Part One

Redefining College and Career Readiness

CHAPTER 1

The Four Key Dimensions of College and Career Readiness

Historically college admission has been determined based on a rather narrow set of measures. However, actual success in college seems to be more dependent on a much wider array of skills, knowledge, attitudes, behaviors, and strategies than are currently considered for admission. What we need is a more comprehensive conception of college readiness.

This chapter presents a four-dimension model that serves as the basis for determining how prepared students are for college and careers. The model considers the capabilities, skills, knowledge, and behaviors students need to demonstrate to be ready to pursue learning beyond high school. The elements of this model can be applied to a broad range of learning settings in high school and beyond. Although the dimensions match up well with traditional core academic courses, they are just as applicable to a wide range of applied courses and learning experiences that help students prepare for postsecondary career studies.

The four dimensions derive from recent research on the key elements of college success. Most important is the finding that the development of a range of metacognitive capabilities, that is, key cognitive strategies, has been consistently and

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emphatically identified by those who teach entry-level college courses as being as important as or more important than any specific content knowledge taught in high school. Key cognitive strategies are used in activities such as formulating problems, conducting research, interpreting conflicting evidence, communicating conclusions and findings, and completing all work with precision and accuracy.

Inextricably bound with key cognitive strategies is key content knowledge. Greater consensus is emerging regarding the content knowledge associated with college and career success. These big ideas of each content area are important building blocks that can serve as frameworks for the development of individual high school courses and an integrated, sequential program of study over four years of high school.

Similarly important are the attitudes and behavioral attributes that students must demonstrate to succeed in postsecondary education. Among these are the ability to study, manage time, be aware of one's performance, demonstrate persistence with difficult tasks, and set and achieve academic and personal goals. These academic behaviors require mastery of specific skills combined with a mind-set and attitude toward learning. The common element across all of these is a high degree of self-management, self-awareness, and intentionality on the part of the student. These attitudes and dispositions need to be developed systematically over time if they are to become habitual for students by the time they reach a postsecondary program where they will be expected to take much more responsibility for their own learning.

Finally, an increasing number of studies have highlighted the importance of students' possessing knowledge of how the postsecondary system operates and the differences between high school and college. These studies have identified the adjustment challenges students face when attending postsecondary programs because, for most students, going to college is like entering a new culture. This profound transition, disorienting for even the best-prepared students, is particularly difficult for students from communities that have little prior experience with postsecondary education. All students, particularly those without prior knowledge of the college-going culture, lack critical information in a number of areas and the ability to read important cues. Examples range from procedural tasks, such as how to choose among colleges and how to apply to college and for financial aid, to more sophisticated insights into how college is different from high school, how to interact with professors and peers in college, and a host of

other types of knowledge critical to student success in applying to and matriculating at college.

GENERAL ELEMENTS OF A MORE COMPREHENSIVE DEFINITION OF COLLEGE AND CAREER READINESS

In a general sense, *college and career readiness* can be defined as the level of preparation a student needs in order to enroll and succeed—without remediation—in a credit-bearing course at a postsecondary institution that offers a baccalaureate degree or transfer to a baccalaureate program, or in a high-quality certificate program that enables students to enter a career pathway with potential future advancement. *Succeed* is defined as completing the entry-level courses or core certificate 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 or of completing the certificate.

The level of performance necessary to succeed in these courses in the manner just described is calibrated against what recent research has come to define as "best practices" entry-level college courses, which are quite different from the stereotypical freshman course. These courses require students to engage significantly with the course content and topics and to use key cognitive strategies. Students who succeed in these best practices courses will be ready to pursue further studies in a range of fields and to continue on in the major or certificate program of their choosing.

The college- and career-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 skills the course was designed to convey and develop. The student demonstrates self-management skills that lead to success in the course. In addition, the student is prepared to get the most out of the rest of the college experience by understanding the culture and structure of postsecondary education and the ways of knowing and intellectual norms of the academic and social environment in which he or she is participating. This student has both the mindset and disposition necessary to enable this to happen.

This definition can facilitate several important actions. First and foremost, it can be used to judge the current system by which high schools calculate student readiness for college and careers. High schools should be prepared to measure

student readiness in all four dimensions and ascertain how each high school course or learning experience contributes to each of the readiness dimensions. When high school staff engage in such systematic analysis, they are able to shape the high school's instructional programs so that it does a better and more intentional job of developing student capabilities in all of these areas.

In addition to judging how well the high school program is designed, the four dimensions can be used to provide better information to students at key points in high school while they still have time to address deficiencies in any of the four readiness dimensions. Nothing is potentially more powerful than enabling students to take control of their own learning and preparation by providing them with longitudinal information on how close to college and career ready they are along each of these four dimensions.

In short, a more robust, inclusive definition of college readiness can help shape high school practices and student behaviors in ways that lead to more students who are ready to succeed in college and careers.

CURRENT MEANS TO DETERMINE COLLEGE AND CAREER READINESS

It is beyond the scope of this book to present a full critique of current conceptions and constructions of college and career readiness. Nevertheless, it is worthwhile to consider briefly some of the limitations of the key measures used currently to determine readiness for postsecondary programs of study, most notably 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 new tools, methods, and indicators that will help students understand how ready they are for postsecondary studies. It will serve as well to help high school educators in particular reflect on the limitations of current measures and the potential power of new sources of information on college and career readiness that reflect more fully the four dimensions outlined in this chapter.

