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Critical Skills for the 21st Century Workforce

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Abstract

This chapter is based on the proposition that three major forces, taken together, have fundamentally changed the nature of work in the 21st century: These forces are interpersonal, technological, and international in nature, driving organizations to seek employees who possess what are called 21st century skills. After reviewing the critical features of what defines a skill, we review a critical subset of 21st century skills centered around these three forces: customer service, teamwork, safety, creativity, critical thinking, meta-cognition, cross-cultural knowledge and competence, and ethics and integrity. We conclude with implications for education and training of the 21st century workforce.

Critical Skills for the 21st Century Workforce

Several major co-occurring economic forces have profoundly disrupted the nature of work in the 21st century from work carried out in the past. First, *technology* often serves to improve the quality and augment the aggregate productivity of the work that employees carry out across a range of jobs (e.g., GPS for delivery drivers; brain scans for neurosurgeons). Notably, technology also can serve to replace workers entirely (e.g., automated customer service; robots for specialized manufacturing; unmanned aircraft and cars; Donofrio & Whitefoot, 2015). Second, the rise in jobs calling for *customer service* increasingly requires employees to communicate, coordinate, and cooperate with teammates and customers more often and effectively than ever before—and sometimes in remote or virtual environments that heavily rely on technology. And third, the rise of *globalization* reflects unprecedented levels of innovation, along with managerial and strategic operations, when striving to address technology and teamwork across borders, cultures, and time zones. Managers and employees alike need to be adaptable across cultural and geographic locations, and they also face unique adjustment challenges when striving to achieve work/life balance in jobs that require global travel and relocation. These three powerful economic forces contribute critically to what has been coined as *21st century skills*. Although many of these skills are not new, in that they were used in the work of the past, the requirements of today’s work and workforce have made certain skills indispensable.

Before reviewing a set of critical 21st century skills, we first review the fundamental features of what constitutes a skill. These features are important to remember, and they are unchanging, even when the type of skills needed in today’s workforce are in fact changing.

What is a Skill?

A generic definition of *skill* is “... the level of proficiency on a specific task or group of tasks. The development of a given skill or proficiency on a given task is predicated in part on the possession of relevant basic abilities” (Fleishman & Quaintance, 1984, p. 163). Researchers have offered many other definitions of *skill* at various levels of refinement (e.g., specific skills: Fleishman & Quaintance, 1984; general skills in the Department of Labor Content Model, <https://www.onetcenter.org/content.html/#cm2>), so it is useful to review considerations that are common to these definitions, such as:

1. Is the skill *general or specific*? A general skill, such as critical thinking or communication, can be viewed as more similar to an ability or an aptitude, because it covers broad domains and therefore requires extended and extensive experience to improve upon. By contrast, a very specific skill, such as balancing a checkbook, can be viewed as something that is clearly trainable, because the content is well specified and fairly limited in scope. Clearly, general and specific skills are related; for example, people who possess a more general skill in mathematics may more easily learn new specific types of math such as calculus, and likewise, people who accumulate more specific skills in math are simultaneously developing their more general mathematical skills. Just as there is a general vs. specific aspect to the definition of a skill, training interventions have been similarly pitched at more general vs. more specific levels, with general-skill training being viewed as having a wider impact, but specific-skill training being viewed as more feasible and often focused on practical matters. Highly complex skills are often specific to a domain, such that the specific knowledge required to acquire the skill does not transfer to other skills; however, some aspects of that

knowledge might generalize to related areas (e.g., knowledge of the structure of a computer programming language might facilitate the learning of other programming languages).

2. Is the skill *cognitive, physical or affective in nature*? Some skills are mostly thought of as information-based and cognitive in nature (e.g., STEM skills); and other skills may require physical action and are thus facilitated by physical ability (e.g., running a marathon). A third set of skills falls more heavily in the affective domain and are often referred to as “soft skills” (e.g., empathy skills and customer service skills require expression of genuine interest and concern). Of course, many skills draw from each of these three domains, perhaps in different combinations over time (e.g., a skill that was originally more cognitive in nature can become more automatic and more physically and affectively driven).
3. How much is the skill *dependent on the type of environment*? Environmental characteristics that can inhibit or enhance training- and performance-relevant skills include the pacing, ordering, and predictability of the task; the spacing and quality of practice; the quality of results and feedback; the influence of supervisors, coaches, role models, and peers; the assistance of technology in skill development and performance; and so on (see Oswald, Hambrick, & Jones, 2007, Table 4.1). In addition to attaining and maintaining a skill, refreshing the skill once it is attained might call upon this set of concerns as well as others.
4. How much *effort* does the skill require? Some skills must always be performed with a high level of cognitive, physical, or emotional effort to achieve the results that are desired, perhaps because the environment is relatively unpredictable (e.g., troubleshooting in an electronic repair, improvisational comedy). Other skills might be performed with less effort because of factors such as the environment facilitating a high level of performance, the environment not being very challenging, the person being prepared with scripts to be enacted, or the person having a high level of prerequisite ability and experience in the domain. A skill or its aspects can become more automatic over time as a person gains experience, meaning that attentional and cognitive demands can be reduced at the same time that psychomotor and motor functions improve (Kanfer & Ackerman, 1989; Proctor & Dutta, 1995). Some have equated skill almost purely with automaticity (e.g., Rasmussen, 1983), but we make no such association here because skills call upon strategies, rules, and knowledge that may be subject to change, as they are often applied in somewhat unpredictable environments. Thus, to apply a skill successfully, a person might need to be switching back and forth from automatic processing to effortful control as characteristics and demands of the person and the environment change over time (Beier & Oswald, 2012). This continuous switching itself may be a skill that develops over time.
5. How does the *level of performance* reflect the level of skill? Some skills are captured by a person’s level of performance relatively easily (e.g., typing skill might be defined as average words-per-minute of typing from general or technical samples of text that represent the domain of interest). For other skills, measuring levels of performance may be more difficult and error-prone, such as when the domain is multidimensional or “fuzzy” (e.g., negotiating skill), when the skill itself changes (e.g., cultural knowledge changes yet influences skill in bilingualism), or when there are a lot of environmental factors that also influence performance beyond individual skill (e.g., teamwork, bad weather).

