College Readiness Practices at 38 High Schools and the Development of the CollegeCareerReady School Diagnostic Tool

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Presented at the annual conference of the American Educational Research Association

Denver, Colorado

April 2010

Abstract

Educational Policy Improvement Center (EPIC) researchers visited 38 public high schools around the United States in 2007 and 2008 with the goal of validating and operationalizing a definition of college readiness. Schools in the sample were selected because they were demonstrating success at enabling more students from underrepresented groups to be ready for postsecondary education. This paper presents a qualitative summary of what researchers collected—programs, activities, practices, attitudes, and cultures of the schools visited. The results of the study include the identification of seven key principles underlying a comprehensive approach for promoting college readiness. In addition, the findings have resulted in the creation of an instrument, the CollegeCareerReady School Diagnostic, to measure school level college readiness over time and provide a detailed profile tied to actionable recommendations and resources.

Overview

In 2007, at the request of the Bill & Melinda Gates Foundation (the Foundation), the principal investigator, Dr. David T. Conley published a monograph, "Redefining College Readiness" that describes a four-part conceptual model for college readiness, including four dimensions: (1) key cognitive strategies, (2) key content knowledge, (3) academic behaviors, and (4) contextual knowledge. For the next phase of work, the Foundation sponsored the Educational Policy Improvement Center (EPIC) to conduct a research study designed to validate and then operationalize that conceptual model of college readiness. This paper summarizes the results of this study.

The key research questions for this research study were:

1. How do practices and programming at the case study high schools relate to the four components of the college readiness model?
2. How can a high school tell how well its program of study, organizational structure, and culture are aligned with college readiness?
3. What is known about all aspects of college readiness, and how can this information best be incorporated into a diagnostic instrument to determine the degree to which any individual high school contains all the necessary elements for college readiness?

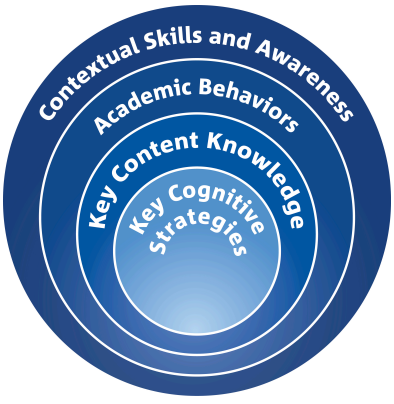
Addressing these research questions resulted in a two-part process that began by collecting evidence of programs and practices at high schools throughout the United States demonstrating success preparing more students from underrepresented groups in higher education to be ready for postsecondary education. Based on the evidence, the project then developed a web-based diagnostic instrument to measure the degree to which a high school's entire structure, culture, and instructional program prepare students to succeed in college. This diagnostic instrument

generates a school profile of how the school is preparing students for college, and based on the profile, offers actionable recommendations from the extensive resource clearinghouse created using the evidence collected from EPIC's research.

Theoretical Framework

Historically, research on college readiness has focused on correlations between single performance measures and postsecondary success (e.g. grades, courses taken), and traditional definitions of college readiness offer only single dimensions within which schools, districts, or states can look for opportunities to improve (Conley, 2007). After a decade of conducting research about entry-level college course content and faculty expectations, what emerged is a more comprehensive understanding of college readiness. Overall, students who wish to be college ready need to understand the structure of knowledge and big ideas of core academic subjects, must develop a set of cognitive strategies as they develop their understandings of key content, must possess the academic behaviors necessary to successfully manage and engage with a college workload, and possess a contextual understanding of the navigational and cultural elements of gaining admission and being successful in college (Conley, 2005a, 2005b, 2007). To capture these findings, a four-part conceptual model was developed. Figure 1 represents the model, and the remainder of this section describes each of the four dimensions in detail.[1]

Figure 1. The Four-Dimensions of College and Career Readiness



[1] Adapted from: Conley, D. T. (2007). Redefining college readiness. Educational Policy Improvement Center, Eugene, Oregon.

Key Cognitive Strategies refer to the intentional behaviors that enable students to learn, understand, retain, use, and apply content from a range of disciplines (Conley, 2007). College faculty nationwide, regardless of the selectivity of the institution, expressed near universal agreement that most students arrive unprepared for the intellectual demands and expectations of post-secondary environments (Conley, 2003a). Additional research suggests that college faculty expect students to make inferences, interpret results, analyze conflicting source documents, support arguments with evidence, solve complex problems that have no obvious answer, reach conclusions, offer explanations, conduct research, engage in the give-and-take of ideas, and generally think deeply about what they are being taught (National Research Council, 2002; Conley, 2003; Conley, 2005; Conley, et al., 2008; Conley, et al., 2009). Students who have little prior experience developing these cognitive strategies struggle when confronted with content knowledge they have not retained well that they are now expected to process and manipulate in much more complex ways.

Understanding the teaching, learning, and assessing of the Key Cognitive Strategies necessary for college readiness derives from research on human cognition, including dispositional-based theories of intelligence, which state that intelligence can be taught and developed, and thinking skills can be learned (Bransford, Brown, & Cocking, 2000; Costa & Kallick, 2000); upon cognitive learning theory, which says that learning is a product of thinking (Perkins, 1992); and upon competency theory, which provides a way to think about learner progression through subject matter from novice to expert (Baxter & Glaser, 1997). College ready schools draws upon these characteristics of human learning to create progressively more challenging learning opportunities that are carefully calibrated to lead to student readiness for college success. The specific Key Cognitive Strategies identified that are included in the School Diagnostic include: problem formulation, research, interpretation, communication, and precision/accuracy.

Key content knowledge is the foundational content knowledge necessary to understand the academic disciplines, including overarching reading and writing skills, and core academic subject area knowledge and skills, including English/language arts, mathematics, science, social sciences, world languages, and the arts. For example, students are expected to read a much larger range of material in college than in high school, usually in much larger volumes. College-level writing is expected to communicate clear, substantiated arguments based on a variety of credible sources, and to be executed error free using a specific style manual (Tierney, et al., 2009; Conley, 2007, 10). Researchers note that students who experience a discrepancy in the number, length, and rigor of reading and writing assignments between high school and college are less prepared to meet postsecondary demands in these areas (Conley, 2003; ACT, 2006).

