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The New Centurions

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The New Centurions

EACH GENERATION HAS BEEN DESCRIBED ACCORDING TO THE driving forces that have formed the collective personality of its members. The current group of young people entering the workforce belong to the so-called “millennial generation,” meaning those born between 1982 and 1997. The millennial generation is sometimes dubbed “the echo boomers” and is generally considered to be made up of the children of the baby boomer generation. Each generation has certain characteristics that have defined its interaction with the world; just as the baby boomers are also known as the “me generation,” the millennials have been called the “Net generation.” They are the first generation that has never known life without the Internet. This close proximity to and interaction with the Internet has led to a variety of defining features. While generalizations are sometimes misleading, the following characteristic tendencies have emerged to define this generation.

How to Recruit and Retain Engineering Talent from the Millennial Generation

What Are Millennials?

They Are Abundantly Socially Connected

Facebook and MySpace have been this generation’s corner malt shop. The millennials share the most mundane—and the most sensational—aspects of their lives on these social networking sites. They are constantly connected to cell phones, MP3 players, laptops, or video game players (see Figure 1).

They prefer text messaging to phone conversation and e-mail. Millennials strongly prefer learning by doing. They almost never read the directions; they love to learn by doing and interacting (Figure 2). Multiplayer gaming, computer simulations, and social networks are some of their favorite environments and provide little penalty for trial-and-error learning.

They Value Immediacy and Speed

The millennials are the quintessential multitaskers, and they are used to having the world at their fingertips through online search engines. Most of them have been raised with busy schedules: playing sports, taking music lessons, participating in extracurricular activities

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figure 1. The MP3 player is never far away.

at school, working part-time jobs, keeping up their grades, and volunteering. As they have reached young adulthood, most of them continue to manage these busy schedules and tend to be extremely good at organization and time management. They grew up with Amazon.com “anticipating” what they wanted to buy and stores and the Internet offering them a choice of consumer products unimaginable to previous generations. Furthermore, the economic boom of the 1990s made them impatient consumers; a set of adoring parents and grandparents made sure they always had the “newest stuff.”

They Accept Diversity

About 40% of millennials in the United States are of African-American, Latin-American, Asian, or racially mixed backgrounds, compared with 25% of the two next older generations. A fifth of millennials have a least one parent who is an immigrant. Having grown up with greater diversity in their neighborhoods and schools, millennials tend to be more open and accepting of others, regardless of gender, color, religion, or sexual orientation. Gay student unions are just another student group in school, and same-sex couples are commonplace. Multiracial and multicultural friendships



figure 2. Millennials like to work in diverse groups, with hands-on activities.

are ubiquitous. Recent polls have shown that more than 80% of millennials are accepting of marrying or partnering with someone of another race. Individualism is very important to the millennial; unlike previous generations, they won’t conform just to impress or to fit in. They respect others “as is” and expect the same in return.

They Are Family Oriented

The millennial generation became the first generation to experience the concept of coparenting, with both fathers and mothers playing an equal role in the children’s upbringing. Furthermore, the amount of time children spent with significant adult role models rose from 15 minutes per day (as with Generation X) to several hours per day. The parents of the millennial generation spawned a market of more than 9,000 books on child rearing, whereas there were fewer than 500 books written on the subject during the Generation X years, according to Winograd and Hais. The millennials have been raised to feel that they are wanted, necessary, and valued. From an early age, their families focused huge amounts of time, attention, and financial resources on them and involved them in family discussions and decision making. As a generation, they have been protected (think BABY ON BOARD signs and bike helmets); they have been highly scheduled (with play dates, T-ball and soccer, band and academic camps, and so on); they have had messages of social responsibility drummed into them (recycling and volunteering taught in school and the concept of “everyone is a winner” brought into their sports and extracurricular activities); and they were the center of their parents’ and grandparents’ worlds. They communicate by text and cell phone with their parents multiple times per day (Figure 3). For Baby Boomers who went off to college and called home once a week for ten minutes on the landline in their dorm rooms, this deep and mutually dependent relationship between student and parent is nothing short of amazing.

They Crave Balance

Millennials prefer to keep their time and commitments flexible longer in order to take advantage of better options; they also expect other people and institutions to give them more flexibility. Although they are willing to work hard, millennials are unwilling to put in 60-plus-hour weeks. These young adults value the good life as their parents do but are not willing to sacrifice time with friends and family to achieve it. Furthermore, they are results-oriented. Millennials feel that they should be measured by the quality and quantity of work completed, regardless of when and where it’s done.