Despite the above complexities – and perhaps because of them – we believe that leveraging the research literature and SMEs to define a skill domain more precisely will yield multiple benefits. It increases our understanding of the value of skills in the workforce; it provides clearer implications for how skills can be developed through training and intervention; and it suggests

how human capital can be best invested in skill development, to the benefit of organizations and employees alike.

21st Century Skills

Given the definition and attendant considerations for a skill provided above, there are a huge number of skills that qualify as 21st century skills. After reviewing the research literature and related academic discussions of 21st century skills, we identified three broad forces – interpersonal, technical, and international – that lead us to focus on nine 21st century skills; they are also summarized in Table 1. We are limited in how extensively we can discuss each of these skills (e.g., entire books have been dedicated to each of them, individually or in combination; see Pellegrino & Hilton, 2012), yet we believe that readers will derive some unique value from this chapter and the subset of critical 21st century skills covered here.

Leadership

Organizations always require leaders who plan, cultivate, and inspire the success of employees internal to the organization. Leaders must deal with a 21st century workforce that is less loyal to any particular organization. This is supported by data from organizational development consulting companies that indicate how the majority of U.S. employees are disengaged from their work (Aon Hewitt, 2014; Gallup, 2013). This lack of engagement is partially attributed to a lack of effective leaders or managers possessing the leadership skills that serve to motivate and engage the workforce within the span of their control. Organizational research consistently points to the need for positive leadership behavior, as it is consistently found to be associated with better subordinate learning and performance outcomes (Burke, et al., 2006). Also, we know that leadership capabilities are important even in those who are not formal leaders, yet often find themselves leading teams, projects, and their own tasks and careers.

Employees who are not trained as leaders, and have been exposed to ineffective leaders, will often view leadership narrowly as a transaction: If employee works hard and effectively, the manager rewards that employee; employees who do not work hard or effectively get punished (Bass & Riggio, 2005). This approach can be effective in some circumstances, especially when tasks and rewards can be coupled tightly in terms of time and causality, but often this is not the case, and those leaders who focus on the bigger picture—which includes building relationships and leading by example—may often be more effective. In fact, research has found these latter types of transformational and socialized charismatic leadership styles to be associated with increased employee adoption of organizational values (Brown & Treviño, 2009) as well as productivity (Burke et al., 2006). Trust in leaders has been framed within a mediational model, where both leader and follower characteristics contribute to cognitive and affective leader perceptions of trust; these perceptions, in turn, drive various outcomes of performance, attitudes, and intentions that in turn contribute to future trust in the leader (Dirks & Ferrin, 2002).

New leaders looking to develop their skills can benefit from some assistance, and this assistance can come in the form of training or mentoring. Training leaders in transformational leadership skills appears to improve perceptions by their direct reports (Kelloway, Barling & Helleur, 2000), as well as increasing both leader and work unit effectiveness (Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996). Moving beyond training, an ongoing mentoring relationship with a more seasoned leader can assist the developing leader. The mentor can work with the developing leader over time to provide feedback, suggest resources, offer career guidance, and act as a role model. This type of relationship functions has been found to work best when the mentor and mentee have similar interpersonal styles, backgrounds, and common interests (Buckingham, 2012).

