

Guiding the path: Identified skills for educating the next generation of workers

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ABSTRACT

The changing economy brings about new and exciting opportunities for emerging workers. Research shows that adolescents transitioning to adulthood are eager to enter the workforce and begin their careers, but many will be underprepared for the types of responsibilities that their new positions will entail. Subjectively identifying the skills that current workers believe will be necessary for future job success provides insight into how school curriculum may adapt to the changing economy and better support their students. This study explores the viewpoints of workers and the skills that they will need to take the next steps in their careers.

KEYWORDS

Job skills; 21st century; emerging workers; changing economy; workforce readiness; education

Introduction

As the economy advances, the skills required for success in the workforce are advancing (Ferrari, Arnett, & Cochran, 2008). The growing economy encompasses an increase in the number of jobs available and includes new jobs and changes to the functions of existing jobs. Education is used as the vehicle to accommodate the shift of employment by allowing students and workers to adapt to changing economic requirements (Saar & Räis, 2017). Periodically assessing and updating the skill levels of the population is essential (Saar & Räis, 2017). However, the curriculum taught to students at the high school level is not adequately accommodating the changing workforce (Ferrari et al., 2008). If students are not taught the new skills necessary to find success in employment in the emerging economy, they are unqualified for new positions (Ferrari et al., 2008). The lack of education that prepares students for the changing workforce is shown statistically, as youth comprise 40% of the world's unemployed, a status associated with adverse wellbeing and social, health, and economic costs (Mawn et al., 2017).

For students and workers to receive the education to learn skills that accommodate the changing needs of the economy, curriculum designers and school administrators need to understand the types of skills necessary for high school students, unemployed

youths, and underemployed workers to find and enjoy employment (Ferrari et al., 2008). Currently, there are limited ways to subjectively identify the desired skills of current members of the workforce. With Q methodology (Brown, 1980; McKeown & Thomas, 2013; Stephenson, 1953; Watts & Stenner, 2012) used here for capturing the perception of the skills that may be necessary for the future, my study fills this gap in the literature. Current members of the workforce are uniquely qualified to determine the aptitude of their skills at the time of employment. With the insight to daily tasks and expectations, current members of the workforce can assess the additional training recommended once they have become employed. The purpose of this study was to identify the skills necessary in the future by current members of the workforce.

Background to the study

According to Alexander Graham Bell (Mbella, 2005), preparation is the key to success. Development is essential for creative and productive thinking (Piirto, 2011). To become employable members of society, it is imperative that children can transition into adulthood with the skills necessary to become productive citizens who contribute to the economy. To be ready for the workforce, students must be prepared during their school years. In fact, the utility of secondary

education includes preparing high school students for the workforce (Ferrari et al., 2008). Preparing for the outlook of the future, in 1998, the Education Consumers Clearing House reported that the most critical job skill requirements identified by Fortune 500 companies for the 21st century have to do with being able to work well with people, as opposed to reading, writing, and arithmetic (Cassel & Kolstad, 1998). This assessment was critical as the world was preparing for the turn of the century. The Fortune 500 top 13 job skills were listed, and where the top nine correspond with skills other than reading, writing, and arithmetic, only three of the 13 job skills listed were derived directly from the traditional school curriculum (i.e., writing, computation, and reading; Cassel & Kolstad, 1998). This is a marked change from the 1970s, where three of the first and highest required job skills were listed as writing, computation, and reading (Cassel & Kolstad, 1998). Cassel and Kolstad (1998) determined that the necessary skills for the 21st century were to include creative thinking and problem solving, decision-making skills, leadership skills and development, and self-efficacy. The study conducted by the school administrators of the United States involving the Council of 66 leaders in business, education, government, and other fields focused directly on the knowledge, skills, and behavior that students will need for the 21st century (Ryan, 1999). The focus in the study was understanding how schools will need to change for the 21st century to be successful in educating our students. Ryan discovered that there was an urgent and immediate need for people to be more civil in their relationships with each other and with society, and to learn how to treat others as they would like to be treated. Ethics were the key and overriding issue in the study, a need to value honesty, and a need for integrity and effort on the part of everyone. A second important conclusion of the study emphasized an immediate and urgent need to bring standards and accountability into the foreground of schools and the workplace. Fifteen years later, Piiro (2011), supplemented the necessary 21st century skills with skills that incorporate creativity and innovation. Thinking creatively, working creatively with others, and implanting innovation were key themes in her assessment. Piiro's assessment supports the awareness that the skills for the 21st century are still being developed, as previously discovered skills are not sufficiently accommodating the needs of the transitioning workforce. Nearly two decades later, the economy is shifting again as a new generation enters the workforce.

