

Redefining College Readiness

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Table of Contents

Introduction	5
An Operational Definition of College Readiness	5
Uses of the Expanded Conception of College Readiness	6
How College Is Different from High School	6
Current Means to Determine College Readiness	8
Course Titles and Grade Point Averages	8
Tests	9
Performance in College Courses	10
Components in a Comprehensive Definition of College Readiness	12
Key Cognitive Strategies	12
Academic Knowledge and Skills	14
Academic Behaviors	16
Contextual Skills and Awareness	17
A Definition of College Readiness	18
General Characteristics	18
Example Performances	19
Possible Ways to Measure the Dimensions of this Definition	20
Key Cognitive Strategies Measurement	20
Key Content Knowledge Measurement	20
Academic Behaviors Measurement	21
Contextual Skills and Awareness Measurement	21
Integrating the Four Sources	22
Implications of the Definition	23
Gauging College Prep Programs	23
Gauging Effects in College	23
What Schools and Students Can Do to Foster College Readiness	25
Create a Culture Focused on Intellectual Development	25
Specify Core Knowledge and Skills	26
Provide Necessary Supports to Students	26
Provide Necessary Supports to Teachers	27
What Students Can Do to Develop Their College Readiness	28
References	30

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Introduction

The purpose of this paper is to provide an operational definition of college readiness that differs from current representations of this concept primarily in its scope. The paper suggests that, while much has been learned about this phenomenon, particularly during the past 20 years, few systematic attempts have been made to integrate the various aspects or components of college readiness that have been investigated in some depth during this period of time. As a result, college readiness continues to be defined primarily in terms of high school courses taken and grades received along with scores on national tests as its primary metrics.

Recent research has shed light on several key elements of college success. Most important for this paper is the realization that a range of cognitive and metacognitive capabilities, often described as “key cognitive strategies,” have been consistently and emphatically identified by those who teach entry-level college courses as being as important or more important than any specific content knowledge taught in high school. Examples of key key cognitive strategies include analysis, interpretation, precision and accuracy, problem solving, and reasoning.

Close behind in importance is knowledge of specific types of content knowledge. Several studies have led to college readiness standards that specify key content knowledge associated with college success. Writing may be by far the single academic skill most closely associated with college success, but the “big ideas” of each content area are also very important building blocks.

Similarly important are the attitudes and behavioral attributes that students who succeed in college must demonstrate. Among these are study skills, time management, awareness of one’s performance, persistence, and the ability to utilize study groups. These are both specific skills and more general attitudes, but all of them require high degrees of self-awareness and intentionality on the part of students as they enter college.

Finally, an increasing number of studies have highlighted the importance of the contextual knowledge that a student must possess to be ready for college. These studies describe the need for students to understand how to apply to college, how to manage financial aid issues, and, perhaps most importantly, how to adjust to college once they arrive. The transition to college has a component of culture shock for students, one that is more severe for students from some communities than others. Information about the culture of college helps students understand how to interact with professors and peers in college and how to navigate college as a social system and learning environment.

An Operational Definition of College Readiness

College readiness can be defined operationally as the level of preparation a student needs in order to enroll and succeed—without remediation—in a credit-bearing general education course at a postsecondary institution that offers a baccalaureate degree or transfer to a baccalaureate program. “Succeed” is defined as completing entry-level courses at a level of understanding and proficiency that makes it possible for the student to consider taking the next course in the sequence or the next level of course in the subject area. This conception is calibrated against what our recent research has come to define as “best practices” entry-level courses as opposed to the stereotypical freshman course (Conley, Aspengren, Gallagher, & Nies, 2006a, 2006b; Conley, Aspengren, Stout, & Veach, 2006c). If students are prepared to succeed in best practices courses, they will be able to cope with the full range of college courses they are likely to encounter.

The college-ready student envisioned by this definition is able to understand what is expected in a college course, can cope with the content knowledge that is presented, and can take away from the course the key intellectual

lessons and dispositions the course was designed to convey and develop. In addition, the student is prepared to get the most out of the college experience by understanding the culture and structure of postsecondary education and the ways of knowing and intellectual norms of this academic and social environment. The student has both the mindset and disposition necessary to enable this to happen.

Uses of the Expanded Conception of College Readiness

This definition can facilitate several important actions. First and foremost, it can be used to judge the current system widely in place to gauge college readiness. The paper will conclude that although measures exist currently or are in the process of being developed to generate high quality information in all of the component areas of the definition, no system exists or is being developed to integrate the information and, more importantly, shape high school preparation programs so that they do a better and more intentional job of developing student capabilities in all of these areas.

The pursuit of such a goal should lead to the consideration of new or refined measures and metrics to gauge college readiness with greater precision and across a wider range of variables and learning contexts and to provide better information to high school students about their college readiness at key points in high school. Ideally and in addition, the definition can also be used as a conceptual framework to design observational tools to assess the degree to which any particular high school program of instruction contains all the necessary elements to prepare students for college. In short, a more robust, inclusive definition of college readiness can help shape student behaviors and high school practices in ways that lead to more students entering college ready to succeed.

How College Is Different from High School

College is different from high school in many important ways, some obvious, some not so obvious. College is the first place where we expect young people to be adults, not

large children. Almost all of the rules of the game that students have so carefully learned and mastered over the preceding 13 years of schooling are either discarded or modified drastically. The pupil-teacher relationship changes dramatically as do expectations for engagement, independent work, motivation, and intellectual development. All of this occurs at a time when many young people are experiencing significant independence from family and from the role of child for the first time. No wonder that the transition from high school to college is one of the most difficult that many people experience during a lifetime.

Because college is truly different from high school, college readiness is fundamentally different than high school competence. Detailed analyses of college courses reveal that although a college course may have the same name as a high school course, college instructors pace their courses more rapidly, emphasize different aspects of material taught, and have very different goals for their courses than do high school instructors (Conley et al., 2006c). Students fresh out of high school may think a college course is very much like a similarly named high school class taken previously only to find out that expectations are fundamentally different. The college instructor is more likely to emphasize a series of key thinking skills that students, for the most part, do not develop extensively in high school. They expect students to make inferences, interpret results, analyze conflicting explanations of phenomena, 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).

Research findings describe college courses that require students to read eight to ten books in the same time that a high school class requires only one or two (Standards for Success, 2003). In these college classes, students write multiple papers in short periods of time. These papers must be well reasoned, well organized, and well documented with evidence from credible sources (National Survey of Student

Engagement, 2003, 2004, 2006). By contrast, high school students may write one or two research papers, at the most, during high school, and may take weeks or months to do so. Increasingly, college courses in all subject areas require well developed writing skills, research capabilities, and what have been commonly described as thinking skills.

According to the National Survey of Student Engagement (2006) the vast majority of first-year college students are actively engaged in small groups and are expected to work with others inside and outside class on complex problems and projects. They are then expected to make presentations and to explain what they have learned. In these courses, students are expected to be independent, self-reliant learners who recognize when they are having problems and know when and how to seek help from professors, students, or other sources.

At the same time, college faculty consistently report that freshman students need to be spending nearly twice the time they indicate spending currently to prepare for class (National Survey of Student Engagement, 2006). These students do not enter college with a work ethic that prepares them for instructor expectations or course requirements. College freshmen who are most successful are those who come prepared to work at the levels faculty members expect. Those who do not are much less likely to progress beyond entry-level courses, as witnessed by the high failure rates

faculty is the first-term freshman who is failing the course, shows up at office hours near the end of the term, and requests “extra credit” in order to be able to pass. College instructors are often mystified by such requests. The students are equally mystified by the instructor reaction, since this strategy has worked very well for the student throughout high school. In other words, the cultural and social expectations about learning and performance that students encounter tend to be vastly different as well.

In short, the differences in expectations between high school and college are manifold and significant. Students must be prepared to use quite a different array of learning strategies and coping skills to be successful in college than those developed and honed in high school. Current measures of college readiness do not necessarily capture well these many dimensions of readiness.

