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Widening the Scope of Standards through Work-Based Learning

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A major policy challenge of the next decade is how best to improve the preparation of young people for success in the workplace. Current and past policies have clearly not been enough to insure that many young people grow up and enter the workplace with sufficient skills to earn a good living. Less educated workers have seen their wages stagnate or decline, falling further behind college-educated workers (Goldin and Katz 2008). In the past, any lack of progress of the less-educated was at least partly offset by a rising educational attainment. But recently, growth in educational attainment has stagnated and the share of US workers with a with a college degree is no longer the highest in the developed world.

One of the most serious concerns about inadequate preparation is the high rates of failure to complete a high school diploma. Estimates based on administrative records indicate that 25 percent or more of students complete a high school diploma (Chaplin 2002). Among African-Americans, dropouts make up 38 percent of their relevant cohort (Warren and Halpern-Manners forthcoming). The Hispanic graduate rate is over 40 percent. Even by age 25, dropouts face high unemployment rates (9.6 percent in September 2008), low wages, and limited career opportunities. Moreover, the negative social consequences from dropping out (including high rates of crime, time in prison, and unwed childbearing) independently lead to poor prospects for the job market.

Even among high school graduates, wage growth has been modest and well below the levels attained by college graduates. Further, employers report great dissatisfaction with the quality of high school graduates. Manufacturing firms reported that 60 percent of applicants with a high school diploma or GED were poorly prepared for the typical entry job in the firm (Deloitte Consulting 2005). Over half of these firms reported that the shortage of available skills is affecting their ability to serve customers and 84 percent say the K-12 school system is not doing a good job preparing students for the workplace.

From a long-term perspective, many worry about that slow earnings of many U.S. workers will continue in the face of rising immigration, outsourcing, and the expanding labor force in India, China, and other less developed countries whose workers are now a part of a world labor market (Freeman 2007). Given automation, outsourcing, and the need for creative workers, the Commission finds that "People who prefer conventional work environments are likely to see their jobs disappear."

The common responses are improved education at the K-12 level and improved access to community colleges at the youth and adult levels. These policies are necessary but not sufficient. They rely on a classroom-based system with limited links between what is learned at school and what is required to succeed on jobs. Empirical evidence and direct observation show that non-cognitive skills are in high demand but are rarely taught in schools. The classroom-based system is unresponsive to differences in learning styles and that many learn best in the context of real tasks. High school students, especially those performing at the low and middle levels, are often unmotivated because they do not expect to attend a selective college and because they see little connection between school subjects and rewarding careers. They should have choices in how they prepare to enter productive, rewarding careers.

Although reading, math, and writing capabilities are in high demand and are relevant to most jobs, so too are a range of other general skills (such as communication, responsibility, teamwork, allocating resources, problem-solving, finding information) and occupation-specific skills. Researchers have documented how activities that help young people attain these non-cognitive skills are important for youth development.

Unfortunately, the nearly exclusive emphasis in public policy and in public funding is on academic skills. State academic standards for high school students generally do not incorporate many of the skills necessary for success in the workplace, despite the voluminous documentation in national reports and the extensive research findings of the importance of non-cognitive skills.[1] Although all share the goal that "all students should leave high school ready for college or work," many see the statement's real but usually implicit goal as preparing all students for college. This is clear from the effort to require that all students take academic courses that meet college requirements. Education officials seem to view "ready for work" as implying that all students complete a college-prep academic curriculum, under the assumption that students will learn occupational and other workplace skills on the job or in community colleges. Yet, there is little to no documentation about why the courses should be universal requirements to become ready for work.

This paper undertakes three tasks. The first is to discuss evidence concerning the important role of skills other than the traditional academic skills for success in the job market and differences between what is required for work and careers and what is required

[1] For a recent, highly regarded study, see Heckman, Stixrud, and Urzoa (2006).

for college. This section will look at survey evidence on the actual uses in the job market of course work typically covered in common high school requirements. Second, I will consider the actual course standards in various states and examine whether the standards cover areas not required for most jobs and/or whether the standards fail to include skills that are required for work. The third task is to examine the potential role of work-based learning in achieving and document critical non-cognitive skills that would be incorporated into state standards. It will take account of arguments that many students learn and retain best through contextualized instruction and by applying the skills to school-based projects or to a work context.

Do Work and College Require the Same Skills?

Thinking about this question immediately leads to the question: what work and which college? Some reports boldly claim that the skill requirements are the same. I am not kidding. Moreover, this view is not a marginal one, but rather the prevailing guide to state standards for high school students. Consider, for example, the following statement in a report on the 2005 National Education Summit on High Schools under the sponsorship of the National Governors Association (NGA) and prepared by Achieve, Inc., a nonprofit organization working with NGA and states (Achieve 2005a):

> Consequently, *all* students — those attending a four-year college, those planning to earn a two-year degree or get some postsecondary training, and those seeking to enter the job market right away — need to have comparable preparation in high school.