Key content knowledge, however, should not be taught in isolation from the Key Cognitive Strategies. Successful academic preparation for college is grounded in these two companion dimensions. Understanding and mastering key content knowledge is achieved by processing information so that its structure becomes more apparent and then applying that information by means of the key cognitive strategies in different contexts (Bransford, et al., 2000). With this relationship in mind, several national standards systems have identified a comprehensive listing of the essential academic knowledge and skills, such as Standards for Success, the American Diploma Project, the Texas College

and Career Readiness Standards, and most recently the College- and Career-Readiness Standards of the Common Core State Standards (currently for literacy and mathematics).

Academic behaviors are self-management skills, attitudes, and habits necessary for students to meet the challenges of college workload and rigor. These are distinguished from key cognitive strategies by the fact that they tend to be independent of a particular content area, and consist largely of self-monitoring and study skills. Academic behaviors are not direct indicators of mental ability; rather, students who exhibit these behaviors are better equipped to translate their intellectual capabilities into school success (Zimmerman, 2002). Examples include the ability to self-monitor, manage time, take notes, set goals, persevere in the face of obstacles, collaborate, self-evaluate, and self-advocate (Conley, 2007, 12–13; Bransford et al. 2000).

Literature supports the assertion that academic behaviors, as defined here, are related to self-regulation and can be learned. Theories linking academic behaviors to academic outcomes draw from both education and psychology literatures. Classroom conventions, instructor priorities, beliefs and motivations related to studying, and students' awareness of their own thinking are all highly relevant to any discussion of academic behaviors (Zimmerman, 2002). In addition, research from social psychology indicates the importance of self-regulation in maintaining academic behaviors, and have demonstrated success training students leading to increased attendance to measures of physical health and personal commitments, higher performance levels, and decreased exam stress (Oaten & Cheng, 2006). However, educational psychologists Gettinger and Seibert characterize this category of behaviors as different from other types of learning for three reasons: (1) they are "skillful" in that they require training and practice (often not explicitly provided) but are independent of a specific content area; (2) they are "intentional" in that their application requires not only knowledge, but also decision making; and (3) they are most often practiced in an individual context rather than in a classroom (2002, 350–1).

Contextual skills and awareness refers to the privileged information necessary to navigate the college admissions and financial aid processes and to understand how college operates as a system and a culture. The inclusion of contextual skills and awareness in the four-part college readiness model is supported by observations linking successful navigation of the application, admissions, and financial aid processes to the possession of a degree of social and cultural capital provided by a college-oriented network (Pascarella, Pierson, Wolniak, and Terenzini, 2004, 252). Unfortunately, many low-income and first-generation college students have limited access to these networks and the opportunities that become available with the attainment of a college degree (McDonough, 1997). Many minority students have the desire or expectation of college attendance, but do not have the informational resources, personal support networks, continual checkpoints, or structured program to attain their postsecondary education goals (Noeth & Wimberly, 2002). Similarly, students who do not possess "college knowledge" may find themselves overwhelmed once they arrive on campus with little orientation to the culture and norms of their new surroundings (Conley, 2010, 40–41).

Individuals raised outside of a college-bound cultural or social capital network must rely more heavily on their high schools to provide access to both. A number of studies have found that counselors who support students and families during the admission process improve 4-yr college enrollment rates for low-income and underrepresented students and

> students of color (Gandara & Bial, 2001; McDonough, 2004a; Plank & Jordan, 2001; Venezia, Kirst, & Antonia, 2003). Schools can increase access to college by providing emotional support, access to information, and help navigating the college admission process (Stanton-Salazar, 2001).

These four-dimensions of college and career readiness serve as the conceptual framework for this study. The first phase of the research process was to use these four dimensions as lenses to examine the case study high schools, helping identify programs, practices, and beliefs contributing to successful student preparation for college. This phase served to test the theoretical model against actual practice, thereby validating and deepening a comprehensive understanding of the complex construct of college readiness. The findings were then translated to a diagnostic instrument, allowing schools to measure progress and guide reform efforts towards addressing the four-dimensions of college readiness.

Methodology

Overview

To address the research questions and explore the relationship of the four-part model to current practice, the research design included a literature review and an analysis of the college readiness model using a qualitative case study design. The project employed a purposive sampling strategy to select schools that have demonstrated the ability to prepare students for college more successfully than comparable schools. Researchers compiled a large list of high schools for participation through a nomination process and literature review on each of the four components of the college readiness framework. This list was subsequently refined after EPIC researchers collected performance and demographic data as well as initial information on the college readiness programs and practices at these schools. Researchers used these data to select target schools representing a broad cross-section of schools that prepare students for success in college. A total of 38 schools participated. The sampling and data collection and analysis methods are described below.

Sampling Design and Procedures

Researchers selected nearly 200 schools as candidates for site visits through various methods. The goal was to obtain a varied sample of high schools from around the nation that were performing better on some college readiness indicator than would be predicted based upon the school's demographics. Initially, researchers identified possible participants through a comprehensive literature review and found schools recognized in articles or other publications as providing excellent preparation for college. They also contacted organizations, programs, and individuals working in the field of college readiness for nominations of high schools that had succeeded in preparing more students from underrepresented groups for enrollment and success

in college. Finally, the Foundation provided additional nominations from extensive contacts and work with secondary schools nationally.

Researchers collected extensive information for each school on the preliminary list, carefully considering a variety of characteristics: school type and size; geographic setting and location; student body demographics (student race, income, enrollment, and grade-span data); performance indicators; and college readiness programs and practices. Other data included: graduation rates, college enrollment rates, as well as participation and performance data for AP/IB, SAT, and ACT exams (when available). Finally, researchers examined the school websites and any other documentation of each school's college readiness programs and practices available on the Internet.