An important question to ask, based on this assessment of the nature of college, is: How well do current measures gauge student readiness along these and other related important dimensions necessary for college success? The next section describes the current means of determining college readiness and some of the limitations of those approaches. This is followed by a section that first defines a more comprehensive notion of what it means to be college-ready and then details each of its facets. Next, the paper presents briefly some ways in which

“The nature and quality of the courses students take are ultimately what matters and few real measures of course quality exist currently.”

in these courses and the significant proportion of college students who drop out during the freshman year.

Finally, the relationship between teacher and student can be much different than in high school. An oft-cited example by college

these facets might be measured and how a more integrated approach to measuring college readiness might benefit students. Finally, the paper considers the changes necessary from high schools, colleges, and students for this new approach to be put into practice.

Current Means to Determine College Readiness

While it is beyond the scope of this paper to present a full critique of current conceptions and constructions of college readiness, it is worthwhile to consider briefly some of the limitations of the current key measures, most notably among them course titles, grade-point averages, and tests, as well as a related measure, performance in entry-level general education courses subsequent to admission. This brief overview is presented to accentuate the need for a more robust and comprehensive definition of college readiness, one that leads to new tools, methods, and indices that will help students understand how ready for college they are and will help high schools make systematic improvements to increase the number of college-ready students who graduate each year. Each of the major measures and their limitations is discussed briefly in turn.

Course Titles and Grade Point Averages

The most common approach is to define college readiness in terms of high school course taking patterns, including the titles, perceived challenge level, and the number of units required for graduation, combined with the grades students receive in those courses. What this widely held definition assumes or presumes is that the number of courses that high school students take, and the units and names assigned to them, are accurate, comprehensive proxies for college-level success (Callan, Finney, Kirst, Usdan, & Venezia, 2006). Generally, these course titles must be approved by college admissions offices, in an uneasy but highly choreographed interplay between high schools and colleges. The net effect is to produce course titles that appear standardized on transcripts, but that promote a lack of “alignment between what is required to get into college vs. what’s needed to stay in college and succeed as an adult.” (Wagner, 2006)

Adelman (2006) employed transcript analysis to reach the conclusion that completing a challenging high school

curriculum is the greatest pre-collegiate indicator of bachelor’s degree completion, and the impact is even greater for black and Hispanic students than white students. This, however, leads toward a course title based definition of college readiness. Simply increasing the prescribed courses students take may not be sufficient, particularly for students who attend high schools with low academic standards and expectations. The nature and quality of the courses students take are ultimately what matters (ACT, 2005b), and few real measures of course quality exist currently. A key necessary component that could address issues of course quality would be a set of criteria that specify the performances necessary to receive a high school diploma. Since the 1980s, states have centered their reform efforts around the development of statewide standards and assessments. Yet most of these standards setting activities end at the 10th grade. Few states have undertaken to define 12th grade high school standards and the curriculum necessary to attain those standards.

While course requirements for the high school diploma have increased in a number of states, they have yet to produce significant improvements in student performance in college (Achieve, 2004). For instance, since 1987 many states have increased their mathematics and science requirements (National Science Board, 2004), but measures of college graduation have not shown increases (ACT, 2002, 2005a; Callan et al., 2006), nor have NAEP scores improved significantly (National Center for Educational Statistics, 2007). This lack of improved college success rates, even in the face of increasingly demanding high school graduation requirements, demonstrates how difficult it will be to achieve greater college success by simply having students take more prescribed courses without understanding what is being learned in those courses.

In fact, the mean grade point average of high school students has steadily increased even as measures of college success have fluctuated or worsened (Woodruff, 2004). A study of high school transcripts undertaken by ACT researchers (Ziomek & Svec, 1995) found compelling evidence of grade inflation. More recently, data from transcript analyses performed as a component of the National Assessment of Educational Progress (NAEP) determined that 2005 high school graduates had an overall grade point average of 2.98. This represented a .30 GPA increase, from 2.68 in 1990 (Ziomek & Svec, 1995). In other words, a “B” average in high school now may reflect knowledge and skills equivalent to something more like a “C” average thirty years ago. This is particularly problematic because many colleges have raised their GPA requirements over the same period of time (Breland et al., 2000).

Rather than leading to an improvement in student readiness for college, this appears simply to have resulted in the compression of grades at the upper end of the scale. This has led to any number of attempts to compensate for the compression, primarily through the weighting of particular courses. The UC system, for example, weights Advanced Placement® (AP®) and honors courses, so that many UC applicants now demonstrate GPAs that exceed 4.0. Individual high schools adopt their own weighting criteria, leading to myriad ways to compute a grade point average. According to Hawkins & Clinedinst (2006) many colleges are weighting high school GPAs to combat this problem. It’s not just the UC system that gives higher weight to college prep courses; 49% of colleges and universities are doing it. Many less selective colleges and universities are choosing this weighting strategy over increasing GPA requirements. Breland et al. (2000) found that GPA requirements have increased more in private than public colleges over the last 10 years, which accounts for most of the effect they saw in increased GPA requirements in higher education institutions.

Tests

Beyond using high school course titles to define college readiness, a more direct approach is to test a set of knowledge that students are presumed to need to know to succeed in college entry-level courses. Admissions

tests define college readiness by establishing benchmarks empirically or through “cut scores.” For example, ACT has defined college readiness by establishing College Readiness Benchmarks representing the minimum ACT test scores required for students to have a high probability of success in corresponding credit-bearing first-year college courses. The Benchmarks reflect the ACT scores students need to earn to have at least a 75% or greater chance of obtaining a course grade of “C” or better (ACT, 2005a). This is not a direct measure of necessary content knowledge and thinking skills, but a gauge of probability.

All states have adopted some form of high school examination in English, math and science for a variety of reasons including requirements in the federal No Child Left Behind Act. Research conducted by Standards for Success, published in the 2003 report *Mixed Messages* (Conley, 2003), found that most state standards-based high school tests were not well aligned with postsecondary learning. These tests are perhaps good measures of basic academic skills, but not necessarily of the knowledge and capabilities needed for college success.

As a result, the scores students receive on state tests may not be good indicators of college readiness, but students may believe that passage of the state test is just such an indicator. Recent data from the National Assessment of Educational Progress (NAEP) suggest a fundamental disconnect between trends and scores on state tests and on NAEP tests, which has triggered a federal study of state definitions of “proficiency” (Cavanagh, 2006). When performance on state tests is compared to NAEP performance, significant differences exist from state to state, and students can show improvement on state tests and not corresponding improvement on NAEP. In other words, it is very difficult to know what successful performance on a state test really means.

This creates serious problems when high schools focus on getting students to pass state tests. When students do finally pass the state exam, their program of study may be hopelessly out of sequence with what it takes to be college eligible. One possible means to help address this disconnect would be second-

generation assessment systems that connect high school tests with outcomes beyond high school (Conley, 2006) and, in the process, provide students with solid information on how ready they were and what they needed to do to be college-ready based on their state high school exam score.

Colleges also rely on Advanced Placement test scores as a potential measure of college readiness because these courses are one of the few places in the high school curriculum where some assumptions might be made about what a student who takes a class has learned. This is because each AP course has a set of curricular and resource requirements and, often more importantly, because many students take the corresponding AP exams after they take the course. This causes teachers to align course content with the curricular and exam specifications.

Even AP courses are being questioned by some colleges and universities. Although the reasons why colleges question AP are complex, one contributing issue is that some high schools have adopted the practice of offering an AP course in which none of the students take the AP exam, while others have taken to posting AP courses to student transcripts in subject areas for which no AP exam, and therefore, no true AP course exists. These issues with AP courses demonstrate how even an externally-referenced program such as AP can be co-opted to serve the purpose of inflating the academic credentials of students without necessarily contributing to the students' college readiness.

Performance in College Courses

An obvious but frequently overlooked fact is that the final arbiter of college readiness is student performance in college courses. Students who must enroll in remedial courses or who fail entry-level courses find it much more difficult to graduate from college.

