, but creative change will surely help to overcome some of the current problems of our high schools.

- ***Stronger articulation between high-school and college curricula:*** We noted earlier that high school students are generally unaware of the rigors they will face in college and the workplace after they finish school, and that they would have worked harder if they had known. The new Illinois high school graduation requirements still fall short of Illinois' recommended college admission requirements (Center for the Study of Education Policy (CSEP), 2005). Some colleges have open admissions and many students who enroll believe that they are ready for college, only to be placed into remedial courses. The CSEP report makes some useful recommendations that include the joint development of course content guidelines, that high school graduation requirements be aligned with college and university high-school course requirements for admission and the college general education curriculum, and that the state seek continuation of the incremental improvement of high school graduation requirements beyond the new curriculum.

- ***Safer school environments:*** On September 29, 2005 the Illinois College Access Network (ICAN) hosted an Illinois High School Summit. The final speaker that morning was Omar Tabbara, a recent graduate of the Chicago Public Schools (and currently enrolled at the University of Illinois at Chicago), who had been asked what he would do to improve Chicago high schools. His number one recommendation was school safety. Indiana University (2005) reported that 45% of students in their high school survey of student engagement said they felt unsafe at school, including 59% of black students. Concerns about safety were also high on the list when we asked Illinois teachers whether they would work in some districts (DeAngelis et al, 2002). Illinois policy makers and school administrators need to pay even closer attention to this aspect of schools.

Final word

Illinois' high school students deserve the best opportunity to gain the knowledge and skills they will need to become successful adults, parents and employees. The suggestions included here can help to move us forward. But they will fail if we do not also address the educational experiences that students have prior to high school. Middle-school reform is critical—students should not arrive in high school already 'left behind'. School leadership is critical to building a professional community, district leadership is critical to ensuring that resources are available and distributed in ways that help teachers in all their schools meet high standards of instruction, and state leadership is critical to providing appropriate funding and regulations that facilitate excellence. We need all of the pieces of the system working in unison to crack the 'college readiness' challenge.

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