After examining these data, EPIC identified schools to target for site visits. The only schools automatically excluded from consideration were schools that opened too recently to have a graduating class. Although many of these schools had unique college programs and practices devoted to college readiness, they had not existed long enough to build a consistent record of success over time.

The final target list included schools with at least one high performance indicator. In some cases, information about the community where the schools resided was a factor. For example, a school with a high graduation rate in a poor rural community could have been considered a unique case study example. Researchers also considered diversity in student population, geography, school size, and school type (magnet, charter, comprehensive) in the selection process and intentionally selected schools that represent a broad cross-section of schools nationwide. A final consideration was evidence of college preparatory programs and

practices. Schools that did a poor job of documenting their college preparatory practices may not have appeared on the target list.

Researchers contacted schools on the target list to request their participation and to schedule site visits between October 2007 and April 2008. The list was modified throughout the recruitment process to ensure that the participating schools represented a wide range of locations, school types, sizes, and socio-economic composition. However, schools with high proportions of low-income students, English learners, Latino/a, and African American students were oversampled, as these groups are underrepresented in postsecondary education; these schools provide unique models for schools that are working to improve their students' college readiness. The map in Figure 2 shows schools that participated in the study, and Table 1 lists the 38 participating high schools in alphabetical order, by location, type, and size.

Figure 2. Map of Participating Schools

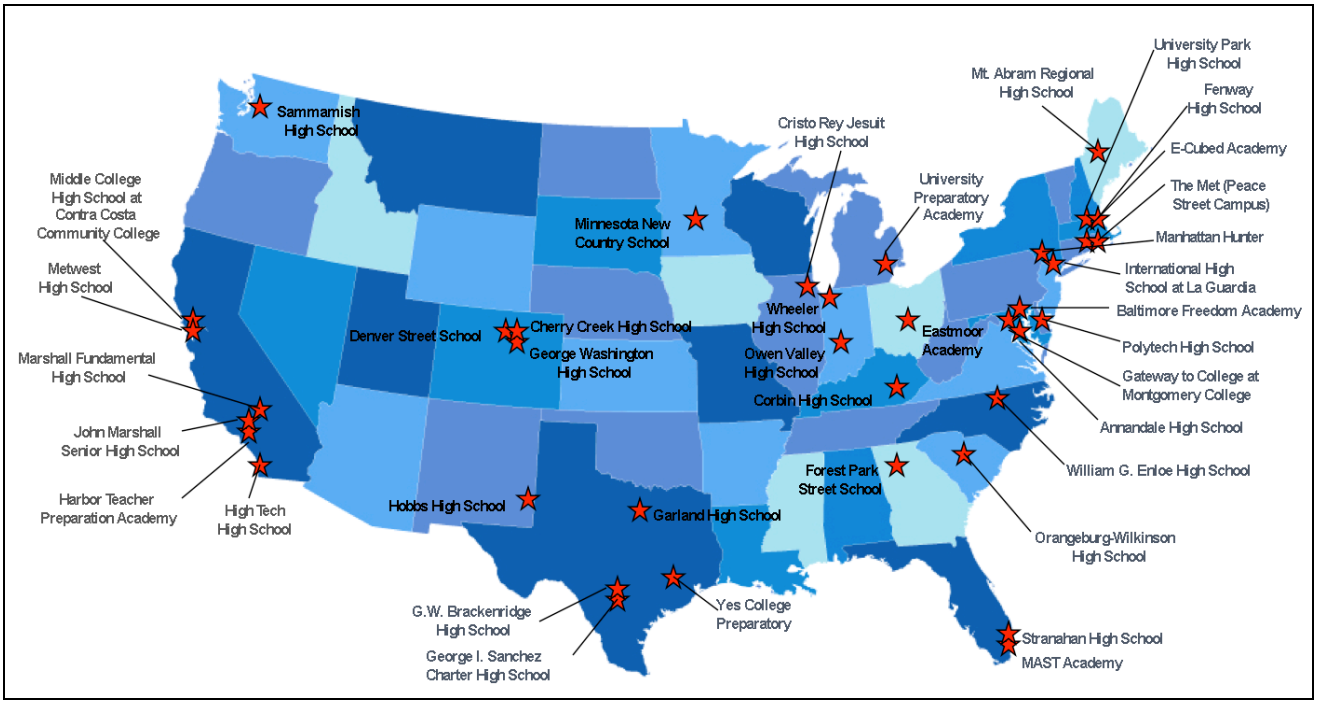


Table 1. List of Participating Schools by Location, Type, and Size[2]

School	City	State	School Type	Location Type	Grade Span	Enrollment
1. Harbor Teacher Preparation Academy	Wilmington	CA	Other/Alternative School (Admission through lottery)	Large City	9-12	318
2. High Tech High School	San Diego	CA	Charter	Large City	9-12	527
3. John Marshall High School	Los Angeles	CA	Comprehensive (With magnet component)	Large City	9-12	4,760
4. Marshall Fundamental Secondary School	Pasadena	CA	Comprehensive (With magnet component)	Midsize City	6-12	1,803
5. Metwest High School	Oakland	CA	Other/alternative school (Admission through lottery)	Large City	9-12	131
6. Middle College High School at Contra Costa	San Pablo	CA	Magnet	Suburb of a Large City	9-12	268
7. Cherry Creek High School	Greenwood Village	CO	Comprehensive	Suburb of a Large City	9-12	3,678
8. Denver Street School	Denver	CO	Private (Open to students who have struggled at, dropped out, or been expelled from public school)	Large City	N/A	97
9. George Washington High School	Denver	CO	Comprehensive	Large City	9-12	1,588
10. Polytech High School	Woodside	DE	Magnet (First-come, first served)	Suburb of a Small City	9-12	1,150
11. Maritime & Science Technology Academy	Miami	FL	Magnet	Rural Fringe	9-12	553
12. Stranahan High School	Fort Lauderdale	FL	Comprehensive (With magnet component)	Midsize City	9-12	2,066
13. Forest Park Street School	Forest Park	GA	Private (Open to students who have struggled, dropped out, or been expelled from public school)	Urban Fringe	N/A	200
14. Cristo Rey Jesuit High School	Chicago	IL	Private (Open to immigrant students)	Large City	9-12	521

[2] For a detailed description of each high school, please refer to *Creating College Readiness* online at http://epiconline.org/publications/project_reports.

