MANAGING TECHNOLOGY AND MIDDLE- AND LOW-SKILLED EMPLOYEES

THE CHANGING CONTEXT OF MANAGING PEOPLE

Edited by Professor Emma Parry, Cranfield School of Management, Swindon, UK

The past two decades have represented a time of unprecedented social, technological, and economic change that has required a transformation in human resource management (HRM). Shifts in demographics, continued increases of women in the workforce, and greater mobility across national borders have led to higher diversity in the workplace. Advances in technology, including social media, have enabled new ways of doing business through faster communications and vast amounts of data made available to all. Mobile technology with its ubiquitous connectivity has led to renewed concerns over work−life balance and extreme jobs. These and many other changes have seen evolving attitudes toward work and careers, leading to different expectations of the workplace and mean that existing ways of managing people may no longer be effective. This series examines in depth the changing context to identify its impact on the HRM and the workforce.

MANAGING TECHNOLOGY AND MIDDLE- AND LOW-SKILLED EMPLOYEES

Advances for Economic Regeneration

BY

CLARETHA HUGHES
University of Arkansas, USA

LIONEL ROBERT
University of Michigan, USA

KRISTIN FRADY
Clemson University, USA

ADAM ARROYOS
Grandslam Performance Associates, LLC, USA

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INVESTOR IN PEOPLE

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About the Authors

Claretha Hughes, PhD, MBA, is Professor of Human Resource and Workforce Development at the University of Arkansas, Fayetteville. She received her PhD from Virginia Tech. She also holds an MBA from the Sam M. Walton College of Business at the University of Arkansas, a Master of Textile Technology Management from NC State University, and a BA in Chemistry from Clemson University. Dr Hughes has over 28 years of experience in business and industry and higher education. She is a certified Master Trainer.

Her research focuses on value creation through the use of human resource development and technology development. She is interested in the impact of values: (1) on teaching and learning processes and motivation; (2) on organizational culture, change strategies, and leadership; and (3) on technology in the workplace environment and employee behavior.

She has authored numerous journal articles, 10 books, and many book chapters and refereed conference proceedings. In 2012, she received the R. Wayne Pace Book of the Year Award for her book *Valuing People and Technology in the Workplace* (Idea Group, U.S., 2012). She is the 2009 University Council of Workforce and Human Resource Education Outstanding Assistant Professor. She has won the College of Education and Health Profession's Significant Research Award, and the 2016 and 2017 Department of RHRC Outstanding Researcher Award. Dr Hughes is Co-PI on a National Science Foundation Grant researching two-year college engineering technology and collegiate engineering preparedness.

Lionel P. Robert, Jr, PhD, is Associate Professor of Information at the University of Michigan School of Information where he was awarded the Carnegie Junior Faculty Development Fellowship. Dr Robert was a BAT Fellow and KPMG Scholar at Indiana University where he completed his PhD in Information Systems. He is the director of the Michigan Autonomous Vehicle Research Intergroup Collaboration (MAVRIC) and an affiliate of the Michigan Interactive and Social Computing Research Group, Michigan Robotics, Information Behavior and Interaction Research Group, and the National Center for Institutional Diversity − all at the University of Michigan. He is also an affiliate of the Center for Computer-Mediated Communication at Indiana University. He is currently associate editor for two journals: *Information & Management* and *ACM Transactions of Social Computing*. He is also the current general co-chair for ACM Group 2020. Dr Robert has published in journals such as *Information Systems Research* and *Journal of the Association of Information Science and Technology* as well as conferences such as CSCW, CHI, ICWSB, and HRI. His research has been sponsored by the US Army, Toyota

Research Institute, Mcity, Lieberthal-Rogel Center for Chinese Studies, and the National Science Foundation.

Kristin Frady, EdD, is Assistant Professor with a joint appointment in the Departments of Educational and Organizational Leadership and Development, Human Resource Development, College of Education and Engineering and Science Education, College of Engineering, Computing and Applied Sciences at Clemson University. Her research agenda focuses on how organizational leadership and learning in educational, community, and workforce development applications influence innovative and technologically infused educational programs and solutions and how they relate to educational development and improving access and equity through building educational and career pathways.

Dr Frady is currently a Co-PI on three different National Science Foundation grants researching two-year college educational technology and collegiate STEM preparedness. She is also PI of a national research evaluation early engineering curriculum researching career development and pedagogical impact on students and teachers. Also, as Faculty Director for Clemson University Center for Workforce Development (CUCWD) and the National Science Foundation Advanced Technological Education Center for Aviation and Automotive Technological Education using Virtual E-Schools (CA^{2}VES), Dr Frady has extensive experience in curriculum design, development, and implementation and has led a team in the development of digital learning tools to expand technician education capacity creating virtual reality tools, advanced e-learning modules, and iBooks and ePubs which have been utilized in secondary and postsecondary educational environments across the United States.

Dr Adam Arroyos is the Founder and CEO of Grandslam Performance Associates, LLC (GPA), a leading provider of leadership development, executive development, workforce development, organizational development, and nonprofit development. GPA engages its proprietary and proven serve2perform® methodology and technology to develop leaders, teams, and organizations driven and capable of achieving high performance in the global marketplace. He is the author of *PerformanceGPA®*: *Achieving High Performance through Service* (Outskirts Press, 2012), a book that provides a proven practice for achieving high performance through serving and engaging others. He has a broad base of experience that includes senior leadership positions in private, public, and nonprofit organizations, including Walmart Stores, Inc