Course Titles and Grade Point Averages

The most common approach is to define readiness in terms of high school course-taking patterns, including the titles, perceived challenge level, and the total units required for graduation, combined with the grades students receive

in those courses. What this widely held definition 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 postsecondary-level success. Generally the course titles that meet requirements for entry into a baccalaureate program must be approved by college admissions officers, who engage in an uneasy but highly choreographed interplay with high school administrators to identify which course titles will be approved. The net effect is to produce course titles that appear standardized on transcripts but are almost certainly not comparable in terms of content coverage or challenge level.

Course requirements for certificate programs are much more variable. Some certificates have demanding prerequisite requirements, and few students enroll directly out of high school because they end up needing to take at least some college courses before they are ready for the certificate program. Others are less demanding of entering students. However, the administrators of certificate programs do not review and approve high school course titles the way that admissions officers review college preparatory course titles. Even this minimal quality control step is lacking for the career-oriented programs in most cases.

Federal studies using transcript analysis reach the conclusion that completing a challenging high school curriculum is the strongest precollegiate indicator of bachelor's degree completion. The impact of a strong high school preparation program is even greater for black and Hispanic/Latino students. This measure, important as it is, remains based on course titles as the primary measures of quality. When this approach is used, the only way to increase rigor is to increase the number of courses taken in a subject area. States, however, are learning that simply increasing the number of prescribed courses students take may not be sufficient, particularly for students who attend high schools that have low academic standards and low expectations for their students.

The nature and quality of the courses students take are ultimately what matters, and few true measures of course quality currently exist. A key necessary component that could address issues of course quality would be a set of criteria that specified the performances necessary to complete the course successfully. States have invested heavily in standards and tests, but have paid much less attention to the actual content of courses. Some states offer curriculum frameworks to guide local course development, but these generally fall short of identifying and

prescribing how to measure key course outcomes or how these align with other courses and with college readiness.

Course requirements for the high school diploma have increased in a number of states, but scant evidence exists that these reforms have led to significant improvements in student performance in college. For instance, since 1987 many states have increased their mathematics and science requirements, but enrollment into engineering majors, which require healthy doses of math and science, remains flat, even while the number of students attending college has increased. Nor have scores on twelfth-grade National Assessment of Educational Progress (NAEP) tests shown improvements in core academic skills commensurate with increases in required courses in English and math. Remediation rates at most two-year colleges remain constant or are increasing. Time to degree completion is not shortening. This lack of improvement in a number of areas related to college success, even in the face of increasingly demanding high school graduation requirements, demonstrates how difficult it will be for states or districts to improve college and career readiness by simply having students take more prescribed courses without a greater understanding by governing agencies of what is actually going on in those courses.

If we use student high school grades as an indicator of improvement, here again we see increases in the average grades of high school graduates over the past thirty years. This has occurred even as measures of college success have fluctuated or worsened. Studies of high school transcripts undertaken by ACT researchers in the 1990s and again in the 2000s found compelling evidence of grade inflation in each decade. Data from high school transcript analyses performed as a component of NAEP confirmed this finding. The data revealed that high school graduates in 2005 had an overall grade point average (GPA) of 2.98 in contrast to 2.68 in 1990. In other words, a B average in high school now may reflect knowledge and skills equivalent to something more like a C+ average only fifteen years earlier. This is particularly problematic because many colleges have raised their GPA requirements over the same period of time. Grade inflation may help explain why college students who appear better prepared on paper are struggling much the same as did students who in the past took fewer English and math courses.

Rather than leading to an improvement in student readiness for college, these increases in GPAs appear 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, which has the practical effect of raising the top of the scale. The University of California (UC) system, for example, weights Advanced Placement (AP) and honors courses, so that many UC applicants now have GPAs that exceed 4.0 on a scale on which 4.0 is hypothetically the maximum. It's not just the UC system that gives higher weight to college prep courses; 49 percent of colleges and universities in the United States are doing it. Many less selective colleges and universities are choosing to employ weighting strategies rather than increasing GPA requirements. Private institutions in particular appear to be raising GPA requirements the most, leading to what amounts to an arms race among colleges to match one another in these increases. Individual high schools have adopted their own weighting criteria, leading to myriad ways to compute a student's GPA.

Many colleges take matters into their own hands and develop their own systems to adjust high school GPAs to combat this problem. In practice, this means lowering the GPAs of students from high schools whose students have historically not done as well in entry-level courses. Many of these schools have higher concentrations of students from low-income families and who are members of ethnic minority groups underrepresented in college. Students at these high schools may be at a competitive disadvantage and not even know it because they assume that their good grades are preparing them for college success, when in some cases, nothing could be further from the truth.

Tests

Beyond using high school course titles to define college readiness and grades to measure performance, a more direct approach is to test a set of the knowledge that students are presumed to need to know in order to succeed in college entry-level courses. Admissions tests are the vehicle of choice for this type of testing. These tests have recently attempted to transform themselves from aptitude-based measures that employ norm-referenced scoring models that make no reference to where on the scale a student is college ready to new models that establish college readiness benchmarks empirically and then identify cut scores associated with college readiness.

For example, ACT has defined college readiness by establishing College Readiness Benchmarks representing the minimum ACT test scores required for students

to have a reasonable 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 percent or greater chance of obtaining a course grade of C or better. This is not a direct measure of necessary content knowledge and thinking skills, but a gauge of probability. Moreover, the ACT test itself was never designed to make these types of distinctions. Instead, its purpose has always been to provide a student score on a continuous scale that admissions officers were then free to interpret as they saw fit. The inclusion of college-readiness benchmarks as a means to interpret student test scores is a new and still relatively unverified addition to college admissions tests. This development reflects the emerging importance of being able to specify college and career readiness more precisely in terms of a set of knowledge and skills that can be measured.