Creativity and innovation, critical thinking, and problem solving, as well as communication and collaboration, are skills that students must master to succeed in contemporary work and life (Partnership for 21st Century Learning, 2015). Several studies over the last decade have documented this need, finding that 21st century skills, such as leadership and collaboration, are more critical than ever for success in the workplace (Casner-Lotto, Barrington & Wright, 2006; Levasseur, 2013). Also, communication skills, both written and oral, that extend beyond self-expression are necessary (O'Lawrence, 2017). These communication skills support finding mutual respect for differences among people and accepting people for who they are. Conceptual, mathematical, and visual skills, which are not only specific disciplinary content, but are also necessary (O'Lawrence, 2017). It is imperative that workers master at least one professional craft, but workers must also synthesize ideas from various disciplines. Ethics and social responsibility skills are essential skills that will be necessary for success in the workplace in this century for high school graduates (Beland, 2007). Workers are now more encouraged to be accountable for a safe and respectful work environment.

Current members of the workforce are uniquely qualified to determine the aptitude of their skills at the time of employment. With the insight to daily tasks and expectations, current members of the workforce can assess the additional training suggested once they have become employed. The purpose of this study was to identify the skills necessary for the future by current members of the workforce.

Theoretical framework

Howard Gardner (2006) proposed a strategy for thriving in the future that addresses the changing needs of employers. Gardner identified the five minds as broad ways of thinking, instead of being distinct computational capabilities. These minds can be cultivated at schools, in professions, or at the workplace. With the need for critical thinking to be developed in schools, it is the duty of educators to ensure that students are taught the values required for a changing economy. The five types of thinking that will be necessary for our changing economy are the disciplined, synthesizing, creating, respectful, and ethical minds. The disciplined mind is a master of one type of thinking. Typically, this mastery is specific to a scholarly discipline, craft, or profession. Individuals who have mastered this type of mind are destined to march to

Table 1. Factor loadings by sorter.

Q sorter	Factor 1	Factor 2	Factor 3
No. 7, Male, 15 working years	0.7100	0.1332	0.3370
No. 8, Male, 18 working years	0.7703	0.2634	0.1624
No. 11, Male, 9 working years	0.7733	0.3305	0.0894
No. 14, Male, 9 working years	0.7180	0.1480	0.2473
No. 15, Male, 10 working years	0.6454	-0.0053	0.2502
No. 2, Female, 4 working years	0.1968	0.7831	-0.1437
No. 5, Male, 4 working years	0.3960	0.6500	0.1336
No. 10, Male, 18 working years	0.4225	0.5099	0.4237
No. 13, Male, 8 working years	-0.4933	0.5846	0.3010
No. 1, Male, 7 working years	0.3303	-0.1742	0.6520
No. 3, Female, 1 working year	0.0586	-0.0227	0.8446
No. 4, Male, 25 working years	0.2106	0.1795	0.5990
No. 6, Male, 2 working years	0.2576	0.3730	0.6001
No. 9, Male, 6 working years	0.1474	0.4572	0.4717
No. 12, Male, 25 working years	0.5155	0.3912	0.5262
Defining Sorts	5	4	4

someone else's tune. Individuals who have mastered the synthesizing mind take information from separate sources and can understand and evaluate information objectively. The values belonging to a master of this type of mind are critical as information continues to grow at alarming rates daily. The creating mind builds on discipline and synthesis. Masters of the creating mind put forth new ideas and pose unfamiliar questions. The difficulty with this type of mind is that acceptance of creative ideas may take time. The respectful mind notes and welcomes differences among human individuals and groups. Masters of the respectful mind seek to work effectively with others. Last, Gardner defined the ethical mind as one that considers the nature of one's work and how it relates to the needs of society. Masters of the ethical mind can serve purposes beyond self-interest.