The report offers scanty evidence to back up this assertion. First, the report states that "High school graduates also say they are not prepared for college or work." The following sentence then qualifies this statement by noting that actually 40 percent of graduates make this comment. The majority say they are adequately prepared.

A second claim Achieve uses to support the argument of the common standards is:

> "Employers say the high school graduates they hire need the same skills and knowledge that colleges and universities assert enrolling students should have."

The basis for these statements is a 2004 survey conducted by Peter D. Hart Research Associates of 1,487 public high school graduates from the classes of 2002, 2003, and 2004 as well as surveys of 400 employers, and 300 instructors teaching first year students at two- and four-year colleges (Achieve 2005b). Of the recent high school graduates, 861 were enrolled

in college, 267 had been enrolled but had withdrawn, and 359 apparently never enrolled in college. For two reasons, it is hard to assess whether the surveys support Achieve's claims that the same type of preparation, the same curriculum for both groups of students, is necessary and appropriate. First, neither the report nor the supporting paper describes the sampling frame and survey details. As a result, the generalizability of these results is difficult to determine. This is especially true with regard to employers, who make up an enormously heterogeneous group. But even with regard to students, we do not know where the students come from, what were the response rates, and what biases may have arisen in conducting the sample.

Second, the responses do not specifically address whether the college-prep curriculum should apply to all students. There are certainly indications that the curriculum students experienced should be strengthened. For example, knowing what they now know, the majority of students say they would have worked harder and applied themselves in high school and chosen a more rigorous curriculum. Interestingly, this comment applies almost as much to college as to non-college students. While about 40 percent of college students and 40 percent non-college young people report gaps in how high schools preparation for college and work respectively, this similarity says nothing about whether a more rigorous curriculum for these groups should be the same.

Similarly, employers find 39 percent of recent graduates with no further education unprepared for the challenges of entry-level work (Achieve 2005b). However, 72 percent of employers say they are satisfied with the overall job high schools are doing in preparing graduates for the work world. Certainly, although the employer dissatisfaction with many graduates is disappointing, the evidence from employer attitudes does not come close to supporting the notion that high school graduates going directly to work need the same skills and knowledge required for college. Indeed, the recommendations section of the report on surveys indicates otherwise. College students and instructors see that expanding advanced placement (AP) and/or International Baccalaureate (IB) would improve the preparation of high school graduates for college. In contrast, non-college recent graduates almost universally (97 percent) see gains coming from "real-world learning" and "making coursework more relevant". Employers agree with this perspective.

Striking data from the 2003 National Assessment of Adult Literacy (NAALs) show most adults do not believe their modest levels of reading comprehension (prose or

document literacy) and math literacy limit their ability their job opportunities. For example, 66 percent of adults performing only at the basic level of math literacy believe their level of math skills do not limit their job opportunities at all. Only 21 percent think their math level limits their access to jobs a little or a lot (Kuttner et. al.). Note that this sample is made up mostly of adults with already considerable experience in the job market.

The use of opinion surveys is one of many tools for learning about what high schools should require to insure adequate preparation for college and careers. For colleges, a more straightforward approach is feasible--examine college catalogues and obtain other required course-taking and test score data from admissions offices. Although colleges vary by quality, selectivity, course offerings, and the capability required of students to perform adequately at the college level, four-year colleges differ only in degree along these dimensions. The topics in which proficiency is required are similar in subject matter. In contrast, the job market is far more heterogeneous, varying not only in the level of knowledge—a nuclear engineer versus an operator of a nuclear power plant—but also in the type of knowledge—a health technician versus a hotel manager.

In other countries, achieving proficiency in the workplace involves meeting the "qualifications" that describe specific skills in a whole variety of occupational areas. In the United Kingdom, for example, the National Vocational Qualification (NVQ) system specifies requirements for proficiency that vary widely across types of occupations and over levels within occupations.[2] It is a modular system that recognizes workplace learning and competence based on evidence of performance at the workplace. The NVQ system takes account of skill gradations in each defined field and allows workers to gain documentation for each level, whether attained with one employer or many. The ultimate goal is that employers place a value on attaining a qualification level, giving workers an incentive to learn on the job. Although this system has not worked as effectively as planned (Eraut 2001), the NVQ approach offers one example of how certifying the attainment of skills can provide the basis for measuring the heterogeneity of skills. In a number of other countries, requirements for skill adequacy develop through the operation of apprenticeship programs and other training programs. Often, firms, labor representatives, and government reach agreement on

[2] For an overview on NVQ and other qualification systems in the United Kingdom, see material provided by the Qualificationa and Learning Authority, http://www.qca.org.uk.

what is required for a qualification that will allow employers to have confidence in the capabilities of their young workers. There is no pretence that the skills required entering an occupational field in the worker's late teens and early 20s are the same for college and careers.

Indeed, in many cases, requirements to enter college differ markedly across student majors. Students often apply to specific university departments, such as psychology, engineering, physics, or management, each with its own expectations for types of courses and levels of accomplishment within courses.