Remedial Education

The high proportion of students who are identified as needing remedial or developmental education is frequently cited as evidence of the limitations of current admissions measures. While the precise number of students requiring remediation is difficult to ascertain, federal statistics

indicate that 40% of admitted and enrolled students take at least one remedial course (National Center for Education Statistics, 2004), reducing dramatically their probability of graduating and costing up to an estimated \$1 billion per year (ACT, 2005b). The California State University system, which draws its students from the top third of high school graduates in the state and which tracks remediation rates more precisely, finds that 46% of all first-year students require remedial education in both English and mathematics (Ali & Jenkins, 2002). The rates at community colleges are likely much higher, leading to multi-tier remediation programs at some institutions where student skill levels are so low they must take more than one remedial course in a subject area before reaching a credit-bearing course.

Having to enroll in remedial courses increases the time it takes students to complete their degrees and is associated with a decrease in the likelihood they will graduate (Adelman, 1999; National Center for Education Statistics, 2004). Nationally, only 17% of those students who must take a remedial reading class receive a bachelor's degree or higher; of those taking two remedial classes (other than reading), only 20% receive such a degree or higher (National Center for Education Statistics, 2004).

Children from low-income families are particularly vulnerable to a system that does not send clear signals to students on how ready they are for college. They are the most dependent on the schools to prepare them properly for college success because they are often the first in their families to attend college. These families can only gauge how ready for college success their children are based on the measures used by the schools. They are among the most likely to end up in remedial education.

Only 60% of these youth can expect to graduate from high school, only one in three will enroll in college, and only one in seven will earn a bachelor's degree (Bedsworth, Colby, & Doctor, 2006; Conley, 2005). Those students who do succeed in earning a college degree are taking longer to do so now than 20 years ago (ACT, 2002). These figures suggest a circuitous path to attaining a degree, and that many, perhaps most, of those who go on to college are not fully prepared for what will be expected of them, particularly in the area of how colleges operate (Adelman, 1999;

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Horn, 2004; Venezia, Kirst, & Antonio, 2004). Just as important, this suggests that the high school program of preparation is not adequately geared toward expecting these students to be prepared for college admission or success. These students are subjected to considerably lower expectations and demands in courses with titles that satisfy the needs of college admissions offices but do little to align with the actual content knowledge and intellectual skill levels freshman college students need to survive in the general education courses that they normally take first (Achieve, 2004; Adelman, 1999).

Remediation statistics reveal the tip of the iceberg. Many institutions allow students to choose not to take remedial courses even if the student is identified as needing such a course. Placement methods vary tremendously from institution to institution and are often rudimentary in nature, identifying only those students with the most serious deficiencies. These factors in combination result in many students, particularly students from low-income families and first-generation college attendees, struggling during the first year of college, resulting for many students in an increase in time-to-degree-completion. According to federal statistics, just over half of students seeking bachelor's degrees beginning in 1995-96 had attained that degree from that institution six years later (National Center for Education Statistics, 2003).

General Education

Student performance in general education courses has long been an issue in postsecondary education, where these courses come to serve as the real arbiter of admission. These “gateway” courses restrict access to majors and also tend to “weed out” students who are incapable of succeeding in them. When students struggle in entry-level courses, it extends their time to degree completion, a hidden cost of inadequate or inappropriate preparation. Failure rates in

some of these courses approach 50 percent, and while some argue this is the fault of poor college teaching, others argue that this failure rate can be explained equally by poor study habits, a lack of understanding of the expectations of college instructors, and deficiencies in content knowledge and thinking skills.

Defining what it takes to succeed in these entry-level courses is a key component in determining what it means to be college-ready. “College readiness standards” can send clearer messages to high schools regarding course content and to states about their high school level standards and assessments. These standards are not geared to what should or does occur in high schools as much as to what will be expected of students in college.

No less than a half-dozen such sets of standards exist currently at the national and state levels. They largely concur on what students need to know and be able to do to be ready for college. All are focused expectations attendant with entry-level college courses.

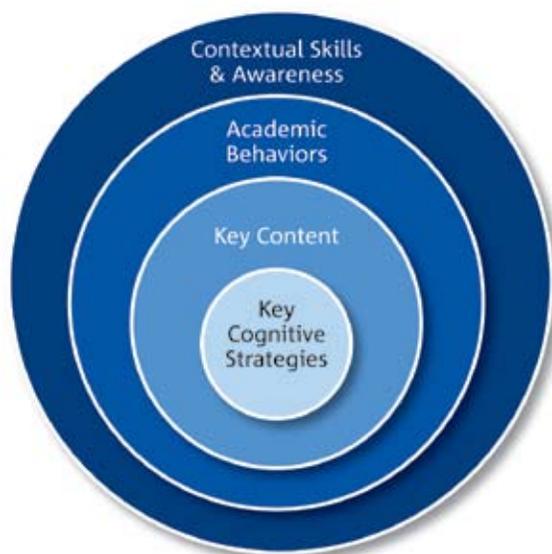
The Standards for Success project, sponsored by the Association of American Universities, developed a comprehensive set of readiness standards in six subject areas (Conley, 2003a). These statements outline the knowledge, skill, and key cognitive strategies necessary for success in research universities. Washington, D.C.-based Achieve, Inc., sponsored by state governors, organized the American Diploma Project. Its goal was to develop standards that reflected both college and work readiness in mathematics and English (Achieve, 2004). Both the College Board and ACT have published their own versions of college readiness standards and criteria. In addition, several states, most notable among them Washington state, have published or are in the process of developing sets of college readiness standards or “definitions” that connect to state high school academic standards (Transition Math Project, 2005).

Components in a Comprehensive Definition of College Readiness

College readiness is a multi-faceted concept comprising numerous variables that include factors both internal and external to the school environment. In order to provide a functional representation of the key facets of college readiness, the model presented below organizes the key areas necessary for college readiness into four concentric levels. These four areas of college readiness knowledge and skills emerge from a review of the literature and are those that can be most directly influenced by schools.

In practice, these various facets are not mutually exclusive or perfectly nested as portrayed in the model. They interact with one another extensively. For example, a lack of college knowledge often affects the decisions students make regarding the specific content knowledge they choose to study and master. Or a lack of attention to academic behaviors is one of the most frequent causes of problems for first-year students, whether they possess the necessary content knowledge and key cognitive strategies.

Figure 1: *Facets of College Readiness*



What the model argues for is a more comprehensive look at what it means to be college-ready, a perspective that emphasizes the interconnectedness of all of the facets contained in the model. This is the key point of this definition, that all facets of college readiness must be identified and eventually measured if more students are to be made college-ready.

Key Cognitive Strategies

The success of a well-prepared college student is built upon a foundation of key key cognitive strategies that enable students to learn content from a range of disciplines. Unfortunately, the development of key key cognitive strategies in high school is often overshadowed by an instructional focus on de-contextualized content and facts necessary to pass exit examinations or simply to keep students busy and classrooms quiet.

For the most part, state high-stakes standardized tests require students to recall or recognize fragmented and isolated bits of information. Those that do contain performance tasks are severely limited in the time the tasks can take and their breadth or depth. The tests rarely require students to apply their learning and almost never require students to exhibit proficiency in higher forms of cognition (Marzano, Pickering, & McTighe, 1993).

Several studies of college faculty members nationwide, regardless of the selectivity of the university, expressed near-universal agreement that most students arrive unprepared for the intellectual demands and expectations of postsecondary (Conley, 2003a). For example, one study found that faculty reported that the primary areas in which first-year students needed further development were critical thinking and problem solving (Lundell, Higbee, Hipp, & Copeland, 2004).