All states have adopted some form of high school examination in English, math, and science for a variety of reasons, including requirements contained in the federal NCLB Act. Research conducted by Standards for Success and published in 2003 found that most state standards-based high school tests were not well aligned with postsecondary learning and that the areas where alignment did exist were at the basic skills levels. These tests are perhaps good measures of a set of core academic capabilities, but not necessarily of the knowledge, strategies, and dispositions needed for college success.

In other words, knowing what successful performance on a state test really means is difficult. As a result, the scores that students receive on state tests are not necessarily good indicators of college readiness, even if states can show correlations between these test scores and grades in entry-level college courses. Nevertheless, this does not stop students and parents from believing that passing the state test is an indicator of college and career readiness.

This belief creates serious problems when high schools focus exclusively on getting students to pass state tests. When students do pass the state exam, perhaps in the tenth or eleventh grade, their program of study may be hopelessly out of sequence with what college eligibility requires. One possible means to help address this disconnect would be to revise state assessments so that they connect with outcomes beyond high school and, in the process, provide students with solid information on how ready they are and what they need to do to be college and career ready. NAGB is investigating ways in which the NAEP twelfth-grade exam might become a better measure of college and career preparation. If this

could be achieved, states could have a reference point for determining how well their own tests measured these constructs. Similarly, the college and career readiness common core standards developed nationally and adopted voluntarily by states serve as a reference point for aligning state standards and assessments with a clear outcome level that corresponds with postsecondary success.

Performance in College Courses

An obvious but frequently overlooked fact is that the final arbiter of readiness for postsecondary education is student performance in college courses. Students who must enroll in remedial courses or fail entry-level courses find graduating from college much more difficult. One of the first orders of business in improving postsecondary readiness is to reduce the number of high school graduates who end up in remedial courses in college, particularly community colleges.

The high proportion of students who are identified as needing remedial or developmental education is frequently cited as evidence of the limitations of current preparation programs and admissions measures. Although the precise number of students requiring remediation is difficult to ascertain, federal statistics indicate that 40 percent of admitted and enrolled postsecondary students take at least one remedial course, which reduces dramatically their probability of graduating and costs an estimated $1 billion or more per year. The California State University (CSU) system, which draws its students from the top third of high school graduates in the state and tracks remediation rates more precisely, reported in 2007 that 37 percent of first-time freshmen required remediation in mathematics and 46 percent in English. Interestingly, the average high school GPA of students requiring remediation was approximately 3.15 on a four-point scale, just below the overall average GPA of all CSU-entering students of 3.27, illustrating the limitations of relying on high school grades to predict who will need remediation and who will not.

Remediation rates at community colleges are much higher. Some campuses see 80 percent of their students placing into remedial classes, particularly in mathematics. Some students come in at such a low skill level that they must complete several courses in a subject area before reaching a credit-bearing course. Students placing into the lowest levels of remediation have major skill deficiencies. Nationally, only 17 percent of 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 percent receive such a degree or higher.

Children from low-income families and some ethnic and racial minority groups are particularly likely to end up in remedial courses. In the CSU system in 2007, just under 64 percent of African American first-time freshmen required remediation, as did approximately 53 percent of Mexican American and other Hispanic/Latino freshmen. These students are the most dependent on the ability of their high schools to prepare them properly for college success because they are often the first in their families to attend college. The family members of these students rely on grades as a primary measure of ascertaining how well their children are doing in high school. The evidence suggests that these students may be receiving good high school grades, with GPAs over 3.0, and yet placing into remedial education. That students who do well in high school end up in remedial college courses can be frustrating for families who have encouraged their children to go on to postsecondary education and thought they were ready to do so.

Only 60 percent of students from minority groups and low-income families 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. Students from these groups who do succeed in earning a college degree are taking longer to do so now than twenty years ago. These figures suggest that many, perhaps most, students from groups underrepresented in college are not fully prepared for what will be expected of them.

Just as important, this suggests that their high school program is not adequately geared toward preparing these students for college admission or success. These students are subjected to considerably lower expectations and demands in courses that have titles that satisfy the needs of college admissions offices but are not well aligned 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. Often these students end up in courses that are neither college preparatory nor well aligned with certificate programs at two-year institutions. The courses may in fact be terminal in nature, that is, not clearly connected to any program beyond high school.

Current remediation statistics reveal only the tip of the iceberg. The tests used to determine who places into remedial courses vary from institution to institution. Placement criteria vary tremendously from institution to institution and are often set at a low level to begin with, identifying only students with the most

serious deficiencies. Many colleges allow students to choose not to take remedial courses, even if the student is identified as needing such a course. Students also may choose not to take the remedial course until several years into their program, when they must do so in order to take a required course.

These factors in combination mean that many students, particularly those from low-income families and first-generation college attendees, struggle during the first year of college. For students who do remain beyond the freshman year, their time to degree completion often increases dramatically. According to federal statistics, just over half of students seeking a bachelor's degree beginning in 1995–1996 had attained that degree from that institution six years later. In short, relying on remedial education to solve the problems of inadequate preparation in high school does not seem to be a viable policy, particularly if the goal is to increase the proportion of first-generation college attendees and move students through the postsecondary system quickly and efficiently.

General Education Requirements for a Baccalaureate Degree

Baccalaureate education in the United States is distinguished from many other undergraduate systems around the world by its inclusion of and emphasis on general education requirements that all students must meet in order to graduate, regardless of their major. This model is not at all common in other countries. In fact, many other postsecondary systems around the world admit students directly to what we would call a major and do not expect students to take courses that do not relate directly to this area of study. Specialization and focus on a potential major often begin in high school.