15. Owen Valley High School	Spencer	IN	Comprehensive	Distant Rural Area	9-12	953
16. Wheeler High School	Valparaiso	IN	Comprehensive	Rural Fringe	9-12	530
17. Corbin High School	Corbin	KY	Comprehensive	Remote Rural Town	9-12	662
18. Mt. Abram Regional High School	Strong/Salem Township	ME	Comprehensive	Remote Rural Area	9-12	341
19. Baltimore Freedom Academy	Baltimore	MD	Charter (Admission through lottery)	Large City	9-12	216
20. Gateway to College at Montgomery College	Silver Spring	MD	Other/Alternative School (Open to students who have left public school)	Urban Fringe	9-12	122
21. Fenway High School	Boston	MA	Magnet (Pilot school)	Large City	9-12	280
22. University Park Campus School	Worcester	MA	Magnet (Admission through lottery)	Midsize City	7-12	230
23. University Preparatory Academy	Detroit	MI	Charter	Large City	9-12	385
24. Minnesota New Country School	Henderson	MN	Charter	Rural	7-12	112
25. Hobbs High School	Hobbs	NM	Comprehensive	Large Town	10-12	1,415
26. International High School at LaGuardia Community College	Long Island	NY	Charter (Open to students whose native language is not English and who have been in the US less than 4 years)	Large City	9-12	480
27. Manhattan/Hunter College High School for the Sciences	New York	NY	Other/Alternative School	Large City	9-12	320
28. William Enloe High School	Raleigh	NC	Magnet (First-come, first-served)	Large City	9-12	2,312
29. Eastmoor Academy	Columbus	OH	Magnet	Large City	9-12	787
30. E3 (E-Cubed) Academy	Providence	RI	Other/Alternative school	Midsize City	9-12	364

31. The Met (Peace Street Campus)	Providence	RI	Other/Alternative school (Admission through lottery)	Midsize City	9-12	691
32. Orangeburg-Wilkinson High School	Orangeburg	SC	Comprehensive	Rural Fringe	9-12	1,686
33. Garland High School	Garland	TX	Comprehensive	Urban Fringe	9-12	2,431
34. George Sanchez Charter School (AAMA)	Houston	TX	Charter	Large City	9-12	598
35. G.W. Brackenridge High School	San Antonio	TX	Comprehensive	Large City	9-12	1,854
36. YES College Preparatory-Southeast	Houston	TX	Charter	Large City	6-12	658
37. Annandale High School	Annandale	VA	Comprehensive	Urban Fringe	9-12	2,425
38. Sammamish High School	Bellevue	WA	Comprehensive	Midsize City	9-12	1,223

Data Collection

The basic methodology used was a nested case study with purposive selection of cases. The basic case unit is the high school and its demographic features and context within a school district. Within the high school is nested its internal governance structure and culture. Within the structure and culture is the instructional program, which entails the formal curricular offerings and related student services. Within the instructional program is the classroom and within the classrooms are teachers and students, where all the aforementioned factors express themselves in the form of the actual instruction and learning that takes place within the school. Information was collected at all these levels and integrated across levels to reach final conclusions about the attributes of college readiness that should be present in a high school. Data was collected and aggregated at each nesting level:

- The High School

- The Structure and Culture
- The Instructional Program
- The Classroom

Table 2 illustrates the data collection methods used at each level. The following methods were employed:

- Interviews
- Focus groups
- Online questionnaires
- Document analysis
- Observations

Table 2. Data Collection Model

	High School and its Context	Structure and Culture	Instructional Program	Classroom Practices
Interviews	A	T,S	A,T,S	T
Focus Groups	P/C	T,S	S	S
Online Questionnaire	A	A,T	A,T	T
Document Analysis	Yes	Yes	Yes	Yes
Observations		Yes		Yes

Legend: A = Administrator, T = Teacher, S = Student, P/C = Parent, community member

Data collection from the site visits involved a three-step process. The first step was to administer an online survey in which school officials entered a variety of data: demographic data, enrollment figures, graduation rates, college application rates, and postsecondary pursuits. The second was to collect and compile from each school a variety of documents related to

academics and college preparation, such as syllabi, assignments, teaching and lecture notes, course curricula, and scoring rubrics.

The third step was for two researchers to conduct a two-day site visit to each school. School administrators, department heads, teachers, counselors, students, and parents at each school participated in focus groups and interviews. Researchers completed a minimum of four classroom observations during each visit, with at least one each in English/language arts, math, science, and social studies. Researchers scheduled additional interviews and activities (i.e., alumni focus groups and observations of advisory periods) as recommended by the school. In total, researchers conducted 300 interviews and/or focus groups and 224 classroom observations, and amassed more than 640 documents for analysis.

Data Analysis

Data was collected and analyzed on a real-time basis using a cross-case emerging categories method commonly referred to as the constant comparison method (Dye, Schatz, Rosenberg, & Coleman, 2000). In this approach, researchers identified variables at each stage of analysis and then compared those variables to data gathered at each subsequent stage. The results from the analysis after each site visit were compared to findings from previous sites in order to identify consistent and common themes, characteristics, and categories. This method allowed for the validation of variables as they were identified along with the simultaneous identification of new variables after each round of data collection.

