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Demographics and Education in the Twenty-First Century

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CHAPTER

16 Demographics and Education in the Twenty-First Century

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FOCUSING QUESTIONS

1. What role do cognitive skills play in the twenty-first century?
2. How can knowledge of changing demographic patterns help educators teach students more effectively?
3. What internal and external factors influence one's cognitive ability?
4. What are some benefits and drawbacks to implementing a differentiated schooling approach based on students' abilities and interests?
5. Why is career and technical education (CTE) an essential component of differentiated schooling?

The National Academy of Sciences' (2007) report, Rising Above the Gathering Storm, called for more scientific and technical innovation to maintain America's economic growth and vitality. Countless other reports have called for more science, technology, engineering and math (STEM) education, culminating in Obama's 2009 Educate to Innovate initiative. The thinking goes, the more STEM knowledge students gain, the more prepared they will be for the twenty-first-century knowledge-based economy. The problem is that STEM jobs account for merely 5 percent of all U.S. jobs, which suggests that prudent allocation of resources is a principal consideration: Do all students need STEM education, or should it be focused primarily on the mathematically and scientifically inclined? And if so, what are the implications for the majority who are not? In this connection, demographics may hold the key to developing a more pragmatic twenty-first-century solution to educational equality and excellence.

THE IMPORTANCE OF DEMOGRAPHICS

Demographics tell us what issues we are dealing with and what kind of society we are becoming. For instance, a higher population of immigrants suggests that we need to increase bilingual education. A shrinking middle class foretells growing inequality, as well as social, economic, and political polarity. A graying population means that healthcare will become an important job sector. Understanding demographics helps us to better address employment opportunities and problems by matching demand and supply.

In the case of STEM education, policymakers are faced with a dilemma. They can consider the "quantitative" approach, which seeks to expand the number of scientists and engineers by requiring compulsory STEM education for all students (i.e., providing some STEM for all); or, they can follow the "qualitative" approach, which strives to optimize STEM development for the mathematically and scientifically inclined student. If the current education priority is STEM competitiveness, then the latter approach is more feasible and efficient, according to The Information Technology and Innovation Foundation (2010). Yet this approach is potentially exclusionary, because only a fraction of students will be extensively developed. On the other hand, the enduring American commitment to equality necessitates that no group or individual be excluded from opportunity. So how can this disparity be resolved?

First, it must be acknowledged that the two apparently competing concepts of individual differences and individual equality are central to America's unique heritage. While citizens in other nations have fought for human rights, they tend to be focused on the collective good (e.g., class equality in the French Revolution, political and economic freedom in China's Tiananmen Square protests, and racial equality for black South African inhabitants under Apartheid rule). America's founding principles, on the other hand, reflect the emphasis on individual liberty. Its subsequent history—through the Civil War, the Populist and Labor movements, and the Civil Rights movement—continues to chronicle the struggle for the right to be simultaneously different and equal. In fact, it has been the perennial tension to resolve this paradoxical ideal that has cultivated bold progress, an American hallmark no other nation has matched in the modern era.

Many industries in the United States seem to realize that the concepts of individual differences and individual equality are not mutually exclusive. Professionals in the entertainment, food, and apparel industries pragmatically differentiate their communication to consider the diverse wants and needs of specific demographics (such as ethnicity, gender, and age) while striving to be inclusive. Advertisers for an athletic apparel company, for instance, might develop separate marketing campaigns for a sneaker, one that targets young urban males and another that caters to long distance runners.

How physicians use demographic characteristics to diagnose patients is illuminating. Despite similar pathological patterns, human beings have widely different health profiles that are affected by genetics and environment. Because of this, physicians perform what is called a "differential diagnosis," a determination of what has led to the system failure in a particular place and time. Often, these diagnoses take into account certain patterns that govern group behavior and characteristics, such as smoking, family history, and even ethnic membership. Troubleshooting complex systems such as the human body is notoriously challenging, but can be facilitated if doctors are aware of certain realities—that Jews and Asians, for example, are predisposed to lactose intolerance, or that high blood pressure and diabetes are more common among Hispanics and blacks. In turn, patients receive an equally unbiased, differentiated, and appropriate plan of treatment.

Politicians similarly craft distinct messages that target by geography (swing states), religion (the Christian vote), age (the Social Security vote), political view (Tea Party), lobbies (meat industry), and of course ethnicity (the Hispanic vote) when running for public office. The central point is that most industries in this hyper-specialized age recognize that individuals and groups are more receptive when you respect their distinctiveness and focus on addressing their particular needs. It is perhaps the most democratic approach.

However, this differentiated model has curiously eluded the education industry. Though it adjusts services for certain minority or protected groups (e.g., special education students, bilingual students), education primarily follows a "one-size-fits-all" instructional approach, ignoring differences, abilities, and interests, particularly at the secondary level. Schools still compel all students to take academic courses that muddle the connection between school and life. Invariably, the academically disinclined students lose interest and drop out. There is some evidence, in fact, that augmenting math and science requirements can even lead to lower high school graduation rates (Symonds, Schwartz, & Ferguson, 2011).