Purpose of the study

The purpose of this research study was to explore the thinking of workers regarding the skills needed for future employment, according to the Five Minds Theory (Gardner, 2006). Understanding the types of thinking of workers today will help educators target the kinds of values that should be taught to students to prepare them for the workforce. Five Minds Theory presents a more vivid picture better understands the opportunity for new workers to emerge into the workforce successfully. Therefore, the research question that guided the study proceedings was, "What are the skills that employees will need in the future?"

Method

I chose to utilize Q methodology for this study because of my interest in subjective opinions from

current people in the workforce. Q methodology allows researchers to extract subjective opinions from the participants (Brown, 1996). In the use of Q methodology, the participants are called the P set. The people in the study can draw from their own experiences and use that to paint a picture of how they believe workers need to be in the future. Unlike other methodologies, Q methodology allows for participants to join in on their research experience (Brown, 1997). Instead of participants having something done to them (i.e., blood pressure measured and heart rate measured), each can actively do something (Brown, 1997). This advantage allows the participants to consider all the measurement tools at once in the study and provide a more holistic consideration of the research question (Brown, 1980).

P set: Participants

The participants consisted of 15 postsecondary employees who have been working either part-time or full-time for at least one calendar year. To achieve as much diversity as possible in the sample, people were invited to participate from various backgrounds and levels of education. Therefore, college students and noncollege students who held both part-time and full-time positions agreed to join the study and were successfully able to complete their Q sorts. The age of the participants ranged from 21 to 48 years old. The number of years in the workforce of the participants ranged from 1 to 17 years. Characteristics are typically reported as frequencies, rather than percentages, in Q methodology, so that readers' interpretations are not taken as a representation of an entire target population. Instead, my study explores common opinions present in a small group of workers, who are selected because they possess characteristics of interest to the researcher (Brown, 1980). The P set of this study was young and had sufficient work experience. The characteristics of the P set uniquely qualify them to provide information regarding their preparedness for their next position. Fourteen of 15 participants stated that they wished to have a different role of employment in the next five years, emplacing them to adequately describe the perceived skills needed to reach their next position.

Instrument development

The statements developed for the Q sort were sampled from a concourse of all possible job skills needed in the future. The concourse is the sum of opinions

Table 2. Q sort statements with standard scores by factor.