The general education model employed in this country means that incoming college students who wish to pursue the baccalaureate will be expected to be capable of performing in a number of subject areas, not just their area of interest or strength. These courses are often prerequisite to courses in a major and are often taken during their first or second year in college. Being prepared to succeed in general education courses is key to success for U.S. college students. It is one of the key reasons why the high school curriculum needs to be well aligned with postsecondary expectations across its entire breadth.

Poor student performance in these general education courses has long been an issue among postsecondary faculty, who have historically used these courses as the real arbiter of admission. These courses have been designed to weed out

students who faculty judge are not prepared to succeed in college. Regardless of which students the admissions officers deem worthy of entrance to the institution, the faculty have enforced their own ad hoc admissions process through these courses. Although the practice of weeder courses is falling out of favor at many colleges and universities, the rigorous entry-level general education course is one of the reasons that the first year of college sees the highest rate of failure of any year.

Some notorious courses have failure rates in the 50 percent range year after year. Some argue this is the fault of poor college teaching, but others assert that this phenomenon can be explained equally by deficiencies in content knowledge and thinking skills, poor study habits, and a lack of understanding of the expectations of college instructors, combined with poor attendance. Struggling in entry-level courses often results in the abandonment of whole areas of potential study. If students cannot get through an entry-level course in a subject area successfully, they are then closed off from any major for which the course is a prerequisite. This ends up limiting choice for students who cannot succeed in a particular general education course. When students struggle in multiple general education courses, they may find they have few viable choices for a major. And although colleges are beginning to provide much better advising to students in their first year of postsecondary study, the student remains responsible for choosing the major. Poor preparation for general education courses limits those choices.

A first step toward defining what students must know and be able to do to succeed in college is to define what it takes to succeed in entry-level courses in baccalaureate and demanding certificate programs. College and career readiness standards that represent the knowledge and skills students should have before entering their first postsecondary course can send clearer messages to high schools regarding course content and to states about their high school standards and assessments. College and career readiness standards are not geared to what should or does occur in high schools, but to what will be expected of students in postsecondary education. They have a clear reference point—clearer than the oft-cited goal espoused by many state policymakers to have "well-educated citizens." College and career readiness standards are clearly derived from the expectations that students will encounter in entry-level postsecondary courses.

No fewer 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 that outline the knowledge, skill, and habits of mind necessary for success in research universities. Washington, D.C.-based Achieve, Inc., an organization sponsored by state governors, organized the American Diploma Project. Its goal was to develop standards that reflect both college and work readiness in mathematics and English. 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 and Texas, have published or are in the process of developing sets of college readiness standards that connect to state high school academic standards. Finally, as will be discussed in more detail later, the national effort to define a set of common core standards for college and career readiness is moving forward, and its effects are just beginning to be felt.

AN EXAMINATION OF THE FOUR DIMENSIONS OF COLLEGE AND CAREER READINESS

College and career readiness is a multifaceted concept comprising numerous variables internal and external to the school environment. In order to provide a functional representation of the key facets, all of the factors affecting college readiness that a high school can be expected to address are organized here in a four-part model. The four areas identified here emerge from a review of the literature and from original research my colleagues and I have conducted and are those that can be most directly affected by high schools. Other factors exist outside this model, such as student motivation and family support, but the four dimensions of this model encompass all of the areas for which high schools can reasonably be expected to take primary responsibility to provide all students the necessary learning experiences and programs of preparation.

The four basic dimensions are key cognitive strategies, key content knowledge, academic behaviors, and contextual and awareness skills. In practice, these facets are not mutually exclusive or perfectly nested. 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. Additionally, a lack of attention to academic behaviors is one of the most frequent causes of problems for first-year students, whether or not they possess the necessary content knowledge and key cognitive strategies.

This model argues for 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: all facets of college readiness must be identified and measured if more students are to be made college and career ready. The following discussion explains each dimension in greater detail, but ultimately the four combine in practice and are not entirely separate constructs (see Figure 1.1).

Key Cognitive Strategies

The success of a well-prepared college student is built on a foundation of key cognitive strategies that enable students to learn, understand, retain, use, and apply content from a range of disciplines. Unfortunately, the development of key cognitive strategies in high school is often overshadowed by an instructional focus on decontextualized 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. Tests that do

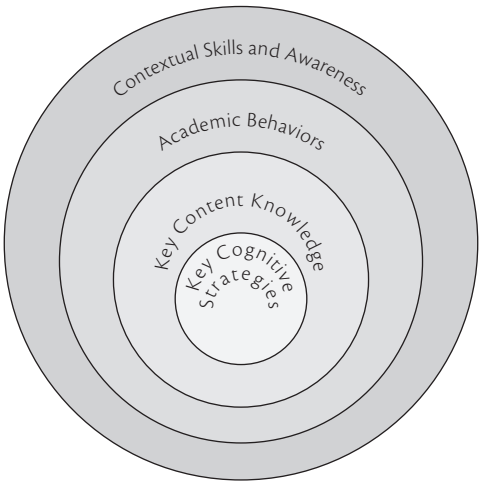

Figure 1.1 Four Dimensions of College and Career Readiness

contain performance tasks requiring more complex cognitive processing are severely restricted in number and time available to complete them, which limits their breadth or depth. The tests rarely expect students to apply their learning and almost never require students to exhibit proficiency in higher forms of cognition. Even before high-stakes exams were an issue, however, studies found an emphasis in high school classrooms on rote learning techniques that did not engage students deeply and did not lead to development of key thinking skills. Much learning for high school students is simply figuring out the "right" answer, or what the teacher wants to hear, and does not involve much active cognitive engagement.