If educators followed a heterogeneous approach to instruction, they would be more mindful of individual abilities and—more importantly—offer a supportive curriculum that provides a visible pathway to achievement. Cultivating the link between potentiality and success would increase students' receptivity and ensure that employers invest in the development of future workers. Amazingly, this intuitive solution runs completely counter to current reform initiatives. If educators wish to match student skills with the specialized demands of a knowledge economy, then they will need to first acknowledge the limitations of a standardized curriculum paradigm.

Two interrelated demographic segments in particular illuminate the importance of a differentiated model and have critical implications for the twenty-first-century knowledge-based economy: the cognitive class and Asian American immigrants. In light of emerging research, the analysis of both groups reveals the folly of a homogenized education model, particularly at the secondary level. The intention is to shed light on a more relevant education paradigm that would ensure the United States remains economically competitive.

THE COGNITIVE CLASS

The cognitive class, also known as the intellectual class (Rindermann & Thompson, 2011), the smart fraction (La Griffe du Lion, 2002; Rindermann, Sailer, & Thompson, 2009), the creative class (Florida, 2003), or the gifted and talented, is not a traditionally recognized demographic segment such as immigrants, Hispanics, or women. In education for the twenty-first-century knowledge economy, however, recognizing the intellectual group—which can be composed of individuals representing all national, racial, and ethnic groups—is critically important.

Research has shown that a person's mental ability has a significant and positive relationship with income and educational attainment (Heckman, Stixrud, & Urzua, 2006; Ng, Eby, Sorensen, & Feldman, 2005; Scullin, Peters, Williams, & Ceci, 2000). On an individual level, it functions to open the doors of opportunity and to solve problems by increasing insight, foresight, and rationality that result in proximal consequences like higher-quality work and better health (Rindermann, 2008; Rindermann & Thompson, 2011).

On an aggregate level, cognitive ability has an enormous impact on economic growth, according to an emerging group of economists and cognitive science researchers. Lynn and Vanhanen (2002) revealed three major insights in a seminal study that collected data from 81 countries: (1) national IQ correlated significantly with per capita Gross Domestic Product (GDP) ($r = .62$); (2) IQ was similarly correlated with economic growth ($r = .64$); and (3) nations' IQs differed widely, with East Asian countries like Japan (IQ = 105) and South Korea (106) scoring high, and sub-Saharan African countries like South Africa (72) and Ghana (71) scoring low.

Although Lynn and Vanhanen's data drew wide scrutiny for its methodological limitations and racial implications, numerous studies have since confirmed the overall IQ-productivity relationship (e.g., Jones & Schneider, 2010; Hunt & Wittman, 2008; Hanushek & Woessmann, 2009). Lynn and Vanhanen (2006) and Rindermann (2007) further reinforced the validity of national IQ by associating it with international tests such as the Trends in International Mathematics and Science Study (TIMSS), the Programme for International Student Assessment (PISA), and the Progress in International Reading Literacy Study (PIRLS), with an r ranging from .80 to .90. Apparently, mathematical, scientific, and verbal abilities are suitable proxies for IQ.

Rather than focus on the average cognitive ability of a nation, several contemporaries have centered on the academic elite known as the cognitive class. Studies suggest that the IQ and test scores of those within the top ten percentile had a decisive effect on GDP and STEM achievement compared with national IQ, even after controlling for external factors like education level and degree of economic freedom (Gelade, 2008; Rindermann & Thompson, 2011). STEM achievement was determined by four indicators: (1) the number of patents per million people; (2) Nobel Prizes in science related to population size; (3) the number of scientists and engineers per million; and (4) the rate of high-technology exports as a percentage of manufacturing exports.

What makes these results compelling is not merely the high correlation between elite cognitive ability and national wealth, but rather the direction of causality and predictive effects as revealed by regression analyses, path analyses, longitudinal analyses, and cross-lagged panel designs. Although there were reciprocal effects between the two, the effect of intelligence on wealth is significantly stronger; that is, cognitive ability leads to higher wealth more than wealth leads to increased intelligence. Causal relationships are undoubtedly difficult to determine, but these studies have certainly demonstrated a clear connection between the two.

In concrete terms, Rindermann and Thompson (2011) discovered that an increase of one IQ point per person in the intellectual class raises average per capita GDP by U.S. $468 compared with only $229 by those from the mean group. Assuming that 5 percent of the 55 million public school students are considered gifted and talented (G&T), then each additional increase in IQ points for the G&T students would add almost $1.3 billion to the GDP. From another perspective, Hanushek and Woessmann's (2009) calculations suggested that the top 5 percent of students who increased their international scores by ten percentage points would have over four times greater impact on a nation's annual economic growth compared with those at the basic literacy level (1.3 vs. 0.3 percentage point annual growth, respectively). Simply put, the higher the IQ, the greater the impact on the economy.

Taken together, these studies suggest that the current lack of investment in academically high-potential students, particularly in the STEM fields, will have negative consequences for the U.S. economy. The federal government's simultaneous focus on academic low-achievers and STEM coursework for all students in the upper grades is admirable, but naïve and narrow-minded in a globally technological world. More resources are needed to better assess the diverse abilities of all students, as well as identifying and developing academically high potential students.