Glaser and Straus (1967) in their seminal work on grounded theory, suggest four steps of analysis in the constant comparison method. These include comparing incidents applicable to each category, integrating categories and their properties, delimiting the theory, and writing the theory. As applied to instrument development, the method is adapted to create a consistent

conceptual framework in steps three and four rather than generating theory per se. While theory continues to inform instrument development, the analysis phase focuses primarily upon category development and validation. Goetz and LeCompte (1981) describe the process as follows:

> (The constant comparison method) combines inductive category coding with a simultaneous comparison of all social incidents observed (p. 58). As social phenomena are recorded and classified, they are also compared across categories. Thus, hypothesis generation (relationship discovery) begins with the analysis of initial observations. This process undergoes continuous refinement throughout the data collection and analysis process, continuously feeding back into the process of category coding.

Researchers also employed redundant reviews of coding decisions in order to help ensure consistency of categorization and of category development. Category development consistently referenced the four-component conceptual model of college readiness and other relevant conceptual and theoretical frameworks.

School interview, focus group, and document data were coded into 50 categories describing skills, behaviors, activities, policies, and practices associated with college readiness (see Table 2 below for a complete list). These data formed the foundation for item development for the CollegeCareerReady School Diagnostic, and the construction of a database of best practices and exemplar documents for fostering college readiness.

Results

This study moved the four-part college readiness from the theoretical to the practical, providing comprehensive and tangible examples of successful student preparation for college. An analysis of the data collected from the site visits generated patterns, then categories, and ultimately yielded a number of key theoretical principles that describe what educators and administrators do in successful schools. More than 2,300 distinct college readiness programs, practices, policies, strategies, and goals were coded into at least one of these 50 categories. Many items were coded into multiple categories. For example, field trips to visit college campuses might be coded as "encouragement to apply to college," "college selection," and "exposure to college environmental characteristics." This coding process resulted in more than 3,400 lines of data. Table 3 lists the 50 categories.

Table 3. List of Categories Generated from Data Analysis

Categorical Codes	
Academic focus	Note-taking
Arts content and skills	Oral communication skills
Assessments	Parent involvement
Awareness of college academic expectations	Persistence through difficulty
Awareness of how to prepare for college	Personalizing instruction
Career exploration	Precision skills
Collaboration	Problem solving skills
College selection	Professional skills
Community contributions	Reading skills
Contact with professors	Reasoning skills
Curriculum and standards	Research skills
Diversity skills	Resources for students facing particular obstacles
Encouragement to apply to college	Scheduling
English content and skills	School leadership
Exposure to college environmental characteristics	School structure
Financial aid/College costs	Science content and skills

Foreign language content and skills	Self-monitoring/Awareness skills
Independent decision making/Self-advocacy	Social studies content and skills
Information or assistance with the college application process	Staff-to-student ratios
Inquisitiveness	Teacher collaboration
Integration of knowledge across concepts/disciplines	Teacher selection and training
Intellectual openness	Technology skills
Interpretation skills	Test taking strategies
Leadership skills (for students)	Time management skills
Math content and skills	Vocabulary skills

What emerged from this dataset was a set of seven key principles for college and career readiness. The descriptions below include not only a definition of each of the seven key principles, but also examples of how the principles translate into practice from the data collected during the 38 high school site visits.[3]

Principle 1: Creating and maintaining a college-going culture in the school

This principle is drawn from the observation that students experience tremendous college and career readiness benefits (both social and academic) when they learn in environments where adults intentionally emphasize the value and attainability of postsecondary education. Staff members in schools that foster a college-going culture don't discuss *whether* students should attend college, but rather *how* to prepare for college and transition successfully after graduation. These schools value a broad range of postsecondary options including community college and career-oriented certificate programs. Regardless of the programs students plan to attend, they receive clear messages that their educational community has high expectations for them and believes in their ability to be successful.

Schools observed in the study upheld this principle in a variety of ways. In many schools, college acceptance letters were prominently displayed and the post-graduation plans of each senior were proudly shared with the student body on bulletin boards or in the school newspaper. Cristo Rey Jesuit High School in Chicago hosts two college fairs each year to which students of all grade levels are invited. The school supports a team of school counselors who specialize in college preparation, meet individually with students about their plans, and provide regular updates about college admissions, scholarships, and financial aid. Several schools in the sample modeled their programs after those observed in colleges and universities as a way of developing an embedded college-going culture. One example is the widespread availability of freshman orientation programs modeled

[3] Adapted from: Conley, D. T. (2010). College and Career Ready: Helping All Students Succeed Beyond High School. San Francisco: Jossey-Bass.

after college freshman orientations. These programs inculcate students in the college-going mission of the school academically and culturally, provide staff an opportunity to assess college readiness skills and deficits early, and allow freshmen to form long-term relationships with supportive adults. Building a strong culture around a college preparatory curriculum is another approach to creating a college-going culture. In many schools this means using a default schedule in which students are automatically enrolled in a program of study designed to prepare them for college. Sammamish High School in Bellevue, Washington, adopted a policy that all students will take at least one AP® course, raising awareness about the connections between a rigorous curriculum and the options available to students after high school.

Principle 2: Creating a core academic program that is aligned with and leads to college readiness by the end of 12th grade

A high school curriculum aligned with college readiness emphasizes key cognitive strategies such as reasoning, problem solving, and research, and is aligned with the content requirements for entry-level college courses. This process of vertical alignment is achieved by comparing course expectations, assignments, goals, and activities across several grade levels and across schools, using a set of college readiness standards as the common reference point. This process poses varying challenges for schools depending on their size and the nature of the relationships that exist between the postsecondary, secondary, and middle schools in the area. However, despite these challenges, working toward entry-level college alignment by grade 12 provides invaluable information for teachers at all levels who struggle to calibrate the rigor of their coursework and, as a result, move many students into their graduating year ill-prepared for postsecondary education.