The term “key cognitive strategies” was selected for this model to describe the intelligent behaviors necessary for college readiness and to emphasize that these behaviors need to be developed over a period of time such that they become ways of thinking, habits in how intellectual activities are pursued. In other words, key cognitive strategies are patterns of intellectual behavior that lead to the development of cognitive strategies and capabilities necessary for college-level work. The term key cognitive strategies invokes a more disciplined approach to thinking than terms such as “dispositions” or “thinking skills.” The term indicates intentional and practiced behaviors that become a habitual way of working toward more thoughtful and intelligent action (Costa & Kallick, 2000).

is presented or conclusion that is reached, but asks why things are so.

Analysis: The student identifies and evaluates data, material, and sources for quality of content, validity, credibility, and relevance. The student compares and contrasts sources and findings and generates summaries and explanations of source materials.

Reasoning, argumentation, proof: The student constructs well-reasoned arguments or proofs to explain phenomena or issues; utilizes recognized forms of reasoning to construct an argument and defend a point of view or conclusion; accepts critiques of or challenges to assertions; and addresses critiques and challenges by providing a logical explanation or refutation, or

“Understanding and mastering key content knowledge is achieved through the exercise of broader cognitive skills embodied within the key cognitive strategies.”

The specific key cognitive strategies referenced in this paper are those shown to be closely related to college success. They include the following as the most important manifestations of this way of thinking:

Intellectual openness: The student possesses curiosity and a thirst for deeper understanding, questions the views of others when those views are not logically supported, accepts constructive criticism, and changes personal views if warranted by the evidence. Such openmindedness helps students understand the ways in which knowledge is constructed, broadens personal perspectives and helps students deal with the novelty and ambiguity often encountered in the study of new subjects and new materials.

Inquisitiveness: The student engages in active inquiry and dialogue about subject matter and research questions and seeks evidence to defend arguments, explanations, or lines of reasoning. The student does not simply accept as given any assertion that

by acknowledging the accuracy of the critique or challenge.

Interpretation: The student analyzes competing and conflicting descriptions of an event or issue to determine the strengths and flaws in each description and any commonalities among or distinctions between them; synthesizes the results of an analysis of competing or conflicting descriptions of an event or issue or phenomenon into a coherent explanation; states the interpretation that is most likely correct or is most reasonable, based on the available evidence; and presents orally or in writing an extended description, summary, and evaluation of varied perspectives and conflicting points of view on a topic or issue.

Precision and accuracy: The student knows what type of precision is appropriate to the task and the subject area, is able to increase precision and accuracy through successive approximations generated from a task or process that is repeated,

and uses precision appropriately to reach correct conclusions in the context of the task or subject area at hand.

Problem solving: The student develops and applies multiple strategies to solve routine problems, generate strategies to solve non-routine problems, and applies methods of problem solving to complex problems requiring method-based problem solving. These key cognitive strategies are broadly representative of the foundational elements that underlie various “ways of knowing.”

These are at the heart of the intellectual endeavor of the university. They are necessary to discern truth and meaning as well as to pursue them. They are at the heart of how postsecondary faculty members think, and how they think about their subject areas. Without the capability to think in these ways, the entering college student either struggles mightily until these habits begin to develop or misses out on the largest portion of what college has to offer, which is how to think about the world.

Academic Knowledge and Skills

Successful academic preparation for college is grounded in two important dimensions—key cognitive strategies and content knowledge. Understanding and mastering key content knowledge is achieved through the exercise of broader cognitive skills embodied within the key cognitive strategies. With this relationship in mind, it is entirely proper and worthwhile to consider some of the general areas in which students need strong grounding in content that is foundational to the understanding of academic disciplines. The case for the importance of challenging content as the framework for developing thinking skills and key cognitive strategies has been made elsewhere and will not be repeated in depth here (Bransford, Brown, & Cocking, 2000).

In order to illustrate the academic knowledge and skills necessary for college success, a brief discussion of the key structures, concepts, and knowledge of core academic subjects is presented below. This presentation is not a substitute for a comprehensive listing of essential academic knowledge and skills.

A more complete exposition is contained in *Understanding University Success*, produced by Standards for Success through a three-year study in which more than 400 faculty and staff members from 20 research universities participated in extensive meetings and reviews to identify what students must do to succeed in entry-level courses at their institutions (Conley, 2003a). These findings have been confirmed in subsequent studies.

This overview begins with two academic skill areas that have repeatedly been identified as being centrally important to college success: writing and research. This is followed by brief narrative descriptions of content from a number of core academic areas.

Overarching Academic Skills

Writing: Writing is the means by which students are evaluated at least to some degree in nearly every postsecondary course. Expository, descriptive, and persuasive writing are particularly important types of writing in college. Students are expected to write a lot in college and to do so in relatively short periods of time. Students need to know how to pre-write, how to edit, and how to re-write a piece before it is submitted and, often, after it has been submitted once and feedback has been provided. College writing requires students to present arguments clearly, substantiate each point, and utilize the basics of a style manual when constructing a paper. College-level writing is largely free of grammatical, spelling, and usage errors.

Research: College courses increasingly require students to be able to identify and utilize appropriate strategies and methodologies to explore and answer problems and to conduct research on a range of questions. To do so, students must be able to evaluate the appropriateness of a variety of source material and then synthesize and incorporate the material into a paper or report. They must also be able to access a variety of types of information from a range of locations, formats, and source environments.

Core Academic Subjects Knowledge and Skills

English: The knowledge and skills developed in entry-level English courses enable students to engage texts critically and create well written, organized, and supported work products in both oral and written formats. The foundations of English include reading comprehension and literature, writing and editing, information gathering, and analysis, critiques and connections. To be ready to succeed in such courses, students need to build vocabulary and word analysis skills, including roots and derivations. These are the building blocks of advanced literacy. Similarly, students need to utilize techniques such as strategic reading that will help them read and understand a wide range of non-fiction and technical texts. Knowing how to slow down to understand key points, when to re-read a passage, and how to underline key terms and concepts strategically so that only the most important points are highlighted are examples of strategies that aid comprehension and retention of key content.

Math: Most important for success in college math is a thorough understanding of the basic concepts, principles, and techniques of algebra. This is different than simply having been exposed to these ideas. Much of the subsequent mathematics they will encounter draw upon or utilize these principles. In addition, having learned these elements of mathematical thinking at a deep level, they understand what it means to understand mathematical concepts deeply and are more likely to do so in subsequent areas of mathematical study. College-ready students possess more than a formulaic understanding of mathematics. They have the ability to apply conceptual understandings in order to extract a problem from a context, use mathematics to solve the problem, and then interpret the solution back into the context. They know when and how to estimate to determine the reasonableness of answers and can use a calculator appropriately as a tool, not a crutch.

Science: College science courses emphasize scientific thinking in all their facets. In

addition to utilizing all the steps in the scientific method, students learn what it means to think like a scientist. This includes the communication conventions followed by scientists, the way that empirical evidence is used to draw conclusions, and how such conclusions are then subject to challenge and interpretation. Students come to appreciate that scientific knowledge is both constant and changing at any given moment, and that the evolution of scientific knowledge does not mean that previous knowledge was necessarily “wrong.” Students grasp that scientists think in terms of models and systems as ways to comprehend complex phenomena. This helps them make sense out of the flow of ideas and concepts they encounter in entry-level college courses and the overall structure of the scientific discipline they are studying. In their science courses, students master core concepts, principles, laws, and vocabulary of the scientific discipline being studied. Laboratory settings are the environments where content knowledge and scientific key cognitive strategies converge to help students think scientifically and integrate learned content knowledge.

Social Studies: The social sciences entail a range of subject areas, each with its own content base and analytic techniques and conventions. The courses an entry-level college student most typically takes are in geography, political science, economics, psychology, sociology, history, and the humanities. The scientific methods that are common across the social studies emphasize the skills of interpreting sources, evaluating evidence and competing claims, and understanding themes and the overall flow of events within larger frameworks or organizing structures. Helping students to be aware that the social sciences consist of certain “big ideas” (theories and concepts) that are used to order and structure all of the detail that often overwhelms them can help build mental scaffolds that lead toward thinking like a social scientist.