Returning to the link between jobs, careers, and skill requirements in the United States, we find only a modest amount of systematic research and analysis that identifies what workers must be able to accomplish to qualify for specific occupations and levels within these occupations. Certification is lacking in many fields, too narrow and complex in other fields, and not sufficiently portable and well-recognized in still others (Wills 1992). In 1994, the Congress established the National Skill Standards Board (NSSB) to develop a system of relevant, rigorous, portable, and well-recognized skill standards that would guide training and would provide reliable signals to worker and employers. Unfortunately, NSSB was extremely slow to develop, rationalize, or recognize useful occupational standards.[3]

In an earlier government-led effort to learn about skills required at the workplace that dealt primarily with the types of competencies required for success in a wide array of jobs, the US Department of Labor created the Secretary's Commission on Achieving Necessary Skills (SCANS) in the early 1990s. The Commission's report highlights what have come to be called SCANS skills. They incorporate many capabilities not directly taught in school, including: the ability to allocate time and resources, to acquire and evaluate information, to participate effectively as a member of a team, to teach others, to negotiate differences, to listen and communicate with customers and supervisors, to understand the functioning of organizational systems, to select technology and to apply technology to relevant tasks. A recent classification known as 21st Century Skills incorporates academic skills and knowledge, but also emphasizes such other skills as interactive communication, teamwork, adaptability, planning, self-direction, and responsibility.[4] For all types of skills,

[3] Some industries issued standards through this process but they have not come into common use by employers or by providers of education and training.

[4] For one statement of 21st Century Skills, see http://www.metiri.com/21/Metiri-NCREL21stSkills.pdf .

there are many levels of competence. Context matters greatly. Responsibility and attention to detail may be necessary for mowing lawns well and for nursing, but the required levels differ dramatically between the two positions. These two reports are highly relevant to preparing high school students for work and careers, but lack the specificity of what is required for occupational fields.

Extensive occupation-specific skills standards do exist in the U.S., but the standards operate at the individual state level through licensing and certification. Moreover, these forms of occupation qualifications are expanding. Today, about one in five workers requires a state license to practice their occupation, up from less than 5 percent in the early 1950s (Kleiner 2006). Much of this increase has resulted from rapid growth in traditionally licensed occupations, such as physicians, dentists, and attorneys. But, the number of licensing laws has been increasing as well. In the U.S., licensing rules vary widely across states, with many states regulating occupations as varied as alarm contractor, auctioneer, manicurist, and massage therapists. Although licenses ostensibly offer some quality assurance to consumers among all providers, Kleinman finds evidence of licensure playing more of a role in raising prices than in assuring quality. In contrast, certification provides information about a worker's skills, but does not limit competition from those who lack certification. So far as I know, no one has attempted to pull together the skill requirements for licensing in order to link them with course content required in high schools.

The U.S. Department of Labor's Occupational Information Network (O*NET) system provides data on mean levels of occupational skill requirements, including measures of math, reading, and writing tasks uses rating scales. Handel (2007) points out that these scales are complex and difficult to understand. O*NET questionnaires does cover key knowledge content areas as well as interpersonal skills, physical abilities, and thinking skills. Other areas, such as computer skills, are less well documented. Again, O*NET does not directly analyze how skills required in specific occupations relate to high school courses.

One recent survey—the Survey of Workplace Skills, Technology, and Management Practices (STAMP)—comes closest to providing an understanding of the proportion of workers who use the skills covered in high school and college courses. Spearheaded by Michael Handel (2007) and foundation-sponsored, STAMP is a random-digit dial telephone survey of employed wage and salary workers in the United States at least eighteen years of age conducted between October 2004 and January 2006 (n=2,304). Eligible individuals were

selected randomly within households. According to Handel, the undercoverage of immigrants, especially undocumented workers, most likely leads to an undercount of unskilled jobs and an overrepresentation of high skill jobs. Handel's goals are ambitious. He not only wants to describe the share of workers requiring various skills, but also to examine the effects of skill requirements on employee involvement, wages, working conditions, employment outcomes as well as the trends in skill requirements and their impact.

The survey offers a rich array of detail. There are 12 items on basic job and organizational information, including occupation, industry, organizational position, organizational and job tenure. There are 60 items skill and task requirements, including cognitive skills, math, reading, writing, forms and visual matter, problem-solving, interpersonal job tasks and physical job tasks. Items on other characteristics of the job include closeness of supervision, repetitive work, autonomy, supervisory responsibilities over others, decision-making authority over organizational policies, complexity of computer skills required, and the use of telephone, calculator, fax, bar code reader, and medical, scientific and lab equipment. The occupations of workers are divided into five categories: upper white collar (professional, managerial, and technical), low white collar (clerical and sales), high white collar (craft and repair), low white collar (laborers, truck drivers), and service (food service, police and firemen, child care and home care workers).