George Washington High School in Denver has created a professional learning community that spotlights student performance and within-school alignment issues along multiple dimensions. Teams of instructors meet regularly by subject to review student work and performance data. Staff casually observe each other in the classroom and bring feedback and ideas to the learning community meetings, and teachers also perform regular peer reviews. These activities help set the stage for enhanced alignment and coordination of curricular expectations across classes, subjects, and grade levels. At the classroom level, many schools in the sample incorporated some form of long-term, project-based learning, often consisting of the development of a portfolio driven by student interest. The E-Cubed school in Providence administers the Diploma Plus model, a program in which students demonstrate proficiency through a digital portfolio of work. The portfolio is required to meet certain standards in order for the student to advance to the next grade, and all students must participate. This type of benchmarking assessment was observed in a number of different forms throughout the sample. While some schools used individualized assessments like the portfolio, others offered a more traditional common exam. Both approaches help to enforce a form of horizontal alignment at a particular grade level by determining how consistently students meet certain expectations across courses and teachers.

Principle 3: Teach self-management skills and academic behaviors and expect student to use them

Student self-management is an important college and career readiness skill, but one that is developed inconsistently in high school. Although educators may stress the importance of being organized and personally responsible, these exhortations are not necessarily accompanied by carefully structured programs and requirements designed to help students internalize these habits. The result is that some students become highly proficient at self-management by the end of high school, while others gain little in their ability to manage key tasks and behaviors necessary for postsecondary success.

Many schools in the sample acknowledged an explicit need to support students in the development of academic behaviors. Instructors at Corbin High School in Corbin, Kentucky provide their students with rubrics specifying how their work will be graded; substandard work is returned and resubmission is expected. Corbin students are also provided examples of high quality class notes and encouraged to use time at the end of each class period to organize and rewrite their notes. Students with well-developed note taking skills act as mentors for students who struggle to capture key ideas in an organized fashion. Many schools in the sample provide their students with planners, and some go as far as to monitor student use of this tool. Schools like Forest Park Street School in Forest Park, Georgia, employ student advocates who work individually with students struggling to self-manage. Similarly, Gateway to College at Montgomery College in Maryland assigns student to small cohorts of students who take a series of "foundation courses" designed to reinforce self-management and self-advocacy skills while at the same time bringing students up to speed in reading, writing, and math.

Principle 4: Make college and careers real by helping students manage the complexity of preparing for and applying to postsecondary education

In many cases, the ability to prepare students to apply to college is largely a function of counseling departments. Many of the schools in this sample have significant concentrations of students who would be first-generation college attendees, a fact that compels not only counselors, but faculty and administrators to prioritize the dissemination of "college knowledge" repeatedly and systematically throughout all four years of high school. By providing regular exposure to resources and information that increase familiarity and remove barriers to the admissions and financial aid application process, schools can make postsecondary education feel attainable to a larger percentage of students.

The most straightforward way to address this principle is to have all students apply to college and for this process to be supported and monitored by faculty, counselors, or advisors. Some schools experience resistance from parents who object to making college application mandatory; in these cases students in the sample schools are often still required to complete various pieces of the application process (personal statement, ACT/SAT and FAFSA completion) without being required to actually apply. Communication with parents was a prevalent theme throughout the schools in the sample. Counselors at Annandale High School in Annandale, Virginia attend all parent-teacher conferences. Hobbs High School in Hobbs, New Mexico publishes a "Counselor's Corner" newsletter (also reproduced in the local paper) to inform parents of deadlines, developments, and recommendations regarding college, scholarship, and financial aid applications. Hobbs counselors also stay with the same class for all four years. This practice allows for the development of long-term relationships with students and families,

and for the counselors to provide students with a specific counseling focus depending on the priorities for that year.

Principle 5: Create assignments and grading polices that more closely approximate college expectations each successive year of high school

If high school students are not given experiences that begin to approximate what they will encounter in college courses, they will have few coping mechanisms or strategies available to help them succeed. A progressively more challenging high school program of study in which students must take more responsibility for their own learning helps lay the groundwork for a smoother transition to postsecondary education. Instating a system of progressively rigorous expectations is more difficult in larger schools; these tend to rely on sequenced courses perceived by students to be increasingly "harder" rather than requiring more complex cognitive strategies or more independent work. Smaller schools are more likely to be successful at coordinating and monitoring deliberate learning progressions that can make increasing expectations more tangible to students.

Research papers are the most prevalent assignment given to approximate the college experience, although the frequency with which these are assigned, the length, citation style, and other requirements all vary from school to school. Some schools increase the length requirement of biannual research papers as a means of progressing students toward college-level capabilities; others require a larger number of papers throughout the year but increase the stringency of the grading criteria. Students at Manhattan Hunter Science High School in New York attend a weekly research class for three years during which they learn how to identify research topics, find reliable and relevant information, write research papers, and present them orally. Dual enrollment or early college programs integrate the expectations of college-level work in to the high school curriculum. At Middle College High School at Contra Costa Community College in San Pablo, California, students attend high school and community college simultaneously. This model allows students to adjust to the rigors and expectations of postsecondary work over time while being supported by high school faculty. By the time students graduate, not only are they fully prepared to complete college-level work but they have already begun earning college credit.

Principle 6: Make the senior year meaningful and appropriately challenging

While many students and families believe that by grade 12 students have earned the right to an easier year, evidence suggests that students who do not challenge themselves academically during the senior year are much more likely to place into remedial courses in college and earn lower grades in entry-level college courses. These effects are particularly pronounced for first generation college attendees, low-income students, or racial or ethnic minorities. Many of the schools in this study paid special attention to the structure of senior due to the relatively large populations of traditionally underrepresented students enrolled in their programs.