Customer Service

Providing customers and clients with good service has been and continues to be a priority for organizations and the U.S. economy as a whole. As of 2014, 120 million workers (approximately 77% of the labor force) are employed in the service sector (U.S. Bureau of Labor Statistics, 2013), which includes workers in professional, retail, utilities, management, education, and health services. This number is only expected to grow further, to 130 million workers by 2022, accounting for most of US economic growth in that period (Henderson, 2013). To keep up with the need for high-quality customer service, more service workers will need to be able to communicate with customers and clients, to get results, and to be perceived as friendly and empathetic while learning about and fulfilling customer needs (Koenig, 2011). Models of service quality include aspects of the customer service experience that are very dependent on the skills of customer service representatives. For example, the well-established SERVQUAL model describing service quality (Parasuraman, Zeithaml, & Berry, 1985) organizes the content of service quality into five categories: tangibles (the physical appearance of people or things related to the company), reliability (delivering on service promises), responsiveness (providing customer assistance quickly), assurance (employee ability to convey trust and confidence), and empathy (individualized attention to the needs of each customer). In addition to technical expertise, organizations need people who can also successfully perform as a friendly ambassador for their organization.

At the employee level, good customer service can be best achieved through two methods: Selecting service-oriented employees, and providing employees with training and feedback on how best to serve customers. Employees that are predisposed to want to help others, and to be likeable and calm while doing so, can be specifically chosen from job applicant pools using personality inventories (Hogan, Hogan, & Busch, 1984). These customer service orientation inventories tend to evaluate candidates on a combination of characteristics such as agreeableness, conscientiousness, and emotional stability (Ones, Viswesvaran, & Dilchert, 2005). In addition to selecting customer service employees with desirable characteristics, the desirable behavior typically exhibited by people with these characteristics can be trained. These trainable behaviors include using specific language and tone, following through on promises, and acting on anticipated future customer needs (Raub & Liao, 2012). Research from a variety of service industries, including medicine (Mayer, Cates, Mastorovich, & Royalty, 1998), banking (Pattni, Soutar, & Klobas, 2007), and hospitality (Garavan, 1997) suggests that training on the basics of customer service can decrease customer complaints and increase satisfaction and loyalty.

Given the importance of customer service for industry, training for communication and empathy skills should be a priority. In addition to training, employees must believe that their organization values providing customers with high-quality service. This concept is referred to as *service climate*, and it is a shared perception by members of an organization that service is a core principle valued and prioritized by management; it is typically informed by whether and how the organization incentivizes employee service behaviors (Schneider, White, & Paul, 1998). Service climate depends on buy-in from organizational leadership, but results in better employee attitudes, less employee stress, greater customer satisfaction, and positive financial outcomes (Hong, Liao, Hu, & Jiang, 2013).

Teamwork

Another set of 21st century skills that continues to grow in importance is teamwork. Work teams are able to accomplish larger projects that individuals simply cannot, because teams can strategically draw on the diverse pool of talent and efforts from each group member (West,

2012). Teams can even eliminate the need for direct work group supervision, allowing organizations to be more efficient (Salas, Stagl, & Burke, 2004). The key to teamwork, like any work function, is to ensure that the members of the team possess the skills needed to function well as a part of a team. With this in mind, teamwork generally results in better work performance when it consists of effective communication, coordination, and cohesiveness; further, good teamwork also increases the job satisfaction of team members (LePine, Piccolo, Jackson, Mathieu, & Saul, 2008).

The need to train workers on teamwork skills is widely understood. The job search website CareerBuilder recently polled a large sample of hiring managers, and found that 60% of them cited team orientation as a quality they seek in applicants (CareerBuilder, 2014). During their 2011 meetings to discuss 21st century skills, representatives of the National Research Council (NRC) identified skills needed for success in the workplace, listing the ability to work productively in teams and groups as a general skill set desired by employers (Koenig, 2011). Higher education also recognizes the importance of training for teamwork skills, as evidenced by the listing of teamwork as a practical skill on the Association of American Colleges and Universities' list of essential learning outcomes (Association of American Colleges and Universities, 2007).

Good teamwork requires workers to possess the aforementioned skills of communication, coordination, and cohesiveness, which are related to both interpersonal skills and team performance regulation skills (Rousseau, Aubé, & Savoie, 2006; Stevens & Campion, 1999). Interpersonal skills relevant for teamwork include communicating effectively with team members, motivating team members, resolving conflicts, and solving problems in a collaborative fashion. This also includes the ability to influence others on a team, which can be useful for developing group consensus (Zhuang, MacCann, Wang, Liu, & Roberts, 2008) and for effective informal mentorship. Team performance regulation skills refer to the group ability to set goals, monitor progress toward those goals, and to plan and organize the activities of group members so that individual efforts are properly coordinated and balanced. Effective training interventions need to consider both interpersonal and team-regulation skills, because they are both required for effective teamwork. For example, the U.S. Department of Labor (2012) offers a set of exercises for helping workers understand how to participate in group decisions, support peers with complementary skills, communicate important information, and accomplish goals through group effort. Curricula focusing on these basic teamwork behaviors can better prepare people for the 21st century workplace.