For our purposes, two key questions are—to what extent do jobs use/require skills that are closely linked to high school curricula, particularly curricula required for college? To what extent do jobs require skills generally not taught, measured and certified in high school?

Match Between High School Course Material and Skills Used at Work

One relevant body of survey evidence relates to measures of the level of math, reading, and writing on the job. In the case of math, respondents are asked questions of the form: "At your job, do you use… [say, simple algebra for unknown values]?" The levels (last part of the question) rise from using addition or subtraction to calculus or other advanced mathematics. In reading and writing, the question is of the form, "As part of your job, do you read…" The levels extend from anything at work, even very short notes or instructions to work-related books. In writing, the levels run from writing anything at work to books or articles for scholarly journals.

Using these data, Handel presents information on the share of workers using various skills. Table 1 draws on this information to highlight the use of some of these skills. Many of the results are remarkable, especially given the increasingly prevailing view about the level of course work that all high school students should be required to complete so as to succeed in the workplace. The relationship between the uses of math and the course demands are easiest to understand. Nearly all workers use some math and 68 percent use fractions, but less than one in four uses anything more advanced than fractions. Only 19 percent use the skills developed in Algebra I and only 9 percent use the skills for Algebra II. Even among upper white collar workers, professionals and managers, the use of middle to upper level high school math is strikingly low. Only 14 percent of these managerial, professional or technical workers report using Algebra II and only 22 percent report using statistics. The share using these math tools among workers in all other job categories is generally in the single digits. Upper blue collar workers use Algebra I (36 percent) and geometry and/or trigonometry (29 percent) at rates higher than all other groups of workers, including upper white collar workers.

In the case of reading, nearly all workers use some reading and about half (53 percent) read work-related books or instruction manuals or reference materials. Still, 46 percent of workers do not read material at least 5 pages long.

Writing requirements are exceedingly low. Except for workers in upper white collar jobs, less than half write anything at least *one* page long. Less than 15 percent of these workers write anything five pages or more; for upper white collar workers, the proportion is only 47 percent, a surprisingly low figure.

One skill that varies in interesting ways by occupation is the reading and creation of visuals, such as maps, diagrams, floor plans, graphs, or blueprints. Upper blue-collar workers are the most likely to read and create such visuals (82 percent and 62 percent, respectively), rates far higher than among upper white collar workers. Even among lower blue collar workers, 55 percent commonly read these visuals and 22 percent create them.

Other data concerning the relatively low reading, writing, and math requirements comes from two other questions. Workers are asked about the level of formal education needed by the average person on the job. Surprisingly, in none of the job categories is the average response a college graduate or higher. Even among upper white collar workers, the average formal education required is between a two-year and a four-year degree. A second

set of questions deals with the type of employer training workers receive. Nearly half of workers report some employer training in the last three years. But, of workers given employer training, only 12 percent had training in reading, writing, and/or math. Moreover, upper white collar workers were the group most likely to receive this training. The most common areas of training were in communication and technical skills.

Overall, the evidence is strong that the overwhelming majority of workers rarely use the advanced academic skills expected of a four-year college applicant and certainly less than a four-year graduate. As state officials debate incorporating Algebra II and other high level math into high school requirements, they should be aware of the modest use of these competencies in the work place. Certainly, the skills required to attend and complete college a solid math background and frequently writing five or more pages for a variety of courses. College students must frequently read high level material, including professional articles. But, the survey evidence suggests these skills are generally not required at work. Only 9 percent of workers use Algebra II (19 percent use Algebra I) and only 24 percent have to write five pages or more. Even if the survey data underestimate the current or potential use of these college-oriented skills at the workplace, the gap between these worker reports about what work requires and the high school college prep requirements is wide.

The analysis here is consistent with the work of Richard Murnane and Frank Levy (1996) on the "New Basics" concept presented in their book published over a decade ago. They argued for the importance of a set of academic and other skills that students should achieve to gain access to middle class jobs. Their list is instructive:

- the ability to read at the ninth-grade level or higher
- the ability to do math at the ninth grade level or higher
- the ability to solve semistructured problems where hypotheses must be formed and tested
- the ability to work in groups with persons of various backgrounds
- the ability to communicate effectively, both orally and in writing
- the ability to use personal computers to carry out simple tasks

Note that the list, while insuring adequate academic competencies, comes nowhere near the course requirements pressed as appropriate by national organizations and being adopted in a number of states. Murnane and Levy list some key noncognitive skills while pointing out the difficulty of assessing them. Still, they describe efforts to develop and assess noncognitive skills through learning in context and portfolio assessment strategies.

Two matters are important before moving on. First, we should not discourage students from taking high level academic work. The abilities to read great works, to write a serious paper, and to master high level math are desirable in themselves. Those who gain these skills will likely have more options; futher, it is conceivable that more of these skills will be necessary for a broader segment of the work force of the future. Moreover, some of these skills may (or may not) be prerequisites for other work-related skills. Second, the findings do not mean today's workers require few skills. Rather, other research demonstrates that workers use a wide array of skills in doing their jobs, including technical skills often specific to an occupation or a range of occupations and general skills outside the standard competencies taught in high school.