1. Getting bored easily with mundane tasks in daily life Factor 1: -1.371 Factor 2: 0.084 Factor 3: -0.822	20. Writing down my insightful thoughts as soon as I have them Factor 1: 0.754 Factor 2: -0.382 Factor 3: 0.687
2. Asking for extensions on projects or assignments to do better work Factor 1: -1.088 Factor 2: -0.923 Factor 3: -0.844	21. Changing the world Factor 1: 0.437 Factor 2: -1.563 Factor 3: 1.019
3. Needing structure in tasks given at work Factor 1: -1.154 Factor 2: 0.789 Factor 3: 0.936	22. Saying things charmingly Factor 1: 0.368 Factor 2: -0.646 Factor 3: -0.393
4. Saving money from every paycheck Factor 1: -0.432 Factor 2: 0.417 Factor 3: -0.093	23. Creating new techniques or products at work Factor 1: 1.467 Factor 2: -0.91 Factor 3: 1.243
5. Taking short breaks while at work to refresh my thinking Factor 1: 0.343 Factor 2: 0.707 Factor 3: 0.504	24. Getting upset easily after receiving negative feedback from a superior at work Factor 1: -1.65 Factor 2: -1.515 Factor 3: -1.366
6. Helping others with projects at work Factor 1: 0.195 Factor 2: 0.265 Factor 3: 0.399	25. Liking to excessively involve myself in the lives of others Factor 1: -0.861 Factor 2: 0.029 Factor 3: -1.765
7. Starting tasks without being asked Factor 1: 0.474 Factor 2: 1.129 Factor 3: 1.451	26. Liking to work in groups Factor 1: 0.409 Factor 2: -0.108 Factor 3: -0.312
8. Comfortable with uncertainty Factor 1: 1.732 Factor 2: 1.722 Factor 3: -1.472	27. Living a respectable life Factor 1: 1.872 Factor 2: 0.627 Factor 3: 1.261
9. Trying the same method until it works Factor 1: -1.327 Factor 2: -0.472 Factor 3: -1.649	28. Avoiding gossip Factor 1: 0.586 Factor 2: 0.771 Factor 3: -0.124
10. Watching the local news habitually Factor 1: -1.124 Factor 2: -0.956 Factor 3: -0.543	29. Being willing to continue listening when people disagree with me Factor 1: 1.528 Factor 2: 0.269 Factor 3: 1.255
11. Considering both sides of a prevailing debate Factor 1: 0.902 Factor 2: 1.278 Factor 3: 0.274	30. Being kind, even when someone is impolite Factor 1: 0.682 Factor 2: 2.189 Factor 3: 0.707
12. Having many different types of friends Factor 1: 0.192 Factor 2: -0.649 Factor 3: 0.222	31. Finding something, it becomes mine Factor 1: -0.594 Factor 2: -1.189 Factor 3: -1.000
13. Adjusting my suggestions to accommodate others' suggestions at work Factor 1: -0.169 Factor 2: 1.599 Factor 3: -0.798	32. Calling in sick is okay if there are no projects due that day Factor 1: -1.103 Factor 2: -1.331 Factor 3: -1.923
14. Adding my own meaning to art even after reading the description Factor 1: 0.15 Factor 2: 0.08 Factor 3: -0.869	33. Minding my own business at work Factor 1: -0.947 Factor 2: -0.829 Factor 3: 0.393
15. Reading various genres of books, instead of just one Factor 1: 0.382 Factor 2: -1.362 Factor 3: -0.659	34. Taking responsibility when someone else is blamed for my mistake Factor 1: 1.077 Factor 2: 1.151 Factor 3: 0.844
16. Being open-minded about the lifestyles of others Factor 1: 0.317 Factor 2: 1.6 Factor 3: -0.137	35. Taking home office supplies I need Factor 1: -1.25 Factor 2: -1.6 Factor 3: -0.228
17. Preferring tried-and-true methods for solving problems at work Factor 1: -1.423 Factor 2: -0.379 Factor 3: 0.15	36. Valuing trustworthiness in all I do Factor 1: 1.64 Factor 2: 0.092 Factor 3: 0.992
18. Traveling the same routes every day because it is familiar Factor 1: -0.779 Factor 2: 0.376 Factor 3: -0.261	37. Feeling bad for being late to work Factor 1: -0.828 Factor 2: -0.422 Factor 3: 1.139
19. Being creative when it is not valued in the group Factor 1: 0.581 Factor 2: -0.237 Factor 3: -0.432	38. Working just as hard when the boss is not at work Factor 1: 0.011 Factor 2: 0.302 Factor 3: 2.216

about the research question. The concourse drives the sampling approach to represent the concourse. The sampling procedure used in this study was the theory of five minds (Gardner, 2006), and all statements were revised to reflect the vernacular of employees in a variety of jobs (see Table 1 for all statements in the Q set). The final Q set included 38 statements to be sorted along a continuum, -4 (most unlike me) to $+4$ (most like me), or opinions expressed according to the condition of instruction. The frequency of each statement within the nine-column distribution was 2, 3, 4, 4, 5, 6, 4, 4, 3, and 2. The condition of instruction was, “What do you need to be like to be in the job you want in five years?”

Once approval from the Institutional Review Board was obtained, I purposively recruited a variety of workers to be invited to sort the statements. After being provided instructions, each participant was given the 38 statements, a form board for sorting, and a Record Sheet with a Demographic Survey attached to the back. Each worker was asked to sort the statements on a 9-point Likert-type forced distribution continuum (Thomas & Watson, 2002) ranging from 1 (*most unlike me*) to 9 (*most like me*).

Data analysis

The 15 sorts were the data that were analyzed using PQMethod release 2.35 with principal components factor analysis and varimax rotation. The statistical level of significance used was established at 0.50 to secure the most significant differences among the factors. The final statistical analysis was to calculate Z -scores for each statement within each factor to determine the distribution of statements within each of the three, distinct, factor arrays. The factor arrays were formed based on the eight original unrotated factors. Through the process of varimax rotation, the criteria for establishing at least two defining sorts per factor array was met (Brown, 1980). A defining sort was acknowledged as a sort that had a loading greater than 0.50 on only one factor. I found that five sorts defined the first factor, four sorts defined the second factor, and four sorts defined the third factor (See Table 2). Then, Z -scores were calculated for each statement of each factor, allowing a descending order of statements for each factor array. Once the factor arrays were formed, the distinguishing statements were analyzed. A statement may be defined as distinguished for a factor array if the Z -scores for the statement in one factor array is significantly different from the Z -score in other factor arrays. The factor arrays

are interpreted along with demographic data, field notes, and postsort interviews of the participants with the highest, and most distinct, significant loadings on the factor.