Safety

A lack of workplace safety skills can be fatal for a worker and legally consequential for the organization. Hence, workplace safety skills are one of the most critical skills for many jobs in the 21st century workforce (e.g., in hospitals, on oil rigs, at construction sites). In the United States alone, there were 4,383 workplace fatalities and nearly 2.8 million workplace injuries in 2012 (Bureau of Labor Statistics, U.S. Department of Labor, 2013a,b). Although not every workplace accident is preventable, many of these tragedies are caused by workers failing to follow simple safety procedures that are already imposed by government requirements. Thus, it is important for employers and employees alike that workers possess the skills necessary to do their job safely—and perhaps more importantly, that they apply the skills they possess. The Occupational Safety and Health Administration (OSHA) has detailed policies about requirements for safety training, and these requirements are typically based on the content of the job. For example, those workers who encounter chemical, radiological, or mechanical hazards as a part of

their job are required by law to train on the proper use, maintenance, and disposal of Personal Protective Equipment (OSHA, 2014). Individual states also require specific types of training for specific types of work, such as Ohio's requirement for public school personnel to take part in safety and violence prevention training (Ohio Department of Education, 2013).

It should also be noted that many organizations offer training beyond what is required by law, which can improve employee confidence in the work environment and in the organization as a whole. Companies often offer training on proper body mechanics for lifting objects, a sensible intervention given that almost half of workplace injuries can be classified as strains, sprains, or tears (Bureau of Labor Statistics, U.S. Department of Labor, 2014). Providing knowledge to workers on how to complete work safely leads to an increased likelihood that work tasks will be performed safely, which in turn leads to reduced occurrence of workplace accidents and injuries. With regard to how to increase the application of workplace safety skills, perhaps the most important point to make is that safety compliance is heavily determined by organizational culture regarding safety protocols. Culture based on solid safety training, where employees also monitor and reward each others' safe behaviors, is ideal. Often safety skills are underutilized due to a perceived lack of organizational culture for safe behavior at work, particularly when those perceptions are shared within one's immediate work group (Christian, Bradley, Wallace, & Burke, 2009). In other words, believing that coworkers are concerned about safe practices at work appears to be just as important as individual knowledge of safety procedure for ensuring safe work behavior. Moreover, organizations should foster a culture of reporting safety infractions to management, in order to inform the timing and nature of safety training and protocol design (Reason, 2000). Workers should feel comfortable reporting "close calls" to management without fear of disciplinary action; otherwise, both safety and the safety culture can be meaningfully compromised. It is often the case that the cause of accidents can be traced to some aspect of the situation in which the accident occurred, not just to the irresponsible actions of individuals. Line employees who do the work that requires safety training are key voices in the development of effective training, as they can provide rich, high-quality feedback on safety protocols (Wirth & Sigurdsson, 2008). Ensuring employees are willing to provide that feedback is critical for ensuring that safety training is as effective as possible.

Creativity

Creativity is a critical skill contributing to organizational success, adaptation, and survival within any industry and market (Reiter-Palmon, 2011). Thus, the study of creativity in the workplace has seen a resurgence. Although laypeople may use the term creativity somewhat interchangeably with innovation, the psychological literature has defined *creativity* as the early stages of a problem-solving process (e.g., identifying the problem, generating ideas and solutions), whereas *innovation* is defined as the later-stage development and implementation of creative ideas as well as the subsequent acceptance of creative products by stakeholders in an organization (Mumford, 2001; West, 2003). In other words, creativity is required for innovation.

Regarding type of creativity, two major types have been offered: incremental and radical. *Incremental creativity* is defined as ideas that imply modifications to existing practices, processes, or products, whereas *radical creativity* is defined as ideas that differ substantially from existing practices and alternatives and may not rely on any prior ideas or paradigms (Gilson & Madjar, 2011). In organizational contexts, both types of creativity are important for facilitating innovation.

In terms of the antecedents that contribute to creativity, a meta-analysis (Hammond, Neff, Farr, & Schwall, 2011) found several key sets of factors to be important: individual differences

(openness to experience and intrinsic motivation), job characteristics (role expectations, creative self-efficacy, job complexity, job autonomy, and job self-efficacy), and organizational characteristics (climate for innovation, supervisor support, and leader-member exchange). These three groupings or factors suggest that it is helpful to consider these factors in a multilevel sense, such that job or organizational characteristics contribute to overall creativity, yet how much these characteristics contribute also might depend on the individual differences listed above. Future research might examine such interactions further in a multilevel data set. Making the aforementioned distinction between incremental vs. radical creativity may also be helpful in understanding creativity, as may longitudinal modeling that can examine how creative processes unfold over time.

Creativity is a joint function of (a) creative individuals, who might be creative in almost any situation and (b) environments that can stimulate creativity in almost any individual. The meta-analysis by Hammond et al. (2011) suggests that individual differences do predict creativity; however, there also is research suggesting that at least some types of creativity are trainable. One notable example of training for creativity is the Systematic Inventive Thinking (SIT) method that was inspired by Altshuller's (1984) work on the theory of inventive problem solving (TIPS; also see Goldenberg, Mazursky, & Solomon, 1999). Altshuller and colleagues developed TIPS based on information from hundreds of thousands of inventions across many different fields, leading to the extrapolation of generalizable patterns or "templates" in the nature of inventive solutions. In short, the SIT method rests on research that shows that many creative solutions have underlying patterns and logic that can be defined and taught to others (Boyd & Goldenberg, 2013).