THE 2012 PEW STUDY: THE RISE OF THE ASIAN-AMERICANS

Another demographic segment that can significantly impact America's knowledge economy are the highly skilled immigrants, many of whom come from Asia. Asian immigrants, in fact, are granted three-quarters of all H-1B visas, for instance, with China and India alone accounting for 64 percent. Even so, such findings tell only a fraction of an emerging trend. According to the Pew Research Center's (2012) newest study, *The Rise of Asian Americans,* Asian Americans (the bulk of whom trace their roots to six countries—China, India, Japan, Korea, the Philippines, and Vietnam) are standing out as a select group, leading all other racial groups in population growth, income, and education in the United States.

Representing 6.2 percent of the total U.S. population (as of 2011), the Asian population (including mixed race Asians) grew 46 percent over the past decade and surpassed Hispanics as the fastest growing immigrant group in 2010. Though the Hispanic immigration rate has slowed significantly since the middle of last decade, those from Asia have continued to gain—quintupling from 1980 (3.6 million) to 2011 (18.2 million). Asian immigrants accounted for 36 percent (430,000) of new immigrants—between 2007 and 2010—compared with 31 percent who were Hispanic (370,000). Based on the most recent U.S. Census Bureau's (2008a; 2008b) population projections, growth (or percentage change) for both groups will outpace blacks and whites by 2050 (173 percent Asians and 189 percent Hispanics); see Table 16.1. By then, it is estimated that Asians will number over 43 million and make up almost 10 percent of the total U.S. population. The growth rate of whites and mixed-race whites will decline in comparison, going from 81 percent of the population in 2010 to about 77 percent in 2050. If mixed-race whites are excluded, they represented 64.7 percent in 2010 and will steadily decline over the next four decades to 46.3 percent. By 2050, whites in the United States will be the minority population.

The Asians' level of growth is compounded by certain economic advantages. For one, Asian immigrants have a much lower undocumented rate compared to Hispanics (approximately 15 percent vs. 45 percent, respectively). Also, Asian immigrants

TABLE 16.1 Projections and Percent Distribution of the U.S. Population by Race Alone or in Combination*: 2010 to 2050 (in millions)

Race	*2010*	*2020*	*2030*	*2040*	*2050*	*% Change 2010–2050*
Asian	17.6 5.7%	23.1 6.8%	29.2 7.8%	35.9 8.9%	43.1 9.8%	173%
Hispanic	49.7 16.0%	66.4 19.4%	85.9 13.0%	108.2 26.7%	132.8 30.3%	189%
Black	42.2 13.6%	47.7 14.0%	53.5 14.3%	59.5 14.7%	65.7 15.0%	110%
White	251.4 81.0%	272.8 79.9%	294.9 79.0%	316.7 78.1%	339.4 77.3%	95%
Total	310.2 100%**	341.4 100%**	373.5 100%**	405.7 100%**	439.0 100%**	—

Note: **In combination* means in combination with one or more other races. **The sum of the race groups adds to more than 100% (the total population) because individuals may report more than one race. Source: U.S. Census Bureau (2008a; 2008b).

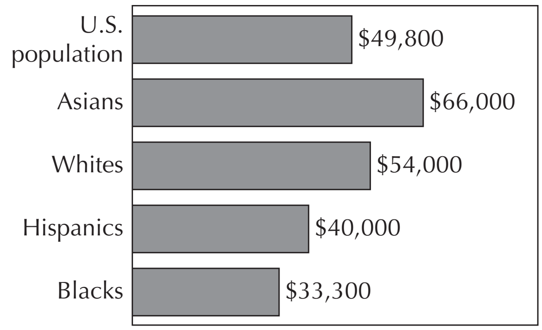

FIGURE 16.1 Median Household Income, 2010

Note: Asians include mixed-race Asian population, regardless of Hispanic origin. Whites and Blacks include only non-Hispanics. Hispanics are of any race. Household income is based on householders ages 18 and older; race and ethnicity are based on those of household head. Source: Pew Research Center analysis of 2010 American Community Survey, Integrated Public Use Microdata Sample (IPUMS) files, Pew Research Center (2012).

are notably more likely than other groups to be admitted with employment visas (27 percent received green cards based on employer sponsorship, compared with 8 percent of other immigrants). Most importantly, their median household income ($66,000) exceeds other groups, including whites ($54,000), even when adjusted for household size differences; see Figure 16.1. Their median household wealth, or sum of assets, also eclipses that of the median U.S. population ($83,500 vs. $68,529), although they still lag far behind whites ($112,000). Despite outperforming whites in income, Asians have a lower net worth as a result of immigration restrictions prior to 1965 that hindered long-term asset accumulation. If current trends continue, that gap should shrink significantly by 2050.

Such economic advantages are most likely because Asians are well educated overall; almost half have at least a bachelor's degree compared with 28 percent of the U.S. population. Among recent Asian immigrant adults, the percent is even higher: practically two-thirds who immigrated between 2007 and 2010 were enrolled in college or graduate school, or held a college degree (see Figure 16.2).