They Are Assertive and Self-Reliant

The millennials grew up in the Decade of the Child. From the nursery onward, millennials have been indulged and made to feel special by parents, teachers, and coaches. Throughout their childhoods, these parents and teachers have built their self-esteem. They have been told again and again that they are special and unique. This has fostered confidence

in their abilities and an ambition that they can be and do anything. Recently, two-thirds of U.S. high school students surveyed expressed the belief that they were in the top 20% of their classes. Often this confidence and ambition are misunderstood as narcissism and entitlement.

Millennials began to develop self-reliance at an early age; they have learned to search the Internet for information without waiting for direction from a parent or teacher. They have the whole world at their fingertips waiting to be explored. Because of their high degree of confidence and access to information, they are more likely to engage openly and confidently in discussions about heretofore controversial subjects.

They Are Optimistic

As a result of their protected, structured, and positively reinforced upbringing, the millennials are an exceptionally accomplished, positive, upbeat, and optimistic generation. Juvenile crime and teen pregnancy rates are lower and standardized academic performance test scores are higher among millennials than among the previous two generations. Highly social, well educated, self-confident, multicultural, and technologically savvy, the millennials possess a strong social conscience and a belief that everyone's input is valued (especially theirs!).

The attributes, likes, and dislikes of millennials are compared with those of several other generational groups in Table 1.

Millennials in School

Millennials bring some exceptionally positive qualities to the world of higher education and to the workplace. They also bring a set of expectations and traits that can



figure 3. Consulting Mom and Dad.

be mystifying to teachers and managers of other generations.

The two keys to attracting the millennial student are to have a clear, concise message and to gear any marketing to the whole family. Millennials are the “sound bite,” text message, Internet generation. They have been bombarded with visual and audio input all their lives, and while they can assimilate multiple messages simultaneously, they have short attention spans for marketing messages. They also want to know—and feel comfortable with—the core values of the institutions with which they are associated.

Baby boomers often use financial rewards in crafting incentives for the study of engineering. Promotional material frequently lists “How much do engineers earn?” before “What do engineers do?” A popular career Web site states as an opening line, “Careers in engineering are popular due to the prestige, positive job outlook, and higher-than-average salary associated with this field.” Many recruitment materials are practically identical to those of two decades ago, just flashier.

These are exactly the wrong ways to go about recruiting the millennials into engineering as a career path. Recent studies, according to Chubin et al., indicate that the primary motivation among incoming engineering freshman to study engineering was doing social good rather than reaping financial rewards. Furthermore, the millennials are “digital natives” whose learning preferences and information use behaviors differ from those of previous generations, particularly with regard to technology-mediated learning. They have a stronger preference for collaborative work; they are keen to experiment with and engage in their careers; and they cannot understand why anyone would not be able to listen to music, carry on a conversation with friends, and do course work at the same time. Recent studies indicate that service learning

table 1. Description of generational trends.

	Matures	Baby Boomers	Generation X	Millennials
Birth Dates	1900–1946	1946–1964	1964–1982	1982–1997
Attributes	Command and control Self-sacrificing Patriotic Conservative Conformist	Optimistic Workaholic Materialistic Competitive Loyal	Independent Skeptical Entrepreneurial Adaptable Resourceful	Hopeful Civic minded Entitled Impatient Multitasking
Likes	Respect for authority Family community involvement	Responsibility Work ethic Can-do attitude	Freedom Multitasking Work-life balance	Public activism Technology Parents
Dislikes	Waste Technology	Laziness Turning 50	Red tape Hype	Anything slow Negativity
Working Styles	Rote Try again (and again)	Work hard Work independently “Figure things out”	Interactive Project based	Interactive Open-ended

As a result of their protected, structured, and positively reinforced upbringing, the millennials are an exceptionally accomplished, positive, upbeat, and optimistic generation.

(integrating community service with academic studies) may be an effective tool for increasing the interest of students in engineering and can serve as a springboard for recruiting students into engineering as a career path, according to Pinnell et al. For this generation, traditional rewards are merely the threshold test.

Parents play a strong role in the choices their millennials make (Figure 4). These helicopter parents (so named because they “hover”) often take a very active role in their child’s education. The parents of millennials show up to new student orientation sessions in record numbers. Parents have been known to show up with (and sometimes instead of) their sons or daughters for advisory appointments with faculty. This constant parental support has created a generation that needs constant feedback and direction in school.