This work reveals how templates create useful constraints that individuals can apply to boost creative output, where users are forced to apply creativity to the resources with which they are already familiar and are close at hand. In other words, contrary to the popular notion that creativity has to come from "outside the box," according to practitioners of the SIT method, creative solutions to problems can often be found "inside the box" by applying creativity to current knowledge and expertise (Boyd & Goldenberg, 2013). This suggests that, by providing individuals with training on how to use the SIT tools and similar methods, we can often train people with job experience to increase their creative output.

Another way to foster creativity is for organizations to cultivate and promote the types of work teams and organizational climate that are associated with higher creative output. In teams, research suggests that two different types of motivation play a role in whether teams are more likely to generate creative ideas: *epistemic motivation* (the degree to which teams engage in systematic information processing and dissemination) and *prosocial motivation* (the degree to which team members seek collective, rather than personal, gain; De Dreu, Nijstad, Bechtoldt & Baas, 2011). Further, research on organizational climate suggests that leader-member exchange (LMX) may contribute to creativity by providing all team members with the support that can address their job-related problems and needs, which in turn can increase self-efficacy to exercise a flexible approach to problem solving in teams that gives rise to more creative outcomes (Liao, Liu, & Loi, 2010). As described by Iyer and Davenport (2008), Google is a case example of an organization that is generally recognized for its consistently creative output. The organization is well-known for attracting employees that are part of the so-called creative class (i.e., researchers, engineers, architects, designers), well-educated, and highly motivated. Besides the talent it recruits, Google provides and maintains an organizational climate that supports inquiry, provides

autonomy, encourages broad participation, and tolerates failures as long as something can be learned from them.

Critical Thinking

In their examination of what skills are most prioritized by employers, the Partnership for 21st Century Skills found that critical thinking was listed as a top-5 skill for high school and for both two- and four-year college graduates (Casner-Lotto & Barrington, 2006). The preference for applicants with high-quality critical thinking skills is likely to increase further, particularly in college-educated workers, where demands on cognitive ability and effective problem-solving are only increasing. Economic projections suggest that by 2018, most jobs for college graduates will be in fields such as healthcare, managerial work, and the STEM fields (Carnevale, Smith, & Strohl, 2010), fields where desirable employees advance new knowledge, troubleshoot or prevent complex technical and interpersonal problems, and interact with a wide diversity of other professionals.

In order to discuss this topic effectively, let us consider what is meant by *critical thinking*, because it is defined in a variety of ways by scholars. Many, if not most, of these definitions are quite broad. According to Bangert-Drowns and Bankert (1990), critical thinking is “the ability and willingness to test the validity of propositions” (p. 3), a definition that incorporates both ability and motivational characteristics. Meanwhile, the Foundation for Critical Thinking (2014) defines the construct as “the art of analyzing and evaluating thinking with a view to improving it.” This operationalization appears more focused on cognitive strategy, yet does not indicate whether or how “improved” thinking would be achieved. Other views of critical thinking break the construct down into components, including recognizing assumptions and evaluating arguments (Watson & Glaser, 2012). The authors of this chapter prefer the definition provided by Halpern (1998), who defined critical thinking as “the use of cognitive skills or strategies that increase the probability of a desirable outcome” (p. 450). This definition, although brief, captures the important distinction and probabilistic relationship between the outcome and the cognitive skills and strategies that contribute to it. All too often, researchers and policy makers seek to “increase critical thinking skills” where the focus is either on improving cognitive strategies or skills, with little attention paid to what outcomes are being affected; or the focus is on outcomes or “metrics” that are thought to be a function of critical thinking, with little attention paid to whether improvement on these outcomes will generalize to other outcomes of personal or societal importance.

Historically, critical thinking has often been considered a generic or general skill set, something like “being smart,” where one’s high or low levels of critical thinking apply to any situation or content area (Ennis, 1989). However, contemporary researchers have deeply questioned this assumption. A report by Kuncel (2011) finds little empirical evidence that critical thinking is a transferrable skill, and attributes the often-cited improvements in critical thinking scores that follow critical thinking interventions to training effects that essentially teach to the test. He points out that learning content knowledge about a topic is a necessary requirement for critical thinking to take place, and generally, educators are better off investing in improving content knowledge. Furthermore, he suggests that cognitive strategies for approaching and interpreting information vary in important ways from subject to subject. For example, awareness of the gambler’s fallacy and sampling bias are particularly useful for thinking critically about psychological research topics—but for chemistry or physics topics, other types of critical thinking are required. Anderman (2011) also posits that training for thinking critically should be taught within a meaningful context, and should be based in repeated efforts to make domain-

specific thinking strategies more efficient, routine, and comfortable through repeated practice. Moreover, he points out that educators should specifically train students to be mindful of the conditions when their critical thinking skills might be transferrable to other content areas, as this knowledge transfer often does not occur automatically. For example, statistics instructors might encourage their students to apply the concept of the representativeness of sample data when interpreting the results of political polls, and physics instructors can note that the principle of inertia is important when considering how fast to drive and how closely to follow other cars on the road. In short, providing context, practicing basic knowledge, and specifically encouraging transfer of knowledge to new content areas appear to be important considerations for fostering critical thinking.