One of the most common practices schools employ to make senior year productive is to require that students register for challenging English, math, science, and social studies courses regardless of the number of credits they need to graduate. Another is the expectation that students enroll in senior seminars that are intensive courses in which student focus on in-depth content knowledge and develop all the dimensions of college

readiness through intensive reading, writing, and, in many cases, a demanding terminal project. High Tech High in San Diego fosters independent thinking and work habits through academic internships. These internships require students to work two afternoons a week, document their experiences, maintain regular communication with teachers, employers, and mentors, and execute a project that contributes positively to the needs of the company. Such internship experiences keep students academically engaged while allowing them to assess their ability to apply their knowledge and skills in a non-academic environment. Seniors at Polytech High in Woodside, Delaware, complete a rigorous senior project involving a research paper and a 30-minute presentation in which they must demonstrate mastery of a technical skill. In some cases external community members review the projects, a dynamic which emphasizes the importance of being able to work independently at the college and career ready level.

Principle 7: Build partnerships with and connections to postsecondary programs and institutions

One key step that high schools take to prepare more students for college is to reach out to postsecondary partners to find ways to work together directly and gain mutual understanding of each other's expectations for students. Because large proportions of students are entering their first year of college unable to place into credit-bearing courses, the initiative to build these partnerships has more often come from the postsecondary side. However, the key to a successful secondary-postsecondary partnership is a deeper understanding of how each institution is gauging academic performance and college readiness. These deeper relationships may take the form of bridging programs, teams of instructors that work across institutional boundaries, richer data sharing (such as with placement test results), and attempts to come to agreement of what constitutes adequate performance for college ready students.

Brackenridge High School near San Antonio has fostered a collaboration with the University of Texas at Austin which allows its English and chemistry students to complete entry-level online course work, including submitting assignments to be graded by UT instructors and peer reviewed by UT students. Blogs, online discussion forums, downloadable lectures, and a coordinated college site visit are all made possible by the coordinated efforts of the two institutions. Similarly, Marshall Fundamental High School in Pasadena has a number of partnerships with local college and community organizations that provide additional resources and opportunities to its students. One example, Upward Bound, sponsored by the California State University, Los Angeles, is a program designed to prepare minority students for college. Within the math component of Upward Bound, students can stay for four weeks on campus during the summer and take math courses from college professors. Pasadena City College (PCC) offers dual credit at Marshall Fundamental, and sponsors the Computer Careers Academy for at-risk students interested in computer-related careers. The academy is a partnership of PCC, the California Department of Education, private industry, and several governmental workforce and occupational programs. These types of collaborations not only enhance student exposure to postsecondary experiences, but they inform secondary-level educators of the areas in which students need additional instruction and support in order to succeed independently after graduation.

Scientific and Scholarly Significance of the Study

Beyond the identification of the seven key principles of college readiness, the data collected from this project are being used to generate an empirically validated instrument that can be used to gauge how well an individual high school is preparing students for college readiness. Current methods used to measure college readiness—course titles, GPA, college admissions tests—do not adequately capture what students need to know and be able to do in order to actually *succeed* in college (Conley et al., 2006). In addition, most standards-based exams in high schools, which are intended to measure high school competence, are not well aligned with the knowledge and capabilities needed for college success (Conley, 2003). Students not ready for college-level work are placed in remedial classes, increasing the time it takes to complete their degrees (Adelman, 1999; National Center for Education Statistics, 2004). This results of this study moves the understanding of college readiness from single measures to a multi-faceted approach, the theoretical to the practical, and enables measurable implementation strategies for improving student preparation for college.

CollegeCareerReady School Diagnostic Development

The data collected from the extensive literature review and the 38 schools have been used to develop the CollegeCareerReady School Diagnostic (School Diagnostic). The instrument is a web-based application that provides critical data on a school or district's current college readiness practices, and examines annual progress indicators on those practices. The School Diagnostic includes a series of surveys for teachers, administrators, counselors, and students. The surveys investigate the four dimensions of college readiness; currently the item pool contains approximately 1,100 items. Table 3 summarizes the four dimensions and their associated components, or aspects, measured by the School Diagnostic.

Table 3. Dimensions and aspects measured by the CollegeCareerReady School Diagnostic

Academic Behaviors	**Academic behaviors are the attitudes and behavioral attributes that students who succeed in college must demonstrate. Academic behaviors require students to take responsibility for their own learning and encompass a range of behaviors that reflects greater student self-awareness, self-monitoring, and self-control of a series of processes and behaviors necessary for academic success.**
Self-Monitoring	Students reflect on interests, strengths, and learning styles; set educational and career goals; and persist when faced with obstacles to attain their goals.
Study Skills	Students effectively prepare for completing college coursework, including exams and assignments.
Contextual Skills	**Contextual skills refer to the navigational skills that are necessary to enroll in college and understand how college operates as a system and as a culture. Examples of this privileged knowledge include a student's potential for long-range planning or goal setting, selecting an appropriate college, applying for college, and seeking out financial aid. Contextual skills also include an awareness of the quantity and quality of college course work, the structure of college course work, and other cultural factors of the college environment.**
Academic Awareness	Students understand the range of expectations and structure of college coursework.
College and Career Culture	Students understand how to navigate the college and career environments. Specifically, they know how to secure the resources they need to manage emotionally, socially, and academically (e.g., writing center, health center, and social organizations). They also explore interests and career options that may prepare them for the workplace after high school or college.
College Admissions Process	Students gather information, navigate the admissions process, and take steps to apply to college.
Tuition and Financial Aid	Students gather information, navigate the financial aid process, and take steps to apply for aid.
Key Cognitive Strategies	**Key cognitive strategies are patterns of intellectual behavior that lead to the development of skills and capabilities necessary for college level work. They enable students to learn, understand, retain, use, and apply content from a range of disciplines and are developed within the ways of knowing a particular content area.**
Interpretation	Students integrate data or evidence, which involves organizing it in a way that enables further analysis. Next, they analyze the data or evidence to find and describe patterns or details. Finally, students synthesize the data or evidence by stating a final conclusion about their analysis and offering a justification for their conclusion.
Precision/ Accuracy	Students check the final product for accuracy, complete all components of the assignment, and present the final draft in a way that is appropriate for the academic discipline and the assignment.
Problem Formulation	Students understand what the problem is asking and the concepts that are being addressed. Next, they hypothesize about what might be a plausible answer or preliminary thesis. Finally, they strategize about how to address the task.