For now, overrepresentation is probably the most fitting description characterizing this ambitious demographic, especially within higher education. Asian Americans constitute 60 percent of all foreign students in U.S. educational institutions. Within STEM fields, both foreign- and native-born Asian students disproportionately held advanced U.S. degrees in 2010: A quarter of the 48,069 research doctorates granted at U.S. institutions; almost half of all engineering Ph.D. degrees, 38 percent of math and computer science doctorates; one-third of physical sciences doctorates; one-quarter of life science Ph.D. degrees; and almost one in five social sciences doctorates. Predictably, two-thirds of the Intel Science high school finalists in 2011 were of Asian heritage. Many finalists and winners of this talent search have subsequently won Nobel Prizes, MacArthur and Sloan research fellowships, or been elected to the National Academy of Sciences. They have been the key to keeping the United States competitive with China and India.

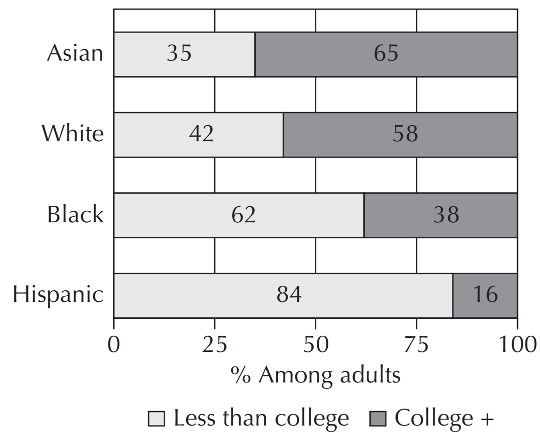

FIGURE 16.2 Education Characteristics of Recent Immigrants by Race and Ethnicity, 2010
Source: Pew Research Center analysis of 2010 American Community Survey, Integrated Public Use of Microdata Sample (IPUMS) files, Pew Research Center (2012).

Undergirding their economic and educational edge is a distinctive culture that strongly values marriage, parenthood, hard work, future orientation, and career success. The Pew survey reveals that Asians do in fact place the highest priorities on: (1) being a good parent (three-quarters of Asian-Americans vs. 50 percent of the general public); and (2) marriage (54 percent say that having a successful marriage is one of the most important things in life, compared with only 34 percent of all American adults); see Figure 16.3. As a result, they are more likely to be married (59 percent vs. 51 percent U.S. total), less likely to be an unmarried mother (16 percent vs. 41 percent), and their children are more likely than all American children to be raised in a household with two married parents (80 percent vs. 63 percent). Along with a larger than average household size, this stability coincides with middle class values and creates a strong network of support for children's growth and learning.

Hard work and success also rate highly among Asian Americans: 93 percent believed that "[Asian] Americans from my country of origin group are very hardworking," compared with only 57 percent who thought that Americans are very hardworking. Perhaps no other book captured the stereotype of strict parenting more than Yale law professor Amy Chua's (2011) *Battle Hymn of the Tiger Mother*, in which she unapologetically opined why "Chinese mothers are superior." In it, Chua extolled the virtues of authoritarian parenting where overriding children's preferences was crucial in getting them to practice harder and longer to become better at what they are doing. Asian parents are more demanding because they "assume strength, not fragility" in their child, unlike the archetypical American parent who constantly agonize over their child's psyche, according to Chua. Results from the Pew survey appear to support her parenting model, with six out of ten Asian Americans finding American parents put too little pressure on their children to succeed in school. Only 9 percent said the same about Asian-American parents. Interestingly, nearly four

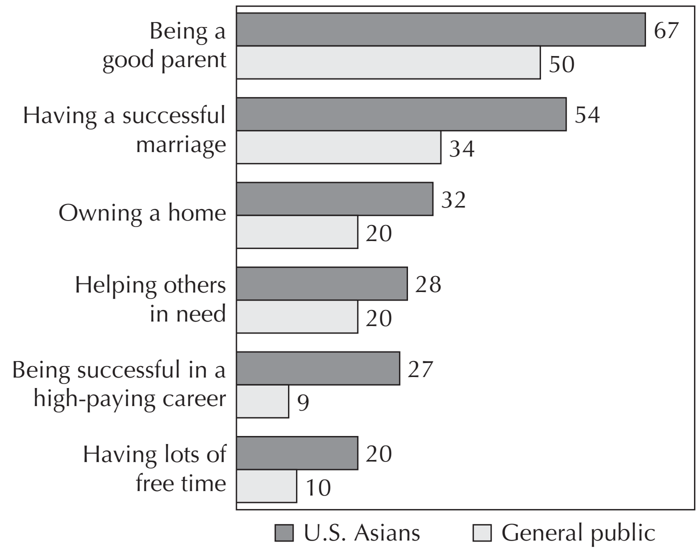

FIGURE 16.3 Life Goals and Priorities: Asian Americans vs. General Public

Source: Pew Research Center (2012): Asian-American Survey. Q19 a-g. General public results from January 2010 survey by the Pew Research Center. The question wording varied slightly from one survey to the other.

out of ten Asian Americans also agree that Asian parents put too much pressure on their children.