World Languages: The goal of second language study is to communicate effectively with and receive communication from speakers of another language in authentic cultural

contexts through the skills of listening, speaking, reading, and writing. Learning another language involves much more than memorizing a system of grammatical rules. It requires the learner to understand the cultures from which the language arises and in which it resides, use the language to communicate accurately, and use the learner's first language and culture as a model for comparison with the language and culture being learned. Second language proficiency can improve learning in other disciplines, such as English, history and art, and expand professional, personal, and social opportunities. Language learners need to understand the structure and conventions of a language, but not through word-for-word translation or memorization of de-contextualized grammatical rules. Instead, students of a language need to master meaning in more holistic ways and in context.

The Arts: The arts refer to college subject areas including art history, dance, music, theater, and visual arts. Students ready for college-level work in the arts possess an understanding of and appreciation for the contributions made by the most innovative creators in the field. Students come to understand themselves as instruments of communication and expression who demonstrate mastery of basic oral and physical expression through sound, movement, and visual representations. They understand the role of the arts as an instrument of social and political expression. They formulate and present difficult questions through their personal artistic visions. They are able to justify their aesthetic decisions when creating or performing a piece of work and know how to make decisions regarding the proper venue for performing or exhibiting any creative product.

Academic Behaviors

This facet of college readiness encompasses a range of behaviors that reflect greater student self-awareness, self-monitoring, and self-control of a series of processes and behaviors necessary for academic success.

These are distinguished from key cognitive strategies by the fact that they tend to be more completely independent of a particular content area, whereas the key cognitive strategies are always developed within the ways of knowing a particular content area. The key academic behaviors consist largely of self-monitoring skills and study skills.

Self-monitoring is a form of metacognition, the ability to think about how one is thinking. Examples of metacognitive skills include: awareness of one's current level of mastery and understanding of a subject, including key misunderstandings and blind spots; the ability to reflect on what worked and what needed improvement in any particular academic task; the tendency to persist when presented with a novel, difficult, or ambiguous task; the tendency to identify and systematically select among and employ a range of learning strategies; and the capability to transfer learning and strategies from familiar settings and situations to new ones (Bransford et al., 2000). Research on the thinking of effective learners has shown that these individuals tend to monitor actively, regulate, evaluate, and direct their own thinking (Ritchhart, 2002).



Key academic behaviors consist largely of self-monitoring and study skills.

Another important area of college readiness is student mastery of the study skills necessary for college success. The underlying premise is simple: academic success requires the mastery of key skills necessary to comprehend material and complete academic tasks successfully, and the nature of college learning in particular requires that significant amounts of time be devoted to learning outside of class for success

to be achieved in class. Study skills encompass a range of active learning strategies that go far beyond reading the text and answering the homework questions. Typical study-skill behaviors include time management, preparing for and taking examinations, using information resources, taking class notes, and communicating with teachers and advisors (Robbins, Lauver, Le, Davis, Langley, & Carlstrom, 2004). An additional critical set of study skills is the ability to participate successfully in a study group and recognize the critical importance of study groups to success in specific subjects. Examples of specific time management techniques and habits include: accurately estimating how much time it takes to complete all outstanding and anticipated tasks and allocating sufficient time to complete the tasks; using calendars and creating “to do” lists to organize studying into productive chunks of time; locating and utilizing settings conducive to proper study; and prioritizing study time in relation to competing demands such as work and socializing.

Contextual Skills and Awareness

The importance of this broad category has only recently been highlighted as an ever-wider range of students apply to college. Contextual factors encompass primarily the privileged information necessary to understand how college operates as a system and culture. It is this lack of understanding of the context of college that causes many students to become alienated, frustrated, and even humiliated during the freshman year and decide that college is not the place for them. Examples of key context skills and awareness include a systemic understanding of the postsecondary educational system combined with specific knowledge of the norms, values, and conventions of interactions in the college context, and the human relations skills necessary to cope within this system even if it is very different from the community the student has just left.

This does not necessarily mean that students need to disown their cultural backgrounds, heritage, and traditions, only that they need to understand the relationship between their cultural assumptions and those operating in college. Success in college is enhanced for students who possess interpersonal and social skills that enable them to interact with a diverse

cross-section of academicians and peers. These skills include the ability to collaborate and work in a team; understand the norms of the “academic” culture and how one interacts with professors and others in that environment; interact with people from different backgrounds and cultures; communicate informally; and demonstrate leadership skills in a variety of settings.

Another important area of contextual awareness is known as “college knowledge.” This is information, formal and informal, stated and unstated, necessary for both gaining admission to and navigating within the postsecondary system. College knowledge includes an understanding of the following processes: college admissions including curricular, testing, and application requirements; college options and choices, including the tiered nature of postsecondary education; tuition costs and the financial aid system; placement requirements, testing, and standards; the culture of college; and the challenge level of college courses, including increasing expectations of higher education (Lundell et al., 2004).

Admissions requirements, and timelines in particular, are extremely complicated, and students often do not know or understand the importance of either until it is too late. Specific institutions have additional special requirements and exceptions that are not immediately evident. Financial aid options are largely unknown or substantially misunderstood by many students most in need of such support. The economically well-off are more likely to have this knowledge than working-class families or families whose children are the first generation to attend college (Conley, 2005; Robbins et al., 2004; Venezia et al., 2004).

The next section provides an operational definition of college readiness that the conceptual model helps to delineate. The section seeks to include specific statements across all of the dimensions of college readiness. These statements are presented in a form that allows them to be measured or gauged. The net result would be a profile of college readiness that would help students know the degree to which they were college-ready, and could eventually help high schools in particular to know how well their programs of study are preparing students to be ready for college success.

A Definition of College Readiness

It is possible to compile very lengthy and detailed lists of the content knowledge students must know and the key cognitive strategies they must possess to be college-ready. In fact, a variety of such compilations have been produced lately (Achieve, The Education Trust, & Thomas B. Fordham Foundation, 2004; Conley, 2003, 2003a, 2004). In addition, others have identified the academic behaviors and context knowledge students need.

Rather than repeat each of these previous lists in detail, it may be more useful to consider a highly representative list of knowledge, skills, and attributes a student should possess to be ready to succeed in entry-level college courses across a range of subjects and disciplines. Such a list attempts to capture “keystone” skills, ones that can only be demonstrated if a set of subordinate and prerequisite knowledge and skills are in place. The list is not intended to be all-inclusive, but to suggest to the informed reader the types of indicators that would be necessary to gauge the more comprehensive notion of college readiness presented in this paper.

General Characteristics

Students who possess sufficient mastery of key cognitive strategies, key content knowledge, academic behaviors, and contextual knowledge would be defined as being college-ready to the degree to which they could demonstrate the following:

1. Consistent intellectual growth and development over four years of high school resulting from the study of increasingly challenging, engaging, coherent academic content.
2. Deep understanding of and facility applying key foundational ideas and concepts from the core academic subjects.
3. A strong grounding in the knowledge base that underlies the key concepts of the core academic disciplines as evidenced by the ability to use the knowledge to solve novel problems within a subject area, and to demonstrate an

understanding of how experts in the subject area think.

4. Facility with a range of key intellectual and cognitive skills and capabilities that can be broadly generalized as the ability to think.
5. Reading and writing skills and strategies sufficient to process the full range of textual materials commonly encountered in entry-level college courses, and to respond successfully to the written assignments commonly required in such courses.
6. Mastery of key concepts and ways of thinking found in one or more scientific disciplines sufficient to succeed in at least one introductory-level college course that could conceivably lead toward a major that requires additional scientific knowledge and expertise.
7. Comfort with a range of numeric concepts and principles sufficient to take at least one introductory level college course that could conceivably lead toward a major that requires additional proficiency in mathematics.
8. Ability to accept critical feedback including critiques of written work submitted or an argument presented in class.
9. Ability to assess objectively one’s level of competence in a subject and to devise plans to complete course requirements in a timely fashion and with a high degree of quality.
10. Ability to study independently and with a study group on a complex assignment requiring extensive out-of-class preparation that extends over a reasonably long period of time.
11. Ability to interact successfully with a wide range of faculty, staff, and students, including among them many who come from different backgrounds and hold points of view different from the student’s.
12. Understanding of the values and norms of colleges, and within them, disciplinary subjects as the organizing structures for intellectual communities that pursue common understandings and fundamental

explanations of natural phenomena and key aspects of the human condition.