Several studies have found college faculty members nationwide, regardless of the selectivity of the institution, to be in near-universal agreement that most students arrive unprepared for the intellectual demands and expectations of postsecondary faculty. For example, according to one study, faculty reported that the primary areas in which first-year students needed further development were critical thinking and problem solving. Other studies noted similar observations regarding the ability of students to handle ambiguous information or problems without one simple answer.

The term *key cognitive strategies* was selected deliberately to describe the intentional behaviors students must be able to employ situationally and to emphasize that these behaviors need to be repeated frequently over an extended number and variety of situations so that students learn when and where to employ them. In other words, key cognitive strategies are patterns of thinking that lead to the development of a variety of specific ways to approach and attack challenging learning situations. The term *key cognitive strategies* evokes a more disciplined approach to the development of cognition than terms such as *dispositions, habits of mind,* or *thinking skills.* It indicates intentional and practiced behaviors that, rather than being habitual, remain strategic in nature, with students making conscious decisions when to apply which for the optimal effect in a variety of learning situations.

Our research has found the following key cognitive strategies to be embedded in entry-level college courses across the disciplines. Although the case can be made that other forms of strategic thinking are equally important, the mental capabilities identified here are highly representative of those necessary to succeed in most postsecondary educational environments and to pursue a wide range of career pathways successfully.

- *Problem formulation.* The student develops and applies multiple strategies to formulate routine and nonroutine problems and uses method-based approaches for complex problems. The student develops a repertoire of strategies and learns how to select from among the repertoire based on the characteristics of the problem and the results from the administration of each strategy.
- *Research.* The student identifies appropriate resources to help answer a question or solve a problem by identifying all possible sources; collecting information from a variety of locations and sources; and distinguishing among the credibility, utility, and veracity of the information contained in the sources. The student learns the rules and ethics of collecting information and how to synthesize information so that it can be used to help identify possible solutions to a problem or illuminate all facets of an issue.
- *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.
- *Communication.* The student constructs well-reasoned arguments or proofs to explain phenomena or issues, uses 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 acknowledging the accuracy of the critique or challenge.
- *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. The student applies understanding of content knowledge appropriately and accurately, achieves accurate results, and reaches appropriate conclusions based on the data at hand and the problem or thesis presented.

These key cognitive strategies are broadly representative of the foundational elements that underlie various ways of knowing. Developing an understanding of these and facility with them is at the heart of the intellectual endeavor of the university. They are necessary to discern truth and meaning, as well as to pursue these goals. 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 strategies begin to develop or misses out on the largest portion of what college has to offer, which is how to think about the world. Students pursuing careers similarly suffer from not being able to grasp fully the complexity of the material being presented and from not being as able to retain information because it is not well understood conceptually.

Key Content Knowledge

Successful academic preparation for college is grounded in two companion dimensions: key cognitive strategies and key content knowledge. Understanding and mastering key content knowledge is achieved by processing information so that its structure becomes more apparent and then probing, consolidating, and applying that information by means of 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 applying key cognitive strategies has been made often and will be taken as a given here and not repeated.

In order to illustrate the academic knowledge and skills necessary for college success, a brief discussion of the key structures, concepts, and components of core academic subjects is presented. This presentation is not a substitute for a comprehensive listing of all essential academic knowledge and skills. Such a more complete exposition is contained in *Understanding University Success,* produced by Standards for Success through a three-year study in which more than four hundred faculty and staff members from twenty research universities participated in extensive meetings and reviews to identify what students must do to succeed in entry-level courses at their institutions in six subject areas. These findings have

been confirmed in subsequent studies. The Standards for Success are presented as well in *College Knowledge* along with extensive discussions of the implications of the standards for high schools. Chapter Eight also contains an excerpt from the Texas College and Career Standards, which illustrates how one state is moving toward a common definition of college and career ready.

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

Overarching Academic Skills

Reading Students in college read much more material in a much wider range of formats and types than high school students do. To be successful, entering students need to be able to understand the formats and important differences between and among different types of written materials. They must be able to distinguish between a descriptive paper and an opinion essay. They need to be able to read a textbook and possess the skills necessary to decode the text, but also to employ the strategies necessary to identify key concepts and terms and retain them. They will encounter source documents from other eras, cultures, and technical environments, and they will have to understand how to interpret meaning in the context in which the document was initially written and from the point of view of the audience for which it was written. They will encounter many unfamiliar words and will need to know how to find their meanings as well as being committed to doing so. They will also be expected to reread material in order to discern deeper meanings and nuances and to deconstruct texts. They will often be expected to read above and beyond the minimum assigned materials, investigating a topic on their own by independent reading.

Writing Writing is the means by which students are evaluated to some degree in nearly every postsecondary course. It is the medium by which student thinking is expressed and assessed most frequently. In college, expository, descriptive, and persuasive writing, in particular, are important rhetorical modes. Students are expected to write extensively in college and to do so in relatively short periods of time. Students need to know how to prewrite, how to edit, and how to rewrite a piece before submitting it and, often, rewrite it again after it has been submitted once and the professor returns it with comments. College writing

requires students to present arguments clearly, substantiate each point, and use the basics of a style manual when constructing a paper. College-level writing is largely free of grammatical, spelling, and usage errors.