ASIANS' ACADEMIC PROFICIENCY

Educators and policymakers are well aware of Asian's overall academic proficiency at the school level. Out of all ethnic groups, Asians had the highest percentage of students who were proficient (a score of 3 or 4) on state tests in 2008: 83 percent of fourth and eighth graders were proficient in reading; whereas for math, 88 percent in fourth grade, 86 percent in eighth grade, and 81 percent in high school were deemed at least competent (Center on Education Policy, 2010); see Table 16.2. Only in high school reading did the same portion of whites score proficiently (78 percent). Asians similarly outperformed whites in 29 out of 34 states in math state tests at the advanced level, representing a median of 46 percent in the advanced category, compared with whites at 36 percent. As broadly acknowledged, a significant gap between Asian/Whites and African American/Hispanics exists across all levels, widening particularly in eighth grade and high school math. This plight has troubling implications for the twenty-first-century economy if America's education model rests on a one-size-fits-all approach.

In addition, Asian students are overrepresented among the gifted and talented (G&T). Asians make up only 5 percent of the total primary and secondary public school population but comprise 9.4 percent of the G&T population (Office for Civil Rights, 2006). Representation can be measured by comparing the percent of students in programs for G&T relative to their proportion in the overall student population, with 1.0 a perfect proportionate representation. Asian

TABLE 16.2 Median Percentages of Students' Scoring Proficiency on State Tests, by Ethnicity, 2008

Subject/Grade	*Asian American*	*African American*	*Hispanic*	*White*
Reading				
Grade 4	83	58	64	81
Grade 8	83	58	58	81
High school	78	53	56	78
Math				
Grade 4	88	56	67	82
Grade 8	86	46	55	77
High School	81	45	50	71

Source: Center on Education Policy (2010)

students are overrepresented compared to white students in G&T programs (see Figure 16.4), despite being outnumbered in total. It is possible that the percentage would be even higher if gifted and talented English language learners (i.e., limited in understanding English) also were included.

ASIANS' STEM CONTRIBUTIONS

High population growth, income, and education suggest significant potential, but do not necessarily reveal impact. The Pew study showed that Asians earned a disproportionate number of degrees in science, technology, engineering, and math as well as of H-1B visas. But actual data of economic and intellectual contributions are needed to prove the value of demographic characteristics as the basis for a reimagined education model. Within the engineering and technology fields, for example, Asians—especially Chinese and Indians—are a driving force behind entrepreneurship and intellectual property that directly impact America's GDP.

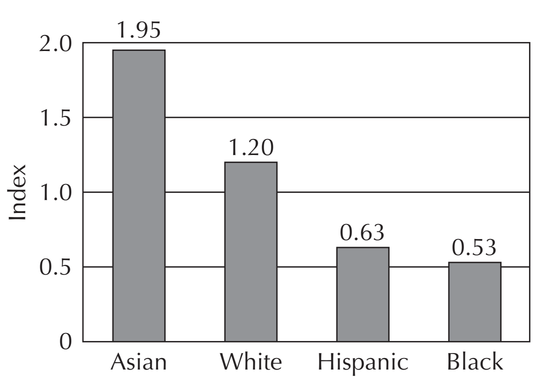

FIGURE 16.4 Gifted Representation Index

Note: 1.0 = perfect proportionate representation; > 1.0 = Overrepresentation; <1.0 = Underrepresentation.

Source: Office of the Civil Rights (2006).

In terms of immigrant-founded U.S. businesses, the four largest immigrant groups came from India, the United Kingdom, China, and Taiwan (Wadhwa, Saxenian, Rissing, & Gereffi, 2007). However, Asians comprised half of the top ten nations whose immigrants founded engineering and technology (E&T) companies in the United States. In particular, Indians were key founders of 26 percent of American E&T start-ups from 1995 to 2005. In fact, they dominated the entrepreneurial arena among immigrant-founded businesses—more than those from the next four nationalities combined (see Figure 16.5). Their growth, as illustrated in Silicon Valley, outpaced every other immigrant group over the past 20 years: Indian-led businesses in

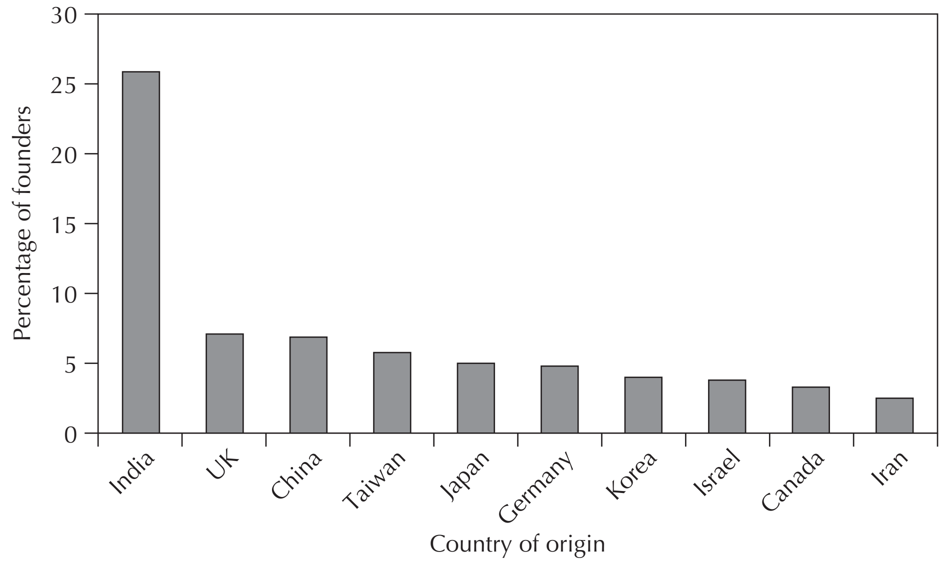

FIGURE 16.5 Birthplace of Engineering and Technology Immigrant Founders
Source: Wadhwa, Saxenian, Rissing, and Gereffi (2007).