Skills Required at Work Not Tested in High School

Although many of the skills not used widely in the workforce are becoming requirements for high school graduation, other skills that are reportedly necessary for success in the workplace are rarely measured, directly taught or evaluated by high schools. As noted above, the SCANS report in the early 1990s and the more 21st Century Skills listing highlight problem-solving, teaching others, teaming and collaboration, allocating resources, interpersonal skills, personal responsibility, communication skills, ability to produce high-quality products, and self-direction. How well do worker reports from the recent STAMP effort validate these aspects of work requirements.

When asked how many hard problems workers must solve, problems that cannot be solved right away, workers report an 4.8 per week, with the levels highest for upper white collar (5.25) but also high for low white collar (4.94) and upper blue collar (4.52). A wide range of communication and interpersonal skills are used by most workers. For example, one question to worker respondents was, "As part of your job, do you teach or train people?" Three of four workers say they do. Rates are highest among upper white collar (86 percent) and upper blue collar (75 percent), but are at high levels (67 percent) among other occupational groups. About 60 percent of workers report needing sufficient skills to deal with people in tense situations, people who may be hostile or upset. Service and both groups of white collar workers frequently have contact with the public. The requirement to work well with customers is also a high priority. Since nearly half of all workers report

having to supervise the work of other employees, managerial skills are often a critical part of a worker's success.

Employer surveys reinforce the importance of skills that go well beyond academic skills. In a survey of 3,200 employers in four large metropolitan areas, employers reported that such personal qualities as responsibility, integrity and self-management are as important as or more important than basic skills (Holzer 1997). In the National Employer Survey, another major employer survey of 3,300 businesses, employers ranked attitude, communication skills, previous work experience, employer recommendations, and industry-based credentials above years of schooling, grades, and test scores administered as part of the interview (Zemsky 1997).

Further evidence showing the importance of non-cognitive skills comes from a complex analysis by Heckman, Stixrud, and Urzua (2006) of the schooling and job market experience of a national sample of young workers as they age from 14 through 30. Although the authors use a limited set of measures to capture cognitive and non-cognitive skills, their results are striking. They find that, except for college graduates, that non-cognitive skills (as measured by indices of locus of control and self-esteem) exert at least as high and probably higher impact on job market outcomes than do cognitive skills (word knowledge, paragraph comprehension, arithmetic reasoning, mathematical knowledge, and coding speed as measured by the Armed Forces Vocational Aptitude Battery). Using another major data set, the National Education Longitudinal Study (NLS), Deke and Haimson (2006) develop evidence reinforcing the importance of nonacademic competencies, such as work habits, leadership skills, teamwork and other sports-related skills, and attitudes toward whether luck or effort determine success in life. They find that for two-thirds of all high school students, a nonacademic skill is most predictive of earnings. Operators of job training programs emphasize the need for disadvantaged men to gain self-esteem, communicate effectively, envision long-term goals, and demonstrate personal responsibility as well as to avoid inflexibility, dishonesty, defensiveness, and impatience (Carmona 2007).

This pattern of responses about skills from workers and employers is not unique to the U.S. In the United Kingdom, a 1998 survey of 4,000 employers found that the first four skills found lacking in 16-24 year-olds were technical and practical skills, general communication skills, customer handling skills, and teamwork skills (Westwood 2004). At the bottom of the list were numeracy and literacy skills. In a 2002 survey of 27,000

employers in the UK, 23 percent of employers reported a significant number of their staff were less than fully proficient in their jobs but affecting only about 6 percent of employees. Again, communication skills, teamwork, other technical and practical skills, customer handling, and problem-solving were mentioned most and numeracy and literacy were mentioned least (Hillage et al. 2002). Consistent with these findings, the Confederation of British Industry (CBI) defines the qualities and competences that make up employability as:

- Values and attitudes compatible with the work including a desire to learn, to apply that learning, to improve and to take advantage of change.
- Basic skills (literacy and numeracy)
- Key skills (communication, application of number, information technology, improving one's own learning and performance, working with others, problem solving) sufficient for the needs of the work.
- Other generic skills that are becoming increasingly such as modern language and customer service skills.
- Up-to-date job-specific skills.
- The ability to manage one's own career

The importance of non-cognitive skills for performance on jobs should not be taken to mean that reading, writing, and math skills are irrelevant. When employers emphasize interpersonal qualities, computer literacy, and specific occupational skills, they may be assuming workers have at least some basic academic skills but that, once some threshold level is reached, non-cognitive skills become a priority. Moreover, learning computer literacy and occupational skills often require basic to moderate reading, writing, and math skills.