Core Academic Subjects Knowledge and Skills

English The knowledge and skills developed in entry-level English courses enable students to engage texts critically and produce well-written, well-organized, and well-supported work products in oral and written formats. The foundations of English are reading comprehension and literature; writing and editing; information gathering; and analysis, critique, and connection. 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, they need to use techniques such as strategic reading that will help them read and understand a wide range of nonfiction and technical texts. Knowing how to slow down to understand key points, when to reread a passage, and how to underline key terms and concepts strategically so that only the most important points are highlighted are 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 from simply having been exposed to these ideas. Much of the subsequent mathematics students will encounter draws on or uses these principles. In addition, having learned these elements of mathematical thinking at a deep level, they understand what it means to actually understand mathematical concepts 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 use a calculator appropriately as a tool, not a crutch.

Science College science courses emphasize scientific thinking in all its facets. In addition to using all the steps in the scientific method, students learn what it means to think like a scientist. This includes the communication conventions

scientists follow, 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 the vocabulary of the scientific discipline they are studying. 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 Sciences The social sciences entail a range of subject areas, each with its own content base and analytical 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 sciences 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 consists of certain big ideas (theories and concepts) that are used to order and structure all of the detail that often overwhelms students and can help them learn to 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 is 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 decontextualized grammatical rules. Instead, students of a language need to master meaning in more holistic, contextual ways.

The Arts The arts refer to college subject areas including art history, dance, music, theater, visual arts, and humanities. 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 (Self-Management)

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

Self-monitoring is a form of metacognition—the ability to think about how one is thinking. Examples of metacognitive skills relevant to self-management are 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. Research on the thinking of effective learners

has shown that these individuals tend to monitor actively, regulate, evaluate, and direct their own thinking.

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 class in order to achieve success in class. Study skills encompass a range of active learning strategies that go far beyond reading the text and answering homework questions. Typical study skill behaviors are time management, preparing for and taking examinations, using information resources, taking class notes, and communicating with teachers and advisors. An additional critical set of study skills is the ability to participate successfully in a study group and to recognize the critical importance of study groups to success in specific subjects that assume students will be using them.

Examples of time management techniques and habits are 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 using settings conducive to proper study, and prioritizing study time in relation to competing demands, such as work and socializing.

Contextual Skills and Awareness (College Knowledge)

The importance of this broad category has only recently been highlighted as an ever-wider range of students applies to college. Contextual factors encompass primarily the privileged information necessary to understand how college operates as a system and culture. This lack of understanding of the context of college 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 contextual skills and awareness are 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. Examples of specific knowledge are how to select the proper postsecondary institution from among all available,

how and when to apply, which tests and materials to provide with an application, how to complete a financial aid form and the FAFSA, what the institution to which the student is applying requires for placement purposes, and how to access the support resources available to students.

The fact that colleges have a culture, norms, and traditions does not necessarily mean that students have to disown their cultural backgrounds, heritage, and traditions, only that they need to understand the relationship between their cultural frame of reference and assumptions and those operating in college. Even though students do not need to disown who they are, success in college comes to 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 know how to interact with professors and others in that environment, be comfortable around people from different backgrounds and cultures, possess informal communication skills, and demonstrate leadership skills in a variety of settings.

Another important area of contextual awareness is the information that is formal and informal, stated and unstated, and is necessary for gaining admission to and navigating within the postsecondary system. College knowledge encompasses an understanding of processes such as college admission, 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 level of challenge present in college courses, including the increasing expectations of higher education.

Admissions requirements, and time lines 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 of the students who are 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.

DIFFERENCES BETWEEN HIGH SCHOOL AND COLLEGE COURSES

It is worth noting that college courses, although different from high school courses, are not necessarily "better." Nor is college teaching superior to high school teaching. They are, however, different in a number of important ways, and understanding those differences is a crucial first step in improving alignment between high school and college.

Secondary and postsecondary instructors and administrators need to enter into a consideration of these differences with an open mind, devoid of preconceptions regarding the teaching and learning that takes place at each level and, perhaps more important, without judgment regarding whose teaching is "better" and the ways in which the other level is flawed in its approach to instruction and student learning. With an open mind, it is possible to see and appreciate what is valued at each level, what is expected of students, and how students are likely to respond to the demands at each level. This understanding is the necessary underpinning to the conversation about how high school and college courses differ.

Why is it important to understand and be fully cognizant of the differences between secondary and postsecondary education? We cannot fully comprehend and act on what it takes to make students ready for learning beyond high school until we have taken into account the ways in which the two environments differ along a number of dimensions.

Over the past eight years, our research has focused on analyzing entry-level college courses to determine what these courses expect and require of students. The primary source of data we have used has been the instructor's view of what is important to succeed in the courses cross-referenced against the content of the syllabi from the entry-level courses they teach. These are all credit-bearing courses that fulfill general education and certificate requirements at two- and four-year postsecondary institutions across the United States.

The instructor input, syllabi, and related course documents have proven to be a rich source of information about and insight into the expectations college instructors have for their students and what they are trying to accomplish in their courses. A close analysis also reveals many of the assumptions these instructors harbor about the nature of their students. These data are informative of the expectations that students will encounter in college courses.

We have concentrated our efforts on what we identify as "best practice" college courses. Our studies begin by specifying the key characteristics that should

be present in entry-level college courses to make them consistent with the best thinking of national organizations and experts in the field regarding content they should include and the instructional methods they should employ. We use these criteria to identify such courses. We then verify these courses by collecting large amounts of information about them by having instructors complete extensive surveys in which they specify their practices and priorities. Finally, we subject all the collected data to the scrutiny of expert secondary and postsecondary educators who serve as independent judges to confirm whether a course truly represents best practices in a particular subject area. Based on these methods, our research findings have identified a number of characteristics that tend to distinguish college courses from high school courses.