Example Performances

The general characteristics listed above are suggestive or descriptive of tasks that students will have to be able to complete in college courses. The following examples, while far from all-inclusive, illustrate what a student who has sufficient competence in the general areas listed above would be able to do in a college course. Any student who can do the following with proficiency will likely be ready for a range of postsecondary learning experiences.

- Write a 3- to 5-page research paper that is structured around a cogent, coherent line of reasoning, incorporate references from several credible and appropriate citations; is relatively free from spelling, grammatical, and usage errors; and is clear and easily understood by the reader.
- Read with understanding a range of non-fiction publications and technical materials, utilizing appropriate decoding and comprehension strategies to identify key points; note areas of question or confusion, remember key terminology, and understand the basic conclusions reached and points of view expressed.
- Employ fundamentals of algebra to solve multi-step problems, including problems without one obvious solution and problems requiring additional math beyond algebra; do so with a high degree of accuracy, precision and attention to detail, and be able to explain the rationale for the strategies pursued and the methods utilized.
- Conduct basic scientific experiments or analyses that require the following: use of the scientific method; an inquisitive perspective on the process; interpretation of data or observations in relation to an initial hypothesis; possible or plausible explanation of unanticipated results; and presentation of findings to a critical audience using the language of science, including models, systems, and theories.
- Conduct research on a topic and be able to identify successfully a series of source materials that are important and appropriate to explain the question being researched;

organize and summarize the results from the search, and synthesize the findings in a coherent fashion relevant to the larger question being investigated.

- Interpret two conflicting explanations of the same event or phenomenon, taking into account each author's perspective, the cultural context of each source, the quality of the argument, its underlying value positions, and any potential conflict of interest an author might have in presenting a particular point of view.
- Communicate in a second language, using the language in a culturally appropriate fashion for common daily tasks and interactions, without resorting to literal translation except for certain specific words.
- Punctually attend a study group outside of class with students who represent a continuum of academic abilities and cultural backgrounds, incorporating the strengths of group members to complete the assignment or project at hand or prepare successfully for the exam or presentation in question.
- Complete successfully a problem or assignment that requires about two weeks of independent work and extensive research, utilizing periodic feedback from teachers and other pertinent resources along the way to revise and improve the final product.
- Create and maintain a personal schedule that includes a to-do list with prioritized tasks and appointments.
- Utilize key technological tools including appropriate computer software to complete academic tasks such as conducting research, analyzing data sets, writing papers, preparing presentations, and recording data.
- Locate websites that contain information on colleges, the admissions process, and financial aid, and navigate such websites successfully, comparing the programs and requirements of several colleges and assessing the financial requirements and feasibility of attending each.
- Present an accurate self-assessment of readiness for college by analyzing and citing evidence from classroom work and assignments, grades, courses taken, national and state exams taken, and a personal assessment of maturity and self-discipline.

Possible Ways to Measure the Dimensions of this Definition

Each of the four major components of college readiness needs to be measured in a somewhat different but complimentary fashion. While a technical discussion of these potential methods is beyond the scope of the paper, a brief description of how each might be measured is offered.

Key Cognitive Strategies Measurement

The key cognitive strategies are demonstrated primarily through learning activities and tasks that are deeply embedded in a course or courses. These strategies should be expected to develop over time, implying a continuous measurement system that is sensitive to increasing sophistication and elaboration of capabilities and not just counting the presence or absence of particular elements.

The best means currently available to accomplish this goal is probably the collection of classroom evidence. This approach has been used in a number of settings with some success, including a range of relatively high stakes decisions. While the measurement of key cognitive strategies envisioned in this paper is primarily for formative purposes, it is not beyond the realm of possibility that these measurements might someday contribute to higher stakes decisions.

A collection of evidence is, as its name implies, student work collected over a period of time to demonstrate some specific set of capabilities or skills. The collection is different from the more familiar “portfolio” in that it is focused on a particular set of criteria and its contents must meet both sufficiency and proficiency requirements. Collections of evidence are more structured than portfolios and are scored using more rigorous methods and instruments.

Collections of evidence have been employed in a variety of settings in the US

and abroad for college readiness purposes. Several states in Australia use variations on a collection of evidence to judge student work produced purposely for an external review process (Gipps, 1994; Masters & McBryde, 1994; Sadler, 1992). In the US, the Proficiency-based Admission Standards System (PASS) has utilized collections of evidence as an optional method to determine college admissions for students applying to the Oregon University System for the past seven years (Conley, 2004). More recently, the Office of the Superintendent of Public Instruction adopted a collection of evidence-based method as an alternative means for students who had not passed the state high school exit exam in Washington state as part of the graduation requirements (Conley, O’Shaughnessy, & Langan, 2006d). Currently, the Educational Policy Improvement Center is developing a formative assessment system with 20 New York City “empowerment zone” high schools that will gauge the development of key cognitive strategies along five key dimensions: reasoning, argumentation, and proof; interpretation; precision and accuracy; problem solving; and research (Conley, McGaughy, O’Shaughnessy, & Rivinus, 2007).

Key Content Knowledge Measurement

Although admissions tests have for a long time done a good job identifying students who are potentially college-ready based only on a short test of general reading and math abilities, advances in the understanding of the key knowledge necessary to succeed in college courses suggest a potentially different, or at least additional, measure of content knowledge. That measure is the end-of-course exam.

The advantage of these tests is that they can be carefully geared to identified standards and expectations for what will be taught in the college course. This helps enhance alignment

between the high school and college programs of study. If the tests are carefully geared to cover key concepts that are foundational to the subject area, they can provide very useful information on student readiness to the student and, potentially, to postsecondary institutions.

End-of-course exams have gained popularity during the past ten years, particularly, although not exclusively, in southern states. Texas is considering replacing its current state high school examination system, the Texas Assessment of Knowledge and Skills, with specific end-of-course exams. California has also added end-of-course exams to their standardized state exam.

High schools are not unfamiliar with end-of-course exams for college preparation purposes. Most notably, Advanced Placement and International Baccalaureate exams have been given at the end of a wide range of specific high school courses for many years (although the AP course is designed to be a college course taught in high school). The results from these exams, however, are rarely combined with other measures of college readiness while students are in high school. Instead, the results from these tests are taken into account by admissions offices as one element among many in the complex calculus of admissions decisions.

A college readiness assessment system that consisted of a series of end-of-course exams would yield much more detailed, fine-grained information on student knowledge and skills relative to college readiness standards. Although clearly more expensive to construct and maintain than current admissions tests, the exams have the advantage of eventually becoming an integral component of the courses associated with them and something for which teachers can prepare students without the label of “teaching to the test” being a negative characterization. These exams can also contain complex problems and writing that are not currently available to admissions tests.

Academic Behaviors Measurement

Academic behaviors can be measured in relatively straightforward ways if the means to measure them is defined largely in terms of their presence and the degree of fidelity

between student behavior and identified successful strategies in a series of areas. Most of these imply some sort of student survey and inventory where students list their methods, tools, and strategies in areas such as study skills, time management, and selfmanagement. Other possible measures relate to self assessment of competence relative to a range of academic skills, which would be facilitated if measures were in place as described for key cognitive strategies and key content knowledge. Academic behavior management is an area that would also lend itself to discussions between teachers (or advisors) and students to assess better behavior in practice versus espoused behavior. Such discussions could also take the form of advising on how to improve. However, progress could be gauged in relation to a scale or other set of objective measures of competence.