High School Standards and Work-Related Skills

Notwithstanding a vast body of evidence that requirements for college differ substantially from those for the majority of jobs and careers, states are imposing increasingly advanced academic course requirements on all high school students. At the same, states are doing little to incorporate into their state standards employability skills not directly linked to academic courses. This section offers a preliminary review of the issue. Since state high

school standards are continuing to evolve, some of the discussion may not capture very recent changes.

Math requirements are a good starting point for discussion. Achieve, a group that strongly promotes Algebra II as a requirement for all high school students, reports that the number of states imposing this level of math is increasing and has now reached 17 states. Examples of what students are supposed to learn in Algebra II include quadratic equations, exponential functions, and inverse functions. It is a good thing for students to learn high level mathematics, but requiring these math courses for all students and doing so with few indicators of their relevance to student careers is questionable. As noted above, I cannot see how states can rightly claim this course is necessary for the workplace when no more than 9 percent of the overall workforce and only 14 percent of professionals, managers, and technicians use these capabilities.

The analysis of English requirements—normally four years for all students—is difficult because of the variation in what material is covered. As in the case of math, more learning is desirable, but not every content standard in literature is required for students to be well prepared for work or even a productive career. Consider, for example, the California English content standards for grades 11 and 12 that require students are able to analyze "…the ways poets use imagery, personification, figures of speech, and sounds to evoke readers' emotions," and "…the ways authors have used archetypes drawn from myth and tradition in literature, film, political speeches, and religious writings."[5] Recommendations from the American Diploma Project, aimed at influencing state standards for high school diplomas, include similar ideas under the literature section, including: a) identify how elements of dramatic literature (for example, dramatic irony, soliloquy, stage direction and dialogue) articulate a playwright's vision; and b) analyze works of literature for what they suggest about the historical period in which they were written.

Several of the suggestions for writing look reasonable and useful for all students. The section includes a section on work-related texts that appropriately incorporates tasks such as translating technical language into non-technical English, providing facts and details, comparing and contrasting alternatives, and providing a scenario to illustrate the points. In the case of writing, the problem may well be the implementation of the standards. There is

[5] These come from the California State Board of Education, http://www.cde.ca.gov/be/st/ss/enggrades11-12.asp

little doubt that students going to a four-year college will be asked to write much more lengthy and academic papers than students going directly to work and in many professions. Note above the reality that only one in four current workers actually write documents of five pages or more.

Raising questions about whether state standards geared for four-year colleges should be applied to all students is politically awkward and elitist in today's context. After all, should not all students be able to master all high level requirements? Moreover, if some students choose not to take the full college-prep curriculum, aren't we depriving them of opportunities and relegating them to bad jobs for their entire career? Finally, setting high standards will push students to learn more, whether or not they use the skills on the job.

Certainly, nothing I say should be taken to mean we should prevent students from having the opportunity to learn high levels of academic subjects. However, forcing these content standards on all graduates may limit students from taking courses more helpful to their careers or, at worst, may worsen the dropout problem (Warren and Corl 2007). In addition, the exclusive focus on these curricular approaches will marginalize efforts to employability through standards more closely linked to success in careers and to work-based learning methods for achieving academic and work-oriented skills.

Meanwhile, state standards are only beginning to focus on helping students learn the array of skills critical to workplace success that are cited above. But, the efforts are modest and sometimes conflict with the reality what workers must master to succeed. One recommendation to Wisconsin by a international education council is to recquire that all students (and teachers) learn a foreign language to achieve "global literacy". Again, in the name of 21st century skills, states may expand course work for students to learn skills only infrequently used in the workplace. In commenting on these efforts, Dr. Arnold Packer, former executive director of the SCANS commission, pointed out that assessment of many skills is difficult and requires some degree of subjectivity. Although many schools are creative in requiring presentations, in using students to teach others, in emphasizing teamwork, and in encouraging students to manage resources, these initiatives are not incorporated into state standards, are generally not measured for every student, and not treated with the same seriousness as state standards requiring more course work and a threshold performance on cognitive, standardized tests.

In order to prevent marginalizing employability skills, states should look to actual work settings and to efforts to assess the performance of workers or learners in apprenticeship programs. Some employability skills are difficult to learn outside the workplace itself. The sociocultural approach to examining skills emphasizes the contextual nature of skills and the importance of non-academic skills often attained in a work environment and through joining experienced workers in a "community of practice" (Stasz 2001). Nelsen (1997) points out that workplaces not only require formal knowledge—facts, principles, theories, math and writing skills—but also informal knowledge—embodied in heuristics, work styles, and contextualized understanding of tools and techniques. In a highly revealing case study of auto repair workers, she describes that the importance of social skills for learning the informal knowledge, as captured in stories, advice, and guided practice. Nelsen further argues that the social skills learned at school are not necessarily useful at work and may even be counterproductive.