Silicon Valley more than doubled (from 7 percent to 15.5 percent) between 1995 and 2005, whereas Chinese-led tech companies declined from 17 percent in 1998 (Saxenian, 1999) to 12.8 percent in 2005.

Aside from founding engineering and technology companies in the United States, Asians also played a significant role in other STEM fields. Whereas Figure 16.1 displayed the contributions of immigrants as a whole in each industry, Table 16.3 compares the influence between Asia and Europe (regions that contributed 10 percent or fewer in each industry, e.g., Middle East, Central/South America, and Australia were grouped together under "Others").

Workers from Asia represent the largest portion in four out of the five

TABLE 16.3 Industry Breakdown of Immigrant-Founded Companies, by Ethnic/Geographic Region

	Asia	*Europe*	*Others**
Innovation/Manufacturing-Related Service	50%	19%	31%
Biosciences	32	37	31
Computers/Communications	63	20	17
Semiconductors	55	15	20
Software	48	24	28

*Others include nationalities whose companies comprised 10% or less: Middle East, Central/South America, Africa, Canada, and Australia.

Source: Wadhwa, Saxenian, Rissing, and Gereffi (2007) immigrant-founded STEM industries (innovation/manufacturing-related service, computers/communications, semiconductors and software) in the United States. Those from India, in particular, stand out significantly, founding more companies in the innovation/manufacturing-related services sector (24 percent) than those from all of the European nations combined (19 percent). Indian immigrants also dwarf those from other Asian nations, including Japan (7 percent) and China (6 percent). As a reference point, the next highest non-Asian nation was the United Kingdom (6 percent).

The biosciences field was more evenly distributed. Indians, Germans, and Koreans each accounted for 10 percent of immigrant-founded start-ups in America, and British, French, and Israeli immigrants each contributed 6 percent. In total, those from Asia and Europe represented 32 percent and 37 percent, respectively.

Within both the computers/communications and the semiconductors industries, workers from China, Taiwan, and India were overrepresented. They accounted for over half of all immigrant start-ups in the former and 40 percent in the latter. Overall, the percentage of Asian immigrant-founders in the computer industry (63 percent) and semiconductors industry (55 percent) was more than triple that of Europeans (20 percent and 15 percent, respectively).

In the software industry, Indians alone dominated immigrants from all other nations, founding 34 percent of all new businesses in the United States. Their rate was almost four times that of the next highest group, the British (9 percent). Asians overall founded twice as many start-ups as those from Europe (48 percent vs. 24 percent).

Intellectual property, in the form of patents, is another concrete measure of STEM innovation. Data from the U.S. Patent & Trademark Office (USPTO), which measures domestic patenting activity, revealed a steadily increasing rate among Asian residents over a 30-year period (Foley & Kerr, 2012). Chinese and Indian patenting activity, for example, accounted for merely 5.3 percent from 1975 to 1982, but by the 2000 to 2004 period, their share increased three-fold to almost 17 percent. In contrast, patenting among ethnic whites has declined over the same 30-year period. Those of white Americans, who own the lion's share of patents in the United States, fell 16 percent (from 81 percent to 68 percent). Innovators from Europe saw patenting activity fall even more sharply at 25 percent (from 8.3 percent to 6.2 percent); see Figure 16.6.

THE CALL FOR EXCELLENCE BASED ON DIFFERENTIATED ABILITIES

Acknowledging the rise of Asian immigrants or the impact of the smart fraction is in no way meant to suggest any inherent abilities that other groups lack; in fact, many immigrants from Southeast Asian countries face much of the same poverty and low achievement as American minorities. However, with all the data on the economic contribution of Asian Americans and the intellectual class, it is nonetheless easy to dismiss these findings as elitist or even racist. In fact, it is merely acknowledging what parents, teachers, and others have long known to be true: that individuals have wide-ranging abilities, inclinations, and interests, and that various factors—fairly or unfairly—contribute to these gaps.

Heredity, for one, plays a significant part in determining one's cognitive abilities. Estimates in academic research vary widely, although social scientists generally assert that heredity accounts for between 45 percent (Jencks, 1972) and 80 percent (Jensen, 1969) of talent. Despite ongoing disagreements, they also agree that cognitive ability can be modified by external factors, and that they dynamically interact to determine realized differences in potential.