Metacognition

Today's effective learners need to be engaged actively in finding skill development opportunities and in building the skills they need for successful careers in the 21st century. Learners who are merely passive recipients of information will likely be less successful. Investigation into best learning practices has led researchers to focus on learning strategies, learner-directed behaviors, processes, and study skills that contribute to learning performance (Farrington et al., 2012), as a means to achieve learning success, and ultimately career success. Generally speaking, learning strategies refer to sets of adjustments in behaviors, feelings, and thought processes that can help students and workers to be more productive and/or effective when they spend time on formal or informal learning tasks. The ability to execute and benefit from these strategies appears to be somewhat distinct from cognitive ability (Snow & Lohman, 1984), and meta-analysis has found support for positive effects of learning strategies on learning outcomes (Hattie, Biggs, & Purdie, 1996). Although there is no clear consensus as what psychological constructs and processes are involved in learning strategies, two generally agreed-upon components are metacognition and self-regulation.

Metacognition refers to the act of thinking about one's own cognition and making a conscious decision to control it (Flavell, 1979). In the context of learning, metacognition allows learners to reflect on their learning efforts to-date: what they are, how successful they have been in achieving the goal of understanding concepts, and how they might be feasibly and usefully changed to suit a given learning context (Credé & Kuncel, 2008). In contrast, *self-regulation* refers to the learners' application of metacognition—either naturally or through training—to the learning process in order to achieve specific learning goals (Farrington et al., 2012). Winne and Hadwin (1998) describe the self-regulation process as having four phases. First, the learner must orient him/herself to the task, by assessing both the difficulty and his/her prior knowledge of the learning task. Note that this assessment need not necessarily be objective to promote engagement and learning, although self-assessment likely contains objective components. Next, the learner must assess the learning goals. This step requires the learner to outline the specific criteria of success associated with the learning task. These criteria imply a constructive learning process to reach the goals of success, especially when the criteria are more specific and proximal (“read this chapter carefully”) rather than vague or distal (“write my dissertation”; Locke & Latham, 2002). Third, the learner must apply metacognitive effort to the learning, and adjust his/her strategy once it is decided that the present strategy is not effective (or less effective than other possible strategies). Sometimes short-term “shortcut” strategies can lead to short-term payoffs, but at the expense of long-term benefits; in contrast, long-term strategies can be less beneficial in the short-term but more durable in the long run (Beier & Oswald, 2012). As a last step, learners may

consider what this learning experience taught them about learning tasks more generally, whether in this particular domain, or in analogous tasks in other domains.

Thinking about learning and willfully directing this thinking towards a learning task can yield diverse and cumulative benefits for learners. Training in learning strategies can provide learners in a variety of situations with the skills they need to take ownership of their own learning process and maximize learning effort. Baird (1986) observed that students who were trained in metacognition, regardless of their initial interest in the topic, were more aware of their own learning practices and had more positive attitudes towards learning. Pennequin, Sorel, Nanty and Fontaine (2010) found that a metacognition-based intervention was related to improved problem-solving ability in math, particularly for low-achieving students, where learning may have profound long-term benefits for them (e.g., basic life skills, employability). Keith and Frese (2005) examined self-regulation in college students, finding that those trained to self-regulate during computer training exercises learned software more effectively than those who were trained on the software alone. Note that metacognition can even benefit those with high ability, in terms of being able to deal with emotional intrusions that are not always related to intelligence (e.g., fear of failure) and promote efficient learning. In addition to individual benefits, teams benefit from the self-regulatory strategies of its members. Dierdorff and Ellingson (2012) found that the average level of self-regulation across members of a work team is related to team efficacy, team cooperation quality, and team decision-making. Conditions and cases where the team benefit is greater than the sum of its parts remains largely an empirical question.

Cross-Cultural Knowledge and Competence

One area of 21st century skills in which more emphasis has been placed is in the cross-cultural competence and knowledge domain, as is evidenced in the chapter that follows. Cross-cultural competence (CCC) refers to a general capability to have successful interactions with others in intercultural situations (Deardorff, 2006). Aside from cross-cultural knowledge (i.e., knowledge of the norms and practices of other cultures), most scholarly conceptualizations of CCC include metacognitive and motivational components (Ang & Van Dyne, 2008; Deardorff, 2006; Thomas, 2006). This suggests that, in addition to awareness of the cultural expectations of others, people must know how those expectations are different from their own and then be willing to expend effort to be flexible, open, and empathetic in the way they communicate. Additionally, some research suggests that emotional regulation is an important part of CCC, because the management of stress is important for effectively adjusting to the people and environment associated with a new culture (Matsumoto & Hwang, 2013). Cross-cultural skills are both directly and indirectly related to a variety of positive outcomes for those living or working in a culture other than their own, including better job performance and more successful expatriate adjustment (Morris & Robie, 2001).