Building on their experience in creating the Cornell Youth Apprenticeship Demonstration Project, Mary Agnes Hamilton and Stephen F. Hamilton have created a manual about how to use work-based learning in ways that build and assess employability skills. To learn technical competence and personal and social competence, the Hamiltons recommend developing a multi-year plan that uses workplaces as environments for learning and for assessment. The workplaces could be service learning, youth-run enterprises, youth jobs, coop programs, or youth apprenticeships. Building technical competence requires a list of the key skills, steps required to learn them, making expectations clear to students and employers, and finding ways that students can demonstrate their capacity to use the skills effectively in context. Students do not simply learn computer skills in the abstract but how to use them in a work context. Coaches at work help students learn technical tasks by demonstrating them, explaining how to perform them and why a task is performed a certain way, and models problem-solving. Coaches are also responsible for monitoring and critiqueing the youth's performance. In the case of social and personal competencies, they provide a number of examples by which students learn at workplace how to understand systems and their organization, adhere to professional norms, cooperate with other in a team, communicate with clear messages, and how to act with self-confidence, initiative, motivation, and continuous improvement.

The work-based learning provides students with an appreciation of the job ladders in the relevant field, including any postsecondary education requirements. One form of documentation of student learning is the student's own portfolio that develop a portfolio that includes details about task competencies achieved, projects the student undertook or helped achieve, and reports by the school and the student's coach or supervisor. Ideally, students completing programs would earn credentials that document occupational competencies (as with apprenticeships) and/or that document the student's achieving high levels of employability skills highlighted in SCANS and similar reports. Some states are developing certificates documenting work readiness. Georgia's Work Ready Certificates are a step in this direction but they test only academic-oriented skills. Expanding the approach to include the types of personal and social competencies as well as technical skills described by the Hamiltons could go a long way toward solving the assessment problem. At that point, states could encourage all students to undertake activities that lead to these certificates.

Cooperative education (coop) could well be a good starting point for doing more to the assess employability skills of high school students. Ideally, coop provides a structured educational strategy integrating classroom studies with learning through productive work. It involves employers as well as students and schools with specified responsibilities for each party. The school is is supposed to monitor student performance. However, so far as I know, the program does not mandate the development and assessment of SCANS skills with any specificity. In 1998, 32 percent of high school students worked for class credit in high school. Career pathway programs in high schools, including Career Academies and Tech-Prep programs, are other potential vehicles for helping students develop SCANS skills and document them in an assessment program. Once states specify standards of employability that track SCANS skills, ideally in collaboration with a representative group of employers, they can encourage schools to implement a variety of strategies and assess student outcomes.

Concluding Thoughts

The U.S. faces critical issues in preparing the next generation of workers to become productive enough to earn good wages for themselves and to contribute to the financing of public priorities. Part of the challenge is to insure that few if any students fail so badly in school that they drop out, often participating in crime and having children well before they

can afford to support them. Since schools play a critical role in these efforts, it is natural that vigorous debates take place about strategies for the U.S. school systems. Moreover, the problem is complicated by the multiple goals of the education system—to encourage learning for its own sake and as a way of cultivating the best in people, to educate for good citizenship, and to teach students sufficient skills to succeed in the workplace. Without minimizing the other purposes of schooling, this paper focuses on the requirements for preparting students for college and careers.

One vision put forward by national organizations and accepted by some states is that all high school students can and should learn to the same high academic standards whether they are going to work or college. A key reason is that the content high school students must master to enter and succeed in college is essentially the same as what students going to work must attain to succeed in the workplace. In this paper, I compile facts about what workers actually use from high school courses to refute the idea that the requirements for work and college are the same. Yet, even if I am correct, the proponents of common requirements may not be misinformed, but rather are implicitly pursuing a "college-for-all" policy. From this perspective, making youth well qualified for work right after high school is of little interest. Since they see little heterogeneity in the world of work youth are about to enter, they have little taste for differentiation. Some of these planners fear that having different course requirements goes against their sense of egalitarianism and equal opportunity. In this view, not requiring all students to take the highest level courses will consign them to a future of low wages and missed opportunities.

An alternative vision is that students vary in their interests and their strengths, that academic coursework is only one part of the learning process, that emphasizing only the most academic, college-oriented curriculum at best will displace other courses and experiences that could be more rewarding for many students and at worst will lead to sharply increased dropout rates. Not only are workers very unlikely to use content from some of the courses being added to state requirements, but even many students who take these courses will forget the concepts unless they are reinforced by frequent use. Meanwhile, other skills that nearly all students could master and that could raise their productivity are taking a back seat or no seat at the education standards table. If designing programs to develop and measure communication, team work, and other SCANS compentencies, there might be a good excuse. But, there are a many settings in which students have been able to

demonstrate important employability skills, especially where there is some link to workplaces in private firms and/or community service projects.

Under the alternative vision, many of the employability skills have been and continue to be learned at the workplace itself through structured programs involving work-based learning. If strucutured well, these programs have the potential not only to lead to major increases in the employability skills of high school graduates, but also to encourage many to become inspired to study and master higher level academic skills, especially those related to careers. Finally, widening the range of skills emphasized in high schools is likely to encourage students to stay in school as potential dropouts see the gain from staying in school and have the opportunity to learn skills most relevant to good jobs now and later in their careers.