Both the micro-environment, which includes one's local milieu (e.g., family, home,

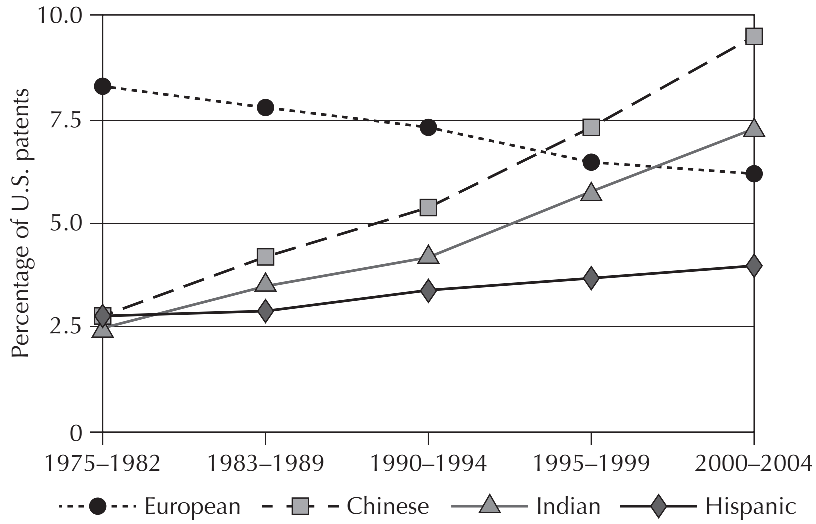

FIGURE 16.6 Growth in U.S. Patenting, by Ethnicity

Note: This table presents the share of patents in which inventors are of particular ethnicities, reside in the U.S. at the time of patent application, and work for a publicly listed corporation.

Source: Foley and Kerr (2012).

and school), and the macro-environment or broader forces (e.g., social class, education levels, and culture) have equally long-term influences. Within the macro forces, some have contended that accumulated advantages (or disadvantages) of geographical isolation and features (Nisbett, 2003; Ornstein, 2007) explain differences in human thought, behavior, and attitudes. Other researchers point to geo-political and economic realities such as voluntary migration (of Asians versus the involuntary migration of African slaves, for instance) and lack of opportunities in developing nations. The science of epigenetics, where gene expression of an offspring is influenced by parents' life experiences (e.g., the foods parents eat or the stresses they underwent when younger)—as opposed to parents' genetic code—has recently gained momentum as factors to explain mental, behavioral and physiological dispositions (Shulevitz, 2012).

Despite the reality of unequal abilities, progressive thinkers are reluctant to promulgate any kind of differentiated development in light of historical oppression and man's imperfect nature, so they invariably push for widespread teacher and school accountability in an effort to standardize outcomes. Inevitably, modern policies in the United States become captive to the unwavering push for equality at the expense of bona fide excellence, as demonstrated by compensatory funding, the focus on low-achieving and minority students, and the lowering of standards over the past decade in state tests and in higher education.

Marketers and politicians have it easier in some ways. They aren't explicitly held to the same equity imperatives and ideals that educators are to create equal opportunities and outcomes. Instead, those in other industries have a more grounded perspective about the existence of individual and group differences, and subsequently, a more pragmatic approach to equality. The truth is that, at times, certain constituents—like big donors or lobbyists—simply matter more to political candidates than others. When it fits their needs, politicians will court the Hispanic vote or the religious right. For advertisers, addressing the different wants and needs of suburban moms, baby boomers, or the millennial generation depends on their annual corporate objectives. Yet, the mindset of an advertiser who wishes to influence customer behavior is, for all intents and purposes, no different than that of a teacher or doctor who provides a service. While they have different goals, both educator and advertiser would be better served if they consider their target's individuality or distinctiveness. Context informs the approach; for educators, that means recognizing the circumstances and dispositions of their students and developing an appropriate plan. It also means embracing diversity of abilities and, often, unequal talents.

Ornstein (1977; 2002) asserted that inequality in the outcomes of schooling is a function of the natural inequality of talent among students (as well as a function of external forces). In fact, he argued that no more than 20 percent of educational outcomes are related to the combined influence of teachers and schools. Demographic patterns, as research on the cognitive elite and the rising Asian demographic has shown, illustrate the reality of these differences and sometimes magnify them. Accordingly, they should be scrupulously understood when formulating a more pragmatic egalitarianism. The solution is not to take on the Sisyphean task of equalizing abilities and outcomes of all students, as current reforms aim to do; rather, the solution lies in differentiating the curriculum by offering multiple pathways to success that take advantage of America's unique diversity.

First, despite educators' apprehension of importing business practices into education, a reframed education paradigm should embrace the differentiated model at the secondary level that other industries and countries have adopted. Without question, a rigorous literacy and math foundation must be laid at the primary, elementary, and the middle school levels for all students, given their differing starting points. However, at the early high school level—when abilities and interests emerge and become amplified—the development of individuals' athletic, cognitive, or artistic capabilities will need to be more seriously assessed. Based on formal assessment techniques, educators can provide recommendations that allow parents to decide whether or not their child should continue on the academic track or consider a career and nonacademic program, a process that families benefit from in countries like Germany, Finland, and Denmark.

As a result of the early assessment of academic potential and the implementation of an individualized plan, students will become engaged, fulfilled, and will significantly contribute to society. Profligate initiatives like the "STEM coursework for all" programs will be de-emphasized to more efficiently fund career and training initiatives (for a significant portion of students) and a more robust academic education (for those with potential in STEM, law, teaching, and other knowledge-based fields). Allocating resources to those with artistic, athletic, or interpersonal skills has long been accepted, so there is no reason why funds shouldn't also be distributed to the cognitively gifted and talented.