Results

First, all data were ordered by the Z -scores for the statements within the three factors to create an array of the results. The highest positive and negative values provided the first glance of the findings. Analysis of the distinguishing statements on each of the three theoretical factor sorts led to a further interpretation of the three factors. These factors were found to represent three distinctive value-sets for future careers and were named innovative worker, loyal workers, and leading workers.

Factor 1: Innovative worker

Five male sorters defined this group. All sorters were over 25 years old, three were over 30 years old, and one was over 35 years old. Two had less than 10 years of experience in the workforce, one had 10 years, and two had 15 or more years of experience. All sorters had at least a master's degree. All sorters wished to advance to another position in the next five years.

Innovative workers are characterized by their free spirit and creativity in the workplace. Upon interpretation of all data sources, there appeared to be two overarching concepts or themes that assist in understanding this type of future worker. The themes are a sense of creativity and the concept of the adventurer. Innovative workers can find new and different ways of managing tasks in the workplace. In most careers, no two days are entirely identical, and this novelty is where the innovative worker thrives. The novelty of tasks and situations present a welcomed opportunity for innovative workers to offer their aptitude for producing original ideas, when there may be very little structure to work with. Innovative workers do not need much structure because of the freedom and flexibility of being creative best suit them.

The statements and data that support the creativity theme are:

- 3. Needing structure in tasks given at work (-3)
- 8. Comfortable with uncertainty ($+4$)
- 17. Preferring tried-and-true methods for solving problems at work (-4)
- 23. Creating new techniques or products at work ($+3$)

The sense of adventure theme for innovative workers is apparent, illustrated by the following statements:

- 8. Comfortable with uncertainty (+4)
- 9. Trying the same method until it works (-3)
- 11. Considering both sides of a prevailing debate (+2)
- 21. Changing the world (+1)

Innovative workers are interested in changing the world. This aligns with their sense of adventure because to change the world; individuals must understand the world. Innovative workers apply their sense of adventure to motivate them to travel the world and attempt to understand the world to make it a better place. Innovative workers do not try the same method until it works; instead, they can step outside of their comfort zones and forming new methods for problems in the workplace.

Factor 2: Loyal worker

One female and three male sorters defined this group. All sorters were over 20 years old, one was over 25 years old, and one was over 30 years old. Two had less than five years of experience in the workforce, one had eight years, and one had more than 10 years of experience. Two sorters had a high school diploma, one sorter had a bachelor's degree, and one sorter had a master's degree. All sorters wished to advance to another position in the next five years.

Loyal workers are peacemakers in the workplace. This type of employee actively tries to find solutions that work for everyone involved, including members of management. While those who are loyal workers may not wish to become leaders or managers, they are incredibly loyal to the company. This can be depicted by their long-term commitment to remaining employed by one company.

The statements and data that support the professionally accommodating theme are:

- 11. Considering both sides of a prevailing debate (+3)
- 13. Adjusting my suggestions to accommodate others' suggestions at work (+3)
- 30. Being kind, even when someone is impolite (+4)

The camaraderie theme of loyal workers is clear, which supports the theme of serving as the team player and is illustrated by the following statements:

- 13. Adjusting my suggestions to accommodate others' suggestions at work (+3)
- 16. Being open-minded about the lifestyles of others (+3)
- 30. Being kind, even when someone is impolite (+4)

Loyal workers want the best for the team. They strive to make individuals happy, therefore, making the workplace a better environment. This improves the efficiency of the team because there are no concerns about how personal matters affect others and their work.

Factor 3: Leading workers

One female and three male sorters defined this group. All sorters were 20 years old or older, two were over 21 years old, and one was over 40 years old. Two had less than five years of experience in the workforce, one had seven years, and one had >20 years of experience. Two sorters had a high school diploma, and two sorters had a bachelor's degree. Only one sorter wished to remain in their current position in the next five years. The others wished to advance to another position in the next five years.