Considerable work is ongoing in this area, on the topics of study skills and time management particularly, and student self management more generally. It is likely that a number of major tools will be available to students and schools in the near future that will be designed to gauge student competence in these areas with greater precision. The only potential issue is that these systems are not necessarily designed to connect with information about intellectual development and content knowledge mastery. While a relationship can be assumed to exist among the three, a measurement system that connected all measures would be preferable to one that reported each separately.

Contextual Skills and Awareness Measurement

Student contextual knowledge of the entire process of college admissions, financial aid, and successful functioning in college can be gauged relatively simply through questionnaires. However, the larger issue is how this information is used. The most important use for the information is as a more general indicator of the quality of the preparation program itself. While information on individual students is quite useful in a diagnostic fashion to identify areas where additional information is necessary, the overall profile of student

contextual skill and awareness suggests very clearly the changes that high school programs need to make to improve student competence and confidence in this area.

Integrating the Four Sources

As noted, much of this information currently is collected in one fashion or another, but rarely, if ever, is the information combined into a comprehensive profile for the student to gauge personal college readiness and for the preparing institution to gauge the adequacy of its preparation program. The “holy grail” of college readiness would be an integrated system that provides all of this information to students in a progressive, developmentally appropriate fashion so that they have a continuous feel for how well they are being prepared and preparing themselves for college.

As mentioned throughout this section, much if not all the basic instrumentation necessary to create an integrated college readiness data system probably exists already or is under development. Numerous organizations vie to provide these services and tools to schools and students. However, few schools utilize these services and tools in ways that result in a comprehensive system within the school that addresses all facets of college readiness. This more comprehensive and inclusive definition of college readiness is a conceptual framework within which some of the most important measurements of student capabilities to undertake postsecondary work can be included and combined. The ultimate result would be one set of scores or indicators across multiple dimensions and measures that could be tracked over time from perhaps sixth grade through high school that would allow everyone involved to know where a student stood relative to the various dimensions of college readiness at any given time.

Implications of the Definition

The definition of college readiness has a series of implications and issues associated with it that will be touched upon briefly in this paper. Clearly, if this sort of definition were adopted at a policy level, the effects would be significant because it would make clearer the gap that exists between those who are admitted and those who have the capabilities necessary to succeed in postsecondary education. Its purpose at this point is not to suggest that numerous students should be denied entrance to college, but to highlight the gaps between the current implied or de facto definitions of college readiness and a more comprehensive, systematic approach to the issue. In this context, the definition is offered more as a statement of probability: the more of the elements of the definition the student has mastered, the greater the likelihood the student will succeed in entry-level general education courses. Given this more generous interpretation, the task of implementing such an expanded definition seems more manageable and incremental.

Gauging College Prep Programs

A reasonable initial goal might be not to use a more comprehensive measure to determine college admissions, but to ascertain how well each high school was preparing students to be ready for college. Entry-level college programs could also be assessed to ascertain the types of readiness they demand of students. Such information can be a useful starting point for program redesign to improve alignment by providing information on the specific areas where changes are needed to enhance student college readiness and success.

High schools in particular need to be organized to develop more systematically each of the elements contained in the definition. Students should be exposed to the definition and provided tools to self-assess what they are going to need to do to make themselves ready. Admissions offices need to emphasize in their communications with prospective applicants the importance of achieving all the components of the definition. Entry-level college courses

can be designed to build upon the elements of the definition and not to reproduce high school-level expectations that lead college freshmen to believe college is just like high school, a perception that leads them to adopt work habits that quickly become problematic. Admissions and placement testing methods need to evolve to capture more information about student proficiency on all the aspects of the definition.

Gauging Effects in College

A student who meets all aspects of the college readiness definition would gain in several ways. First, the student would be comfortable in essentially any entry-level general education course. This is an important level to attain because failure to succeed in one or more general education courses during the first year is closely associated with failure to continue in college (Choy, 2001; Choy, Horn, Nunez, & Chen, 2000).

Second, the student could keep open the option to pursue a wide variety of majors, including those requiring math or science. Currently, many students who complete math and science requirements for college admission are not really prepared to take college-level courses in these areas, and they assiduously avoid them. These students essentially eliminate from the realm of possibility any major that requires math or science.

Given the increasing importance of math and science as components of many majors that previously did not include them, deficiencies in these subject areas have an even greater effect on the choice of majors available to students. Mathematics is found in a range of majors from business to the social sciences. Scientific knowledge is necessary for access to whole fields such as human physiology, physical therapy, nursing, and other health care related fields for which rapid job growth is predicted. Needless to say, lack of skill or confidence in math or science completely rules out all forms of engineering, an area of

critical concern in terms of national economic priorities as well as another area of rapid job growth and economic opportunity.

Third, and often overlooked, students who lack facility in the areas outlined in the definition will simply not get as much out of college, particularly if they fail to develop the key cognitive strategies. On one level, the intrinsic value and sense of accomplishment the student derives from college will be lessened if the student expends significant energy simply to survive and does not pursue challenges, which is what occurs when students feel overwhelmed because what they encounter during the freshman year is unfamiliar and disorienting. College just won't be as stimulating and interesting for students who don't really "get" what college is about.

For students from under-represented groups the problem is more serious. These students enter college with far less awareness of what it takes to fit in and to cope with the system. When this is compounded by a lack of content knowledge or learning skills, there is little about the experience that is positive for them, and many leave during the freshman year. If these students understand more fully all of what college has to offer

and how one behaves in college in order to gain the most benefit from the experience, they will be more likely to remain.

On another level, this is a problem for the institution because more states and other organizations are calling on colleges to be accountable for the "value added" that the college experience imparts to the student in return for the ever-increasing tuition expenses incurred. Unfortunately, students who enter poorly prepared and not thinking in ways consistent with the culture and structure of postsecondary education often find ways to navigate the system without really getting a lot out of it. Some evidence exists to suggest that some students can complete a bachelor's degree and be less proficient at writing, for example, than when they entered (Bok, 2006).

A more comprehensive conception of college readiness can create expectations that students understand the purposes of college and work to take advantage of all options and opportunities available to them. They would be prepared to add value to their education and not simply navigate the system. This would set the stage for postsecondary institutions to assess the value added of a baccalaureate degree in more comprehensive and consistent ways.

What Schools and Students Can Do to Foster College Readiness

If schools and students understand college readiness in a more expansive and comprehensive way, they can do more to develop the full range of capabilities and skills needed to succeed in college. Indeed, at the heart of this definition is the notion that those most interested in college success will change their behaviors based on the greater guidance the definition offers on how to be college-ready. The following section discusses some of the changes that could occur in high schools and on the part of students to achieve better and more complete readiness for college.

Create a Culture Focused on Intellectual Development

Using these criteria, the most important thing a high school can do is create a culture focused on intellectual development of all students. Intellectual development has several elements.

The first element involves students interacting with appropriately important and challenging academic content. For students to do so requires that the school have an intellectually coherent program of study that is systematically designed to focus on what Wiggins and McTeague (1998) describe as the “big ideas” of each subject area taught. They then teach those big ideas by exposing students to a series of “enduring” and “supporting understandings” that create an overall intellectual and cognitive structure for the content, a structure that can span multiple courses and grade levels but that is revisited by students each time a new course within that area is taught.

Second, key key cognitive strategies should be developed over a sequentially more challenging progression throughout four years of high school. If the content of the program of study is carefully organized around the kinds of key organizing and supporting concepts and

information as described previously, it is then possible to use this structure of challenging and appropriate content as a framework for developing key thinking and reasoning skills and other supporting cognitive habits that will affect success in college as much or perhaps even more than any specific content knowledge students acquire.

Third, the academic program should be structured to cause students to demonstrate progressively more control and responsibility for their learning as they approach the college level. This does not necessarily mean students have more choices over what they learn, but rather they are expected to work independently and semi-independently outside of class on progressively larger, more complex pieces of work. For example, students need to become better at critiquing their own work and then rewriting or modifying that work so that it conforms more closely to expected performance and output.