Detailed analyses of both baccalaureate and certificate courses reveal that although a college course may have the same name as a high school course, college instructors pace their material more rapidly, emphasize different aspects of material taught, and have very different goals for their courses than do high school instructors. Students fresh out of high school may think a college course is very much like a similarly named high school class they have already taken, only to find out that expectations are fundamentally different.

College instructors are more likely to emphasize a series of key thinking skills that students typically do not develop extensively in high school. The instructors expect students to work independently to make inferences, interpret results, analyze conflicting explanation of phenomena, support arguments with evidence, solve complex problems that have no obvious right 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.

College students are assessed in a variety of ways, including multiple-choice exams and much more sophisticated tests in which the answers must be inferred from readings and lectures rather than being verbatim restatements of those materials. It may not be enough simply to show up for class, take notes, and do the reading. Students may also be expected to apply what they have learned in routine and nonroutine situations.

We determined that college courses in general move at a more rapid pace than a typical high school course does. Literature courses, for example, frequently require students to read eight to ten books in a term. In these 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. Students receive detailed critiques of these papers that can be frank and unvarnished.

Assessment in college courses generally consists of fewer elements than in a high school class, with each element being correspondingly more important. Typical college courses have a midterm exam, perhaps several papers, and a final exam. When homework is required, it is rarely graded and often not even collected. Students may be accountable for completing homework in order to participate in classroom activities, and instructors may then assign participation points that reflect student preparation and involvement, but not a grade on the homework assignment itself.

Writing assignments in entry-level courses tend to be moderate in length, generally in the range of three to five pages, with the expectation that the student drafts, revises, and edits each paper before submitting it. Most written work includes the expectation that the student has consulted source material and incorporated appropriate material into the paper as directed. Few assignments allow ungrounded expression of personal opinion absent significant justification and references. Postsecondary instructors have low tolerance for grammatical and spelling errors, poor sentence and paragraph construction, lack of an overall structure for the paper, inappropriate word choice, and lack of fluency in the paper. Their assumption is that these elements simply must be addressed by the student in order to complete the assignment successfully. The focus of the instructor's evaluation of the paper is the topic at hand as specified in the assignment, not grammar, syntax, and conventions, although deficiencies in these areas are duly noted.

Because entry-level courses may have relatively few grading elements, each grade is more important, and, consequently, students have fewer degrees of freedom to do poorly on one test or assignment and then be able to compensate by performing better on other elements. Some instructors do allow students to discard their lowest score from a series of exams, but few include opportunities for extra credit in the form of substitute assignments. While it may be possible for a student to rework an assignment under certain conditions, rarely can one requirement be met by completing an entirely different piece of work. Extra credit, where it is offered, most often takes the form of additional items on a test that students may choose to complete, or perhaps some augmentation to an

assignment. Generally students must meet the standards set forth in the syllabus by means of the stated requirements without recourse to additional ad hoc work products that compensate for poor or nonexistent performance on required elements.

Science courses often have separate lecture and lab components, and students enroll in and receive credit for each separately. The labs take on a variety of forms, from very structured classes in their own right with extensive requirements, to more self-guided learning experiences in which students must take the initiative to complete the lab activities independently and ask for help if they need it. Lectures assume students have completed or will complete the lab, and if students make the mistake of viewing the lab as independent of the lecture and fail to attend one or the other regularly, they are likely to struggle mightily on exams given in the lecture section and on lab assignments. The idea that a lab may be required but that they might not receive any credit for attending is particularly difficult for students accustomed to trading time for credits to comprehend and accept.

Many science labs require descriptive and analytical writing skills. The lab section may require that students keep a log in addition to completing the exercises in the manual. The log consists of observations they make, descriptions of the procedures they choose and employ, and their results. These logs may run to dozens of pages and contain detailed illustrations along with descriptions that stretch on for pages. These logs are generally not reviewed weekly, but when they are reviewed, instructors place a premium on the accuracy of the observations and the precision of the descriptions. These are standards to which their work may not have been held previously, particularly in science courses.

Higher education faculty members typically are not particularly tolerant of work that is turned in late. There are various reasons for this stance, but at least part of the reason is that students are adults and should be expected to act as such. College syllabi typically contain a section addressing late work, and in that section the instructor anticipates the various situations and excuses students are most likely to present as explanation for late assignments or missed exams. The college syllabi lay out the consequences for late work and indicate the circumstances under which exceptions are granted. Given that many entry-level college courses have large enrollments, these policies tend to get enforced without significant exception. Instructors of entry-level courses can offer many examples of students who did not submit work

on time and then expected special treatment or extension of deadlines. These students are often bitterly disappointed when no dispensation is forthcoming.

Plagiarism is a large issue in postsecondary education for a variety of reasons. First and foremost, most instructors are highly aware of the rules of scholarship and are therefore attuned to the significance of committing plagiarism. They consider it to be a serious infraction and are vigilant regarding plagiarism and inclined to punish transgressions rather than simply issue warnings. As noted, students must cite sources often in college writing, which leads to more temptations and opportunities for plagiarism. Almost every syllabus for an entry-level college course contains a definition of plagiarism and spells out the consequences of committing plagiarism. Most colleges and universities have an office devoted to student judicial affairs that may become involved if plagiarism is committed.

According to the NSSE, 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 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 college freshmen need to be spending nearly twice the time they indicate they are spending currently to prepare for class. College freshmen who are most successful are those who come prepared to take responsibility for preparing for class in a variety of ways and for a significant amount of time.