CCC is important for a variety of jobs, and training for this skill will need to become more prevalent in today's multinational and hyper-connected workforce. Researchers estimate that 20-40% of all expatriates sent abroad for work return home early (Black & Mendenhall, 1989; Kim & Slocum, 2008; Mendenhall, Dunbar, & Oddou, 1987), where inability to adjust to the host country's culture has been cited as a common problem (Okpara & Kabongo, 2011; Tung, 1982). Many of these expatriates are working in management and professional positions, which are projected to comprise 11% of the workforce by 2018 (Carnevale, Smith, & Strohl, 2010). Another group for whom CCC skills are of great importance is military personnel, who often receive assignments around the world. Although the armed forces have historically

provided training on the content of the culture of interest (e.g., customs, language, politics), it is necessary to train personnel to have mindfulness of differences in perspective in real time (Abbe & Halpin, 2009). Soldiers, officers, and other military personnel must routinely consider differences in the motivations of those in the host culture, maintaining their mission and all the while ensuring they are able to manage their emotions and the stress associated with these complex efforts.

In addition to those who work abroad, many students and employees can greatly benefit from stronger intercultural skills in their home country. Many schools and workplaces are diverse and intercultural due to the diversity of a city, business partnership communications with companies abroad, or the presence of expatriates in one's organization. Regardless of the reason, many people live and work in environments where they routinely interact with people who have different cultural expectations of interpersonal interactions. The same general principles of knowledge, self-awareness, and motivation to achieve successful interpersonal interactions are useful in cross-cultural situations as well (Herfst, van Oudenhoven, & Timmerman, 2008). Perhaps the greatest impediment to progress in this area concerns the measurement of CCC, which is often done via self-report instruments, does not incorporate specific cultural expectations, and in these two respects can be indistinguishable from personality assessment (Matsumoto & Hwang, 2013).

With the sustained practical interest in training CCC by organizations and the military, it is not surprising that the adjoining research literature has arrived at some recommendations on best practices for CCC training. Morris, Savani, Mor, and Cho (2014) have summarized this literature and have provided some recommendations. First, these authors recommend using specific types of training materials that may not be what adult learners are used to using to develop knowledge. Although books and classes are certainly helpful, web-based tools and software can offer additional engagement and realism and thus be more conducive to acquiring the foundation of structured declarative knowledge necessary for CCC. Also, examining foreign documents online (translated using web tools if necessary) is a way for drawing primary knowledge directly from the host culture and allow for learning about the culture, providing a contextual learning experience. Second, these authors emphasize the important need to prepare for situations in the host country where the causes and effects of social interaction may be initially confusing. Learning to interpret situations correctly by examining critical incidents— or those situations whose nature, causes, or outcomes differ from the host and home country—can help future expatriates prepare for their travel. For example, it is very useful to have foreknowledge of what actions or reactions may be considered offensive during conversations in the host country, or how to behave when one is in the home of a host country native. This approach allows expatriates to enter situations with greater cultural awareness that helps to avoid misinterpretations and behavioral awkwardness or gaffes. Lastly, Morris and colleagues recommend learning to imitate customary gestures, greetings, and rituals, usually expected on a moment's notice, that will help ease expatriates into the host culture and allow them to know how to act before understanding why these actions are culturally appropriate. Given the large amount of knowledge needed for an expatriate to prepare for traveling to a foreign country for a work assignment, this approach is beneficial as it focuses more upon the necessary behavior and less on the reasons why, which may be very nuanced and complex.

Ethical Behavior

Adherence to ethical principles of behavior—and generally knowing right from wrong—are important qualities for both students and workers to possess. Nearly all jobs provide

opportunities for people to lie, steal, or be otherwise unethical, and so employers seek out those individuals who possess integrity – people who are consistent in their values and actions, and can be trusted with the company’s time, resources, and reputation (Becker, 1998; Casner-Lotto & Barrington, 2006). Ethical thinking is relevant to a variety of job functions, including decision-making, problem solving, communication, customer service, and teamwork (Binkley et al., 2012). Moreover, meta-analytic research on assessment of integrity for employee selection has shown ethics can usefully predict job performance, training performance, counterproductive work behavior, and job turnover (e.g., Berry, Sackett, & Wiemann, 2007; Van Iddekinge, Roth, Raymark & Odle-Dusseau, 2012).