Reasoning	Students construct an argument or line of reasoning that addresses a question and support their reasoning with evidence. They organize their argument so that the line of reasoning is clear. Students then critique their line of reasoning by reflecting upon it, using both self-evaluation and constructive feedback from others to improve their reasoning from the rough to final draft.
Research	Students identify the information needed to solve a problem. They collect sufficient relevant data or sources to answer the question. Finally, they evaluate the sources or data they have collected to determine their validity, credibility, and relevance and note any potential sources of error or bias.
Key Content Knowledge	**Key content is the foundational knowledge and skills that are important for college preparation in particular subjects as well as for the general application of key cognitive strategies. Content is the framework for applying key cognitive strategies and includes the overarching skills of writing, reading, and oral communication, along with specific content in English, math, science, second language, and social studies that are important for success in college.**
Overarching Academic and Technological Skills	These skills are necessary for students to be able to transfer knowledge and apply it across the curriculum, including reading, writing, conducting research, understanding and using data, and using technology. For example, technological skills include: possessing competency with presentation, spreadsheet, and word processing software; using technology effectively for research; understanding computing safety; locating help sections and online resources; and understanding basic hardware and software configurations.
Core Academic Subjects	Students understand the ways of knowing within various disciplines, the central topics of a discipline, the structure of knowledge within a discipline, and how content being covered links to real world situations.

The Diagnostic yields reports and recommendations based on the answers provided by the users that describe specific actions a school can take to prepare more students for college. The depth and reliability of the results improve with increased levels of participation across the school, but the instrument provides valuable data to each school, regardless of the number of participants.

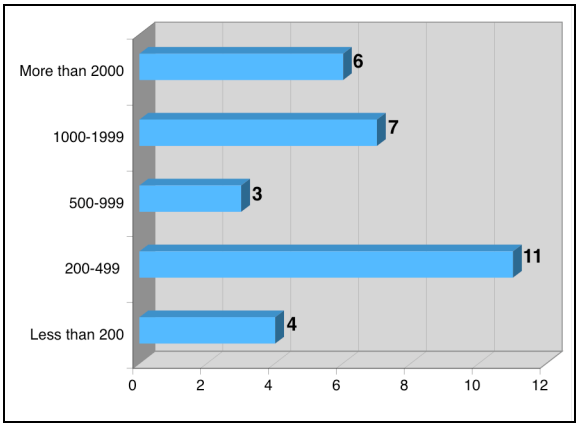
The online system produces an analysis of the alignment among school policies, teacher and counselor practices, and the student impact. Schools receive a school profile reporting the results of how the school is doing in relation to the four dimensions of college readiness. Each report also includes prioritized recommendations and resources that are drawn from the latest research on the best practices for postsecondary success. The diagnostic shows administrators and teachers where instruction could be made more effective, and suggests ways to prioritize the use of their limited resources. Using this tool longitudinally, schools are able to understand and increase the effectiveness of their college readiness strategies over time. The School Diagnostic

also allows for the comparison of results between schools, revealing trends and common challenges in the promotion of college readiness.

Current Status

The School Diagnostic was field tested across a number of school districts during the 2009 – 2010 academic year. In the fall 2009 pilot, 2,100 users in four schools completed diagnostics, and in the winter 2010 pilot, 2,870 users in seven schools participated. School sizes ranged from 97 to 4,760 students, with a mean of 1,019. Figure 3 below shows the distribution of participating schools across various school sizes.

Figure 3. Distribution of Pilot High Schools



To date, there have been over 5,000 users of the School Diagnostic. While the first administration provided data to inform item revision, and initial scalability and usability data, the second administration focused on implementation and identified steps for successful implementation. One interesting preliminary finding to date is that many users reported that simply reading the items included in the School Diagnostic sparked ideas of innovative ways to prepare students for college. One teacher commented, “This survey made me think about what I can do differently with my students to help them reach success.” Another shared, “The questions

were specific and thought-provoking." The goal of the third pilot currently in progress is to refine user documentation and reporting. The project team will be conducting observations, focus groups and interviews to gain feedback on the reports, resources, and user guides.

Specifically, the results of the field testing has resulted in the need for several enhancements, including:

- Wording of some questions will be modified and refined to increase clarity for the user, and some questions will be removed.
- Reports, which provide feedback on aspects of college readiness, will be modified and enhanced to provide a greater amount of data and resources. Reports will also be configured to analyze trends at schools automatically and provide a custom list of suggested resources and improvement plan ideas. Future reports will also provide comparative data, so schools can see their progress relative to others.

In addition to the ongoing system enhancements, the School Diagnostic instrument will be validated both statistically and through other measures, so that longitudinal research can be performed. Ultimately, researchers want to be able to track the progress of students who take the Diagnostic to determine the instrument's predictive validity.

Implications for Further Research

Developing and applying a conceptual model and observational instrument and system to improve college readiness will not automatically increase high school graduation rates. However, it is the first step in creating a data-driven solution framework that allows high schools to make systematic and deliberate additions and modifications to the content of their programs of study, their organizational structure, and their culture so that these are all more explicit aligned with the attributes of college readiness.

Enabling schools to generate better information about how well they are organized to achieve the goal of college readiness for all students is a critical step in any improvement process that seeks to move more students along successfully to postsecondary educational opportunities. This information enables high school teachers and administrators to undertake specific program-level changes that will make immediate differences in the preparation of students and to change counter-productive behaviors and practices and elements of the school's culture that hinder development of college readiness in all students.

While school-level action should not be viewed as a substitute for state policy initiatives to improve college readiness, school-level change certainly is a powerful force to encourage and support state policy actions and initiatives and to provide examples to other educators of how expectations can be increased and better alignment achieved. School districts will be able to act while at the same time creating more "evidence proofs" to which state policymakers can refer when considering instituting systemic solutions that align high school and postsecondary education more closely.

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