Leading workers are very dedicated to their work. With a completist attitude, leading workers can focus on completing assignments and projects, even in the absence of members of management examining progress. Leading workers are intrinsically motivated to finish tasks on time. This intrinsic motivation shows in the leading workers' commitment to being present at work to prepare for new projects and for being punctual. The lack of a deadline does not impede the leading worker from being present in the office.

The statements and data that support the dedication to the task theme are:

- 32. Calling in sick is okay if there are no projects due that day (-4)
- 37. Feeling bad for being late to work (+3)
- 38. Working just as hard when the boss is not at work (+4)

Leading workers seek out opportunities to show the difference between right and wrong. Often, to them, a strong moral compass represents a trustworthy and respectable lifestyle. This lifestyle reflects one that a good leader should have. The statements and data that support the strong moral sense theme are:

- 27. Living a respectable life (+3)
- 29. Being willing to continue listening when people disagree with me (+3)
- 36. Valuing trustworthiness in all, I do (+2)

Leading workers are motivated by their achievements, and likely prefer a leadership role at their workplace. Leading workers pursue their dream to become a leader at any cost. The cost may even be financial, but this will not deter a leading worker from taking the necessary education courses to better prepare them for their dream position. Committing to get additional training shows that they are hardworking individuals.

Discussion

Cassel and Kolstad (1998) determined that the necessary skills for the 21st century were to include creative thinking and problem solving, decision-making skills, leadership skills and development, and self-efficacy. Having the necessary skills to be prepared for the workforce is advantageous. To ensure that students have the needed skills, educators must be aware of the skills that are essential. These specific skills are tied to particular ways of thinking as described by Howard Gardner's Five Minds Theory. Howard Gardner (2006) corroborated those skills and suggested that Five Minds Theory provides a strategy for addressing the changing needs of employers. He acknowledged that the different minds may be cultivated in a variety of environments, including school, professions, or at the workplace. Saar and Räs (2017) found that periodically assessing and updating the skill levels of the population is essential. Also, to accommodate the evolution of jobs, education is used as the vehicle for allowing students and workers to adapt to changing economic requirements (Saar & Räs, 2017). I understand that current members of the workforce are uniquely qualified to determine the aptitude of their skills at the time of employment and provide suggestions for skills that they believe are necessary for their progress in their career but are presently deficient.

This study revealed three types of thinking among workers regarding the skills that they believe will be needed in the future. The results of the study showed that current members of the workforce feel that their values should reflect those of an innovative worker, loyal worker, or leading worker. The innovative worker is characterized by a free spirit and creativity in the workplace. Innovative workers enjoy the freedom and flexibility of being creative in the workplace.

The loyal workers is characterized by adherence to policy and arbitration in the workplace. Loyal workers are incredibly loyal to their company, and this can be depicted by their long-term commitment to remaining employed by one company. A yearning for leading others and being dedicated to the company characterizes the leading worker. Leading workers are intrinsically motivated to finish tasks promptly.

Conclusion

The current literature defines skills that are needed for the 21st century, but I have assessed which skills current members of the workforce believe they will need to have the position they desire in the next five years. As the economy continues to change, and the job opportunities for current members of the workforce diversify, it is imperative that I continually assess the climate of job skills and provide resources to various learning environments to continue to train for the jobs of the 21st century.

Gardner's research finds that my traditional education system is grossly outdated. Based on the emphasis on reading, writing, and arithmetic, my education systems do not prioritize flexibility, creativity, and innovation for future iterations of the economy. There tends to be a focus on mathematics and physical sciences to prepare students for critical thinking in higher education or a career. While these skills are crucial, they are not the only skills necessary in the changing workforce. The curriculum must focus on developing students who are also adept at creativity and synthesizing abilities. Gardner's Five Minds for the Future model identifies the characteristics that students will need to have to become leaders and change-makers in the world. No longer are we able to rely on the specialization of one skill or characteristic. Students will be the most successful when they can synthesize information from varying disciplines and make judgments regarding information from a variety of sources and people. As the economy encourages more innovation, students will need to be poised to become changemakers of the world. Creativity and innovation will be necessary for students to find their place in the global economy. Gardner's Five Minds for the Future provides support for the necessity of teachers and parents to help students to develop characteristics of all five minds. Gardner informs us that students who can cultivate all five minds will be the readiest for working in the changing workforce.

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