The reason the intellectual climate of the school is a central element in college readiness is because the school can control this variable directly and relatively completely if its teachers and administrators choose to do so. Furthermore, this is an area that teachers and administrators often fail to address consciously, instead allowing students to dictate the intellectual tone and tenor of the school. In such environments, little thought is given to how students are developing intellectually from course to course or year to year, or what is happening in any given course to cause such development to occur.

The result is that students often enter their senior year of high school believing they are ready for college because they have completed required courses. This leads to the development of particularly bad study habits and skills during the senior year (Conley, 2001; Kirst, 2000; National Commission on the High School Senior Year, 2001). In this fashion, the lack of a

coherent, developmentally sequenced program of study also contributes to deficiencies in other key areas, including study skills and time management. In fact, it is difficult to imagine a preparation program that emphasizes time management and study skills but does not sequence challenge levels that develop these skills progressively from year to year.

Specify Core Knowledge and Skills

As noted above, the school must organize its curriculum in each subject area around a set of core concepts and supporting information. The goal is to have students develop an understanding of the structure of the discipline and to retain specific content knowledge within this structure. To facilitate this organization of knowledge, the school must be prepared to adopt a formal set of exit standards that specify what students will know and be able to do in each of the core academic areas. These standards need not be detailed to the level of stating each and every piece of knowledge that a student has mastered, but should be comprehensive enough to identify the big ideas and supporting knowledge necessary to comprehend each big idea fully and completely. These standards can be considered “keystone” expectations that clearly infer the mastery of significant subordinate skills and knowledge necessary to achieve them.

This sort of a structure facilitates a more logical progression and development of knowledge mastery over four years of high school in place of the isolated course-based model that currently exists. At the same time, the exit standards do not necessarily mandate or require any particular organizational structure or instructional strategy. Schools remain free to organize the instructional program in the way they see fit to ensure student mastery of the keystone knowledge.

Provide Necessary Supports to Students

In addition to key cognitive strategies and important content knowledge, students need specialized information in order to access the college admission system. Given

the decentralized nature of US postsecondary education, high schools are the only place where all students have the opportunity to come into contact with information on the complexities of college preparation and application. High schools are responsible to make this information available to all students, not just those who seek it out. This means incorporating college readiness activities into the routines and requirements of the school.

For example, students need to know about college requirements and financial aid options. They need to understand the application process. In fact, an increasing number of high schools that serve high proportions of students who would be first generation college attenders are requiring all students to apply to at least one college during the fall semester of their senior year. Students need experience preparing a resume or other summary document that profiles their activities and accomplishments. They need familiarity with the financial aid system and its attendant timelines and documentation requirements. They need to understand the tiered nature of postsecondary education in the US and how some institutions are more demanding and selective in their admissions processes, while others are more open and accept essentially all applicants. They need to understand that different kinds of colleges appeal to different kinds of learning styles and interests and that the majors a college offers is an important element in picking a college. They need to know all of the various deadlines and required paperwork, such as letters of recommendation or transcripts. Finally, they need to understand the role of admissions tests, such as the SAT and ACT, as well as AP, IB, and others, along with any dual enrollment options the state and school may make available.

All of this information is necessary for students to make good decisions about college preparation and to demystify the process. Many students give up simply because they feel intimidated or overwhelmed by all of the requirements and activities associated with applying to college. Others may lack the maturity necessary to see as far into

the future as the college preparation and application process requires. Activities to break this process down into manageable pieces that students master automatically as they move through high school will help increase the number of applicants and their subsequent success getting admitted to and succeeding in college.

While these activities are not very effective if conducted in isolation from the academic program, they are an important component of an overall environment in which students develop the full set of knowledge and skills necessary for college success, including intellectual capabilities and thinking skills, complex and appropriate content, and knowledge of the system of college preparation, application, and admission.

Provide Necessary Supports to Teachers

To teach an intellectually challenging class, teachers must be properly prepared and equipped with the understandings of their subject area necessary to evoke in students the desired responses to material, responses designed to deepen their engagement with and understanding of key course concepts and to expand their repertoire of thinking skills and strategies. Teachers must have a reference point for college readiness that extends beyond their own previous experiences in college or self reports from the few students who return to share their post-high school experiences in college.

The necessary support ideally takes the form of professional development activities in which teachers learn to focus their curricula on key ideas and supporting concepts and to teach these through techniques, activities, and assignments that require students to develop the key cognitive strategies necessary for college success. Such activities are often best undertaken in partnership with colleagues from postsecondary institutions. They can include seminars on recent developments in the academic field, debate and discussions of controversial ideas in the subject area, critiques

of potential student assignments, and reviews of student writing and a consideration of strategies to improve writing.

These activities need not be didactic in nature, with the postsecondary faculty possessing all the answers and the high school faculty viewed as being in need of enlightenment. Instead, these sessions can be collaborative and collegial in nature. While such sessions ideally begin with face-to-face interactions, they can be sustained and continued through the use of online discussion boards and other electronic means that help faculty build and strengthen connections across the system boundaries.

While every high school teacher may not necessarily participate in such activities, a critical mass will have a transformative effect on the academic culture and norms of the high school. Expectations for what constitutes current teacher knowledge of the subject will be transformed along with the level of challenge and rigor in courses. In the past, the Advanced Placement program attempted to achieve this goal through sessions that did very much what was described previously. This worked well when the AP community was small and close knit. The recent rapid expansion of AP has stretched the fabric of this community to some degree and made it more difficult to sustain the type of intellectual interaction that is needed.

Additionally, AP teachers often did not share their experiences with other high school faculty, which resulted in AP courses having a different tenor to them than the rest of the curriculum. This now needs to change so that the new and expanded AP offerings at many school can serve as a reference point for an infusion of ideas and techniques that better prepare all students for college, whether they take an actual AP course.

What Students Can Do to Develop Their College Readiness

A definition of college readiness must also address the issue of how students combine the various facets of college readiness. For students, the combination is more complex because it includes the elements under the school's control along with those that are not.

In particular, students need to understand what it really means to be college-ready. They need to understand what they must do as well as what the system requires or expects of them. They must, first and foremost, understand that college admission is a reasonable and realistic goal that can be attained through planning and diligent attention to necessary tasks.

Because colleges judge students based on the sum total of their performance in high school (although many omit the freshman year and some functionally ignore the second semester of senior year), it is critical that students begin their journey toward college readiness immediately before they arrive in high school. While this paper will not explore the role of the middle school in making students college-ready, it is worth noting that, at the least, the connection between middle school and high school math and English programs is worth careful scrutiny. Students, for their part, need to be making the right decision as they prepare their very first high school schedule as incoming ninth graders. A wrong decision at this point can have ramifications throughout high school and beyond.

Similarly, they need to construct an overall plan for college preparation that ensures they will develop the necessary skills in a progressively more complex fashion over four years. Ideally, the school's program of study will be designed so that students cannot make bad decisions. The element of individual student planning is important in the US educational system, where high school and college are not closely or directly connected.

A number of states have instituted what they call "default" high school programs of study into which all students are enrolled unless their parents specifically exempt them from the program. The programs of study are designed to meet the entrance requirements of the state university system. This is a first step in the direction of ensuring that students do not make bad decisions in high school, decisions they quickly come to regret when they are faced with the prospect of life after high school.

Students need to take the responsibility to utilize the information presented to them on college academic and financial requirements and to discuss this information with adults in their lives who may be able to help them. Not all students have supportive family environments, but support can come from other quarters as well, and students need to be encouraged to reach out to and interact with adults who can help them navigate the college readiness gauntlet, whether these adults are relatives, community service staff, or adults at the school who may be paid staff or volunteers. Young people need personal contact and guidance to know how to become, and believe they are capable of being, college-ready.

Given the knowledge-intensive system of college readiness, admission, and financial aid that the US has developed, this component of personal support and student initiative cannot be overlooked in the college readiness equation.

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