For example, the most prestigious scholarship for prospective freshmen at Missouri University of Science and Technology (the authors’ home institution) requires the student to score in the top 3% on a standardized test and to submit an essay (among other requirements). The essay is the first tool used in screening more than 250 applicants and determines which students are chosen to be among 100 finalists invited to the campus for an interview. Up until recently, the nonfinalists, while disappointed, very rarely communicated with the admissions office regarding this decision. Not so the millennials! In the last several years there has been a huge increase in calls from parents demanding to know why their children were not selected. One parent called and reported the exact GPA and standardized test scores of the other students from his daughter’s high school class who were selected for the interview

and demanded that she be reconsidered as a finalist because her academic record was stronger. Parents have demanded to see the scored essays to see if they were graded fairly; they have asked to meet or speak personally with the committee that rejected their children’s essays, and they have browbeaten numerous high school counselors (nearly reducing some to tears) into calling the university to ask why certain students were not chosen. Another disturbing but interesting aspect is that some parents have actually threatened to discourage their children from attending the university as a “punishment” for the university’s not having chosen the children as finalists, even though the university is their first choice.

Millennials are close to their parents and involve them in all aspects of their lives. To recruit them, either to attend a university or join a company, the process must be transparent and honest, must use quick messages, and must accommodate including their families in the process. In the college application process this can be positive; baby boomer parents are likely to have attended at least some college (unlike previous generations), and so they can provide insight and guidance to the student. These parents also ask good questions. Overall, this generation will be better informed regarding career choices and better prepared for college, both academically and socially.

In addition, many university career opportunities offices (formerly called placement offices) have begun to see more and more parents asking to be involved in students’ job-hunting activities. The requests have ranged from asking to accompany students on plant trips for the final interview to demands to be involved in the final salary negotiation with the company. This trend was originally dismissed, but now more and more companies are recognizing that college seniors, far from resenting this parental involvement, actually welcome it. Students actively seek advice from their parents on job choices, benefits, and other aspects of the job search. As a result, a number of companies are now working parental involvement into their recruiting and hiring processes. They understand they have to give their top recruits what they want if they hope to attract them.



figure 4. Father and daughter discussing a class schedule.

Millennials in the Workplace

The U.S. Bureau of Labor Statistics predicts that by 2016, more than 70 million baby boomers will have retired and will be replaced by the influx of millennials. These young workers are a growing force and have butted up against a workplace designed by baby boomers that is

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at odds with their expectations. This has caused puzzlement, consternation, and havoc as millennials are far more likely than their predecessors to change jobs if they are not happy. For many millennials, their per-job tenure maxes out at two to five years. This turnover can cost companies dearly; turnover costs can easily range from 50% to 150% of an employee's salary.

Millennial turnover is high for a number of reasons. Millennials expect to be intellectually challenged, move rapidly through the chain of command, have a work-life balance, and receive frequent feedback. They expect a workplace that caters to their needs and their sense of time. And salary is not the primary motivator for their selection of a workplace; in one study, salary ranked fourth among 21 choices offered, preceded by health benefits, work-life balance, and promotional opportunities.

Attitude: The Need for Speed

Millennials, as opposed to previous generations, take a very different view of their career expectations. They expect their talents and skills will carry them far. If they feel their employers are not providing adequate career opportunities, these young workers are very likely to walk away. They expect a great deal from their employers in terms of position and opportunities because that is their mind-set. Millennials can be outspoken and perceived as disrespectful of supervisors and other authority figures or coworkers whom they don't see as meeting their expectations or pulling their own weight. The concept of being passed over for recognition or a promotion because the successful candidate has seniority as opposed to talent is anathema to them. Furthermore, millennials have been surrounded by friends, teachers, and parents who have listened to every idea and supported every aspiration. They've been welcomed by school administrators who greeted each and every student by name. Millennials have lived in a networked society and fully expect to be able to share their ideas directly with the CEO. It often comes as a rude awakening when they are not invited to meetings with upper management. Hierarchy and the pecking order are virtually unknown to them.

Work-Life Balance

Millennials view work-life balance as their right, and they want it all: flextime, compressed work weeks, telecommuting, job sharing, and parental leave. In addition to flexibility, millennials prefer a more relaxed work environment that allows them to dress casually, take nap or video game breaks to recharge, and attend to personal matters (such as exercising or a lunch with friends) during the workday. In return, millennials are more likely to put in time from home in the evenings or weekends. Conflict arises when older workers believe that young people who leave at 5 p.m. have no work ethic; what they don't realize is that the millennial worker is apt to go online at midnight to finish up a project.

Many millennials blur the barriers between career and personal life. They take the concept of flextime to new dimensions. They expect work and life activities to intermingle throughout the day. Many millennials will even take a position with lower pay if they get more vacation time with which to pursue their passions outside of work, according to Alsop. Therefore, corporations may need to let go of the mindset that their employees need to be in the office from nine to five and develop ways for employees to contribute in flexible ways.