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Table 1: Selected Questions from STAMP

Math

At your job, do you:

1. use math or numbers in any way (e.g., measure or weigh things, count things, work with money)
2. use addition or subtraction
3. use multiplication or division
4. do math using fractions, decimals, or percentages
5. use simple algebra to solve for unknown values
6. use more advanced algebra to solve complex equations
7. use geometry or trigonometry
8. use probability and statistics, such as correlations and regressions
9. use calculus or other advanced mathematics

Reading

As part of your job, do you read:

1. anything at work, even very short notes or instructions
2. anything at least one page long, including notes, memos, reports, or letters
3. anything at least 5 pages long
4. articles or reports in trade magazines, newsletters, or newspapers
5. articles in scholarly, scientific publications, or professional journals
6. instruction manuals or other reference materials
7. work-related books
8. bills or invoices

Writing

As part of your job, do you write:

1. anything at work, even very short notes or instructions only a few sentences long
2. anything at least one page long, including notes, memos, reports, or letters
3. anything at least 5 pages long
4. articles or reports for magazines, newspapers, or newsletters
5. books or articles for scholarly, scientific, or professional journals
6. fill out bills or invoices

Forms and Visual Matter

1. As part of your job, do you use or fill out any kind of forms or reports, such as order forms, contracts, reports, or online forms? (y/n)
2. How many different kinds of forms do you use in an average month (1-2, 3-9, 10+)
3. How long are most of them (1 page, 2-4 pages, 5+)
4. How would you rate the complexity of the work you do with forms? (0=extremely simple, 10=very complicated)
5. As part of your job, do you read things that communicate information in picture form, such as maps, diagrams, floor plans, graphs, or blueprints? (y/n)
6. Do you write or create [such things]? (y/n)

Source: Michael Handel (2007).

Table 2: Proportions of Workers Using Various Skills Learned in Courses

	All	Upper WC	Low WC	Upper BC	Low BC	Service
Math (α=0.81)						
1. Any math	0.94	0.95	0.97	0.94	0.91	0.88
2. Add/subtract	0.86	0.93	0.90	0.87	0.78	0.73
3. Multiply/divide	0.78	0.89	0.82	0.81	0.65	0.57
4. Fractions	0.68	0.82	0.68	0.70	0.58	0.40
More advanced	0.22	0.35	0.09	0.41	0.19	0.04
5. Algebra I	0.19	0.30	0.08	0.36	0.16	0.04
6. Geometry/trig	0.14	0.20	0.05	0.29	0.15	0.02
7. Statistics	0.11	0.22	0.05	0.10	0.06	0.02
8. Algebra II	0.09	0.14	0.03	0.16	0.08	0.02
9. Calculus	0.05	0.08	0.01	0.08	0.05	0.01
Mean Level	4.11	4.9	3.7	4.8	3.7	2.8
Reading (α=0.80)						
1. Any reading	0.96	0.99	0.97	0.91	0.91	0.95
2. One page	0.82	0.96	0.86	0.72	0.57	0.67
3. Five pages	0.54	0.81	0.47	0.46	0.26	0.32
4. News articles	0.42	0.64	0.37	0.27	0.21	0.24
5. Prof'l articles	0.38	0.65	0.26	0.24	0.15	0.23
6. Books	0.53	0.76	0.40	0.53	0.35	0.38
Mean Level	3.8	5.0	3.5	3.2	2.5	2.9
Writing (α=0.64)						
1. Any writing	0.91	0.99	0.93	0.83	0.80	0.83
2. One page	0.61	0.86	0.56	0.46	0.36	0.41
3. Five pages	0.24	0.47	0.13	0.12	0.07	0.09
4. News articles	0.09	0.20	0.04	0.01	0.04	0.03
5. Books/prof'l arts	0.03	0.07	0.00	0.00	0.00	0.02
Mean Level	1.9	2.7	1.7	1.4	1.3	1.4
Documents						
1. Use forms	0.67	0.78	0.77	0.61	0.46	0.46
2. Kinds of forms[a]	1.27	1.51	1.50	1.10	0.84	0.77
3. Form length[b]	0.99	1.23	1.09	0.83	0.62	0.65
4. Form complexity[c]	3.16	3.99	3.65	2.62	1.84	1.86
5. Use visual matter	0.52	0.60	0.41	0.82	0.55	0.31
6. Create visuals	0.32	0.43	0.19	0.62	0.22	0.15

a. 1 = 1-2 different kinds of forms, 2 = 3-9 different kinds, 3 = 10 or more (0=no form use)
b. 1 = one page long, 2 = 2-4 pages, 3 = five or more pages (0=no form use)
c. 1 = extremely simple, 11 = extremely complicated (0=no form use)

Source: Michael Handel (2007).