Although integrity and ethical behavior are important for students and employees, they are perhaps especially important for leaders, who are entrusted with vast responsibilities in managing others and managing organizational resources. Leading by ethical example can also set a culture for ethical behavior in the organization, and it can establish appropriate relationships with followers (Bass & Steidlmeier, 1999); conversely, a lack of ethical behaviors in top leaders can have widespread destabilizing and demoralizing effects on employees. Belief in the high integrity of leaders is obviously tied to the actual integrity of leaders, and such beliefs are shown to be related to valued employee outcomes, such as increased organizational commitment, job performance and reduced intentions to quit (Dirks & Ferrin, 2002). In addition to the effect of leaders’ integrity on their followers, ethical leaders guide organizational decisions to be in compliance with laws and, whenever possible, to make decisions that will cast their organization in a positive light in the eyes of the public and relevant stakeholders.

Recent research indicates that ethics training can lead to a positive influence on ethical behavior. Grady and colleagues (2008) studied the effects of ethics training on the behavior of nurses, finding that both foundational coursework and continuing education training in ethics translated into greater utilization of ethics committees and increased ethical decision-making when faced with an ethical dilemma. One reason to implement ethics training is the potential pitfalls of intensive goal setting and employee incentivization, which can lead to *motivated blindness* towards ethically questionable behavior - the human tendency to ignore relevant information that is contradictory to a person’s interests and goals (Bazerman & Tenbrunsel, 2011; Ordóñez, Schweitzer, Galinsky, & Bazerman, 2009). For example, tying performance evaluation and compensation to ever-increasing sales goals can encourage employees to pressure customers to buy more than they are comfortable with purchasing, and incentivizing speed of product-to-market can result (and has resulted) in executive management ignoring serious and legitimate concerns regarding product safety. These types of actions erode trust and can have serious consequences for the welfare of others, as well as for the productivity—and even the survival—of the organization.

In Conclusion: Further Understanding of 21st Century Skills

Much more work remains to be done by researchers and practitioners to contribute to a better understanding of the nature of 21st century skills. Our perspective is that great progress can be made on this front by considering these skills in an integrated manner, such as: (a) across societal, educational, and organizational contexts, (b) across cognitive and non-cognitive skill domains (as shown in Table 1; also see Mattern & Hanson, 2015), and (c) across different research disciplines (e.g., educational psychology, vocational psychology, industrial-organizational psychology, and economics). In fact, a more integrative approach seems essential to address effectively the “skills gap,” which refers to the discrepancy between the skills and skill levels that workers have and the skills and skill levels that employers seek out. As noted in a

recent report by Educational Testing Service (2015), younger workers in the U.S. now entering the workforce are lacking in the skills they need to be competitive in today's international job market.

This chapter is our contribution to the large and important discussion regarding the changing nature of work. First, we discuss disruptive economic forces and point out that advances in technology, increased demand for customer service workers, and the expansion of industry across borders have caused employers to demand a broader and more diverse set of skills of prospective employees. Workers are now expected to possess strong interpersonal skills, be well-versed in the use of digital technology, and work in an international workforce, all while possessing the technical knowledge of the job. Second, we examine the term *skill* and discuss the ways in which skills can differ. Skills can be broad or narrow and require intelligence, emotional control, and/or physical abilities that not all people possess. Some skills require substantial effort to be exhibited, while others can become automatic over time, and the measurement of the performance of skills requires careful consideration of both individual effort and the context in which the skill is performed. Third, rather than attempting to provide an exhaustive list of 21st century skills, we present an examination of nine skills that we view to be directly related to the three economic forces that are redefining work and are presented at the beginning of the chapter.

Many books, articles, and the popular press have pointed to the educational system as the main culprit for the skills gap (e.g., Association of American Colleges and Universities, 2007; Conference Board, 2006). However, a different treatment of the "skills gap" is presented by Cappelli (2012), whose book acknowledges the gap but re-examines and redefines it as a function of revised employer expectations in those they hire, and technological advances that dramatically shift workforce needs and requirements. A rapidly changing demography is also a key factor, because this also contributes to a shifting distribution of skills in the workforce (Carnevale, Hanson, & Gulish, 2013; Kirsch, Braun, Yamamoto, & Sum, 2007), and even self-perceptions of skills vary by demographics and can affect the decision to persist in a particular job (McGonagle, Fisher, Barnes-Farrell, & Grosch, 2015). Also, economic models have considered the skills gap as a function of a variety of factors including: the skill levels of jobs within and organization, the composition of skilled jobs in an organization, the wages that jobs demand, the effect of technology on demand for job skills, and the unemployment rate (e.g., Albrecht & Vroman, 2002; Autor, Levy, & Murnane, 2003). It is only through these multiple conceptual and interdisciplinary approaches that we will be able to understand, measure, and develop 21st century skills in a manner that adequately and directly serves today's incredibly diverse and dynamic demographic, economic, educational, and workforce realities.

Table 1
Critical 21st Century Skills

	Interpersonal	<i>Central Skill Areas</i> Technological	International
1. Leadership	x		
2. Customer service	x		x
3. Teamwork	x		x
4. Safety	x		x
5. Creativity		x	x
6. Critical Thinking		x	
7. Metacognition		x	
8. Cross-Cultural Knowledge and Competence	x		x
9. Ethics and Integrity	x		x

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