Finally, the relationship between instructor and student in college is dictated by institutional dynamics to a significant degree. At colleges where students take at least some large classes, students need to take the initiative to connect with the instructor. That connection is best established based on mutual interest in the course content and the subject matter generally. Instructors appreciate students who have an interest in what is being taught because the instructors themselves are usually very interested in their subject areas and often passionate about particular aspects of what they teach. They connect well with students who share their interests and passions. They do not relate well to students who wait until the last week of classes to consult with them during office hours or tutorial sessions for the first time in order to demand special treatment and consideration.

College instructors expect students to be responsible for their own actions and for taking the initiative to resolve any outstanding issues. This means that instructors expect students to contact them, not the other way around, when a problem exists, and to do so while there is time to remedy the situation. While instructors understand that students lead complex lives with competing demands on their time, they also expect that the course they are teaching will be an important priority in the student's life when it needs to be. In general, they are willing to work with students who meet them halfway and make an effort to deal with situations before they spin out of control.

Most colleges have numerous resources available to students who need help: academic support centers, tutoring services, writing consultants, technology labs with instruction available, counselors, advisors, and student life and residence hall assistants. The student as young adult is expected to access the appropriate person or office when in need of assistance. While instructors may attempt to assist students by directing them to the proper resource, few instructors take on the assistance roles that are the responsibility of these various programs and individuals. Instructors will help students with problems related to the content area (and may develop close working relationships with students who show interest in the subject area), but the general expectation is that students will take care of themselves in significant ways through independent action and self-initiative when they have a skill deficiency or cannot complete assigned work due to an underlying lack of knowledge.

College instructors expect students to behave in class. They are not prepared to expend significant amounts of time on classroom management and do not tolerate repeated infractions. It is apparent from the contents of syllabi that instructors are adding more detailed behavioral expectations to their courses in response to what they perceive to be declining student civility. Areas of concern include tardiness and inattentiveness, smoking, reading newspapers, or inappropriately using personal electronic devices in class. Of greater concern are behaviors such as hostility toward others, lack of tolerance for differing points of view, unwillingness to accept feedback on ideas or on pieces of work, and what might best be categorized as generally rude behavior. The remedies most instructors employ are a consultation after class or exclusion from the class altogether, which continues to be very rare but is then dealt with by the office of student judicial affairs in most institutions.

Online discussions among postsecondary instructors regarding student behavior frequently mention a growing phenomenon: a sense of entitlement among students who believe that they should receive a good grade if they attend regularly and make a good-faith effort. They conflate effort with achievement. In other words, if an assignment takes them a long time to complete, they expect a good grade for it based not on the quality of the work but on the time it took to complete. Many students have never experienced failure before or received a grade on an assignment much lower than a B. For a growing number of students entering postsecondary education, the act of participating is considered equal to the act of achieving. Anything less they view as unfair or unjustified.

In short, the expectations students encounter in college can be quite different from those to which they are accustomed. They must be prepared to use a quite different array of learning strategies and coping skills to be successful in college. Current measures of college readiness do not necessarily capture these many dimensions of readiness well.

While many adults are aware of these differences, many young people are not. As high schools prepare students for postsecondary education, the students should at the very least be made aware of these differences. Beyond simply informing students, high schools may want to consider creating situations that start to parallel a college classroom or learning environment in important ways. Examples of ways in which this can be done are presented in Chapters Three, Four, and Five. For now, it is worth noting that the transition from high school to postsecondary education is particularly challenging for students who have little or no opportunity to understand the ways that the postsecondary world they are preparing to enter is different from the high school world they are about to leave.

The next section adds detail to the definition of college readiness derived from the conceptual model. It includes specific statements that illustrate all of the dimensions of college readiness. These are statements that could conceivably 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 school educators know how well their school's program of study is preparing students to be ready for college success and which students it is preparing.

OPERATIONAL EXAMPLES OF COLLEGE READINESS

It is possible to compile 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. 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 set of examples of the 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. This set attempts to capture keystone skills—ones that can be demonstrated only if a set of subordinate and prerequisite knowledge and skills is in place. The examples are not intended to be inclusive, but to suggest the types of indicators necessary to gauge the more comprehensive notion of college readiness presented in this book.

General Characteristics

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

- Consistent intellectual growth and development over four years of high school resulting from the study of increasingly challenging, engaging, coherent academic content
- Deep understanding of and facility applying key foundational ideas and concepts from the core academic subjects
- 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 demonstrate an understanding of how experts in the subject area think
- Facility with a range of key intellectual and cognitive skills and capabilities that can be broadly generalized as the ability to think
- 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

- 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
- Comfort with a range of numerical 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
- Ability to accept critical feedback, including critiques of written work submitted or an argument presented in class
- Ability to assess objectively one's level of competence in a subject and devise plans to complete course requirements in a timely fashion and with a high degree of quality
- 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
- Ability to interact successfully with a wide range of faculty, staff, and students, including many who come from different backgrounds and hold points of view different from the student's
- 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 are suggestive or descriptive of tasks that students will have to be able to complete in college courses. The following examples illustrate what a student who has sufficient competence in the general areas 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 three- to five-page research paper that is structured around a cogent, coherent line of reasoning; incorporates 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 nonfiction publications and technical materials, using 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 multistep problems, including problems without one obvious solution and those requiring 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 used
- Conduct basic scientific experiments or analyses that require the 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 a series of source materials that are important and appropriate to explaining 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 and regularly attend a study group outside 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, using periodic feedback from

teachers and other pertinent resource people 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
- Use 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 Web sites that contain information on colleges, the admissions process, and financial aid, and navigate such sites successfully, in the process 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