Concomitantly, schools must provide multiple pathways to graduation and success in the knowledge economy for the majority who will not go into STEM fields. Although Americans need to acknowledge that mathematical, verbal, and spatial skills are highly valued in a knowledge-based economy, this does not mean that that those with alternative abilities cannot contribute. As Murray (2008) asserted, the problem is the "misbegotten, pernicious, wrong-headed idea that not going to college means you're a failure" (p. 150). Is having a college education the only ticket to success? Going to or finishing college, in the traditional sense (i.e., the academic track), may not be an appropriate or desirable use of one's time and resources. Instead, policymakers should confront such cultural biases and expand niche secondary education services at the high school and community college levels to meet employer demand.

For example, a complex knowledge-based economy needs a diverse and large number of workers to implement the innovation strategies developed by scientists and engineers in a mutually enforcing way (Hanushek & Woessmann, 2009; Autor, Katz, & Kearney, 2006). These positions have been called "middle-skill" jobs—such as computer support, healthcare technicians, back office work in financial and healthcare companies, auto and airplane repair using computer diagnostic equipment—many of which require more than a high school degree but not necessarily a traditional four-year college degree. In fact, middle-skill jobs that require a post-secondary certificate/license or associate's degree are projected to be the fastest growing job sector, particularly in the healthcare, construction, and manufacturing industries (Council of Economic Advisors, 2009). Put simply, society also needs excellent technicians and skilled laborers.

High school students who pursue the vocational track or twenty-first-century career and technical education (CTE) programs like SkillsUSA, YearUp, and The Wisconsin Youth Apprenticeship Program will have the sought-after middle skills needed for jobs that pay better than those for high school graduates and pay comparably to or higher than those for many B.A. holders. It is worth noting that other developed European nations (e.g., Austria, Denmark, Finland, Germany, the Netherlands, Norway, and Switzerland) place far more emphasis on vocational education than Americans do: between 40–70 percent of these European students opt for a "dual system approach" that combines classroom and workplace learning in high school, a pragmatic path that leads to real currency in the labor market (Symonds et al., 2011). The bottom line is that developing STEM skills, although important for a knowledge economy, should be but one part of America's twenty-first-century education paradigm, and that other career tracks have separate but complementary effects on economic growth as well. Given its diversity, the United States would also have an incomparable advantage in supplying hyper-specialized expertise over a wide range of industries—a benefit no other nation has.

Finally, these changes cannot be accomplished without robust support. Students with individualized pathway plans require highly qualified instruction and guidance. Understanding, recognizing, advising, and developing students' diverse abilities and talents are perennial teacher skills that take on considerably more importance in a differentiated paradigm; as such, building teacher capacity during the pre-service and in-service stage is of paramount importance. The role of career and guidance counselors will similarly be augmented, which will be particularly challenging with students who have no clear goals or exceptional talents. At the same time, a transparent process or system is needed to clearly delineate the major career pathways at the latter stages of middle school, so that students and their families can see the patterns of course-taking and other experiences that would best position them to gain access to that field (Symonds et al., 2011). Employers, parents, and schools subsequently will have a larger stake in developing each student's abilities.

CONCLUSION

The current school reform model, based on a standardized approach, is well intentioned and politically correct, but a hollow solution for unleashing diverse potential because it ignores real population differences. Although the United States should emphasize STEM education at the elementary and middle school levels, it can best remain committed to the ideal of equality and the value of the individual by recognizing students' heterogeneous capabilities—many of which will not lie in the STEM fields. More importantly, a reimagined model that offers multiple pathways for student success—whether through twenty-first-century CTE programs, intensive STEM education, or performing and visual arts career programs—is the fairest way to foster the abilities and interests of a demographically diverse student population while addressing the competitiveness issue. Individual equality and individual differences are uniquely American ideals worth fighting for, as long as they are honestly and pragmatically considered. The alternative, one in which equality and homogeneity are synonymous outcomes, would be utterly un-American.

In fact, former director of Common Cause John Gardner (1995) suggests that "Extreme egalitarianism . . . which ignores differences in native capacity and achievement, has not served democracy well. Carried far enough, it means . . . the end of striving for excellence which has produced mankind's greatest achievement." The implication is to develop individual capabilities in all domains that help make a successful transition from adolescence to adulthood, to "prepare more Americans for the new jobs that are being created in a world fueled by new technology. That's why investment in our people"—in more community colleges, Pell Grants and vocational-training classes—is "more important than ever," according to former president Bill Clinton at a recent convention speech (Friedman, 2012). Otherwise, we will be left with mismatched skills that result in what Uchitelle (2006) calls "disposable Americans," those caught in the cycle of unemployment and underemployment. Diagnosing individual strengths, whether these are cognitive, artistic, or physical, is the ultimate realization of Gardner's excellence theme. It is the most ethical way to fulfill individual and collective potential. It is also the only way to allow for true human dignity.

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DISCUSSION QUESTIONS

1. How do we strike the balance between addressing the nation's economic interests (or needs) and those of the individual?
2. Are the two ideals of excellence and equity compatible? Explain.
3. Is going to college a good decision for all students? Explain.
4. Compare the pros and cons of a standards-based education model with those of a differentiated schooling model. Which do you prefer and why?
5. Drawing on your perception of the current education system, do you think that the United States will move toward a differentiated approach? Explain.