Employers must be frank up front with potential employees about positions that require rigid work schedules (Figure 5). Many new millennials will accept more structure during the "breaking-in period" if they anticipate greater flexibility in the future. Some firms also offer greater career-track variety to better match the ambitions of their employees; the corporate ladder is being replaced by a lattice structure in which employees can ascend, move laterally, or make planned descents in response to life demands.

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Feedback

The millennials have been tagged as "the most high-maintenance workforce in the history of the world." One of the results of the intense helicopter parenting attention



figure 5. Be clear about work and time expectations.

paid to the millennials is that they grew up receiving lots and lots of feedback. This generation is the “instant gratification” generation: they expect to hear praise right away. Even if the Little League team came in dead last, they still got a trophy. They are used to higher levels of praise and encouragement and have seldom received much criticism, constructive or otherwise. The idea of giving constant feedback may seem exhausting or unnecessary to the boomer manager, but it’s exactly what millennials say they need. If a millennial has done a good job, tell the person immediately, and explain why it was such a good job. Taking the time to give more feedback keeps employees striving to do their best and provides the information they need for personal development. It doesn’t cost a lot of money and it doesn’t take a lot of time to let your employees know when they’ve done something right. The closer the feedback is to the point at which the employee made the accomplishment, the stronger the positive reinforcement.

The key to millennial managerial success is communication and motivation, along with a clear, structured plan for possible promotion or increase in responsibility. Recognition through public and/or private praise is essential, and nonmonetary rewards can play an important role in boosting morale (especially during an economic downturn). Ensure that the annual evaluation process is fair and well understood, that it includes a self-evaluation and outline of personal and professional goals for the employee (millennial workers want to be heard), and that it assigns a specific level of performance evaluations through an objective, measurable process. Even if there is only a small raise pool, clearly communicate that salary adjustments will vary with performance.

Intellectual Challenge

Millennials fully expect to be engaged and busy at work. They expect a high-energy, social work climate. Many millennials participated in many quite varied activities in high school and college, such as jobs, band, sports, church groups, and volunteer work. They are used to multitasking and thrive on working on several different projects at once. They welcome cross-training and broad exposure. Millennials are talented and creative, and they can lighten the workload of upper management by taking on challenging projects that may be “above their pay grade.” New challenges and constant stimulation keep them motivated, but structure and supervision is required. They have been raised with structured schedules, hovering parents, and hands-on teachers. Millennials are very independent and bright, but they need to be given a clear path and plan for accomplishing a task. The key to success is keeping them on the right track through frequent feedback and project review. Given that they like feedback, this is a positive rather than a negative for them.

Summary

Like every generation, millennials are the product of their society and have strengths and weaknesses. But because there are so many of them, smart organizations will prepare for them. The millennials are a polarizing generation. They are optimistic, intelligent, ambitious, and committed to making the world a better place. But they also receive stinging criticism for their inflated expectations for advancement and feedback. Millennials can be demanding, but much of what they demand is good for an organization in the long run. Millennials scare older employees with their rapid grasp of technology, but they can also be wonderful technology trainers and mentors. Their expectations in terms of professional development, training, and ability to “work smarter not harder” for life balance all encourage office policies that ultimately result in more fulfilled employees. If organizations use the best of the millennials’ traits and effectively embrace the less appealing ones, they will undoubtedly emerge stronger and more prepared for the future.

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Photos are courtesy of Missouri University of Science and Technology.

For Further Reading

D. Chubin, K. Donaldson, B. Olds, and L. Fleming, “Educating generation net—Can U.S. engineering woo and win the competition for talent,” *J. Eng. Educ.*, vol. 97, no. 3, pp. 245–257, July 2008.

L. Orrell, *Millennials Incorporated*. Laverne, TN: Intelligent Women Publishing, 2008.

M. Winograd and M. Hais, *MySpace, YouTube, and the Future of American Politics*. New Brunswick, NJ: Rutgers Univ. Press, 2008.

R. Alsop, *The Trophy Kids Grow Up*. San Francisco, CA: Jossey-Bass, 2008.

M. Pinnell, R. Blust, and J. Brahler, “Can service-learning in K–12 math and science classes affect a student’s perception of engineering and their career interests,” in *Proc. 38th ASEE/IEEE Frontiers in Education Conf.*, Saratoga Springs, NY, Oct. 22–25, 2008.

J. G. Sujansky and J. Ferri-Reed, *Keeping the Millennials: Why Companies Are Losing Billions in Turnover to This Generation—And What to Do About It*. Hoboken, NJ: Wiley, 2009.

B. Tulgan, *Not Everyone Gets a Trophy*, San Francisco, CA: Jossey-Bass, 2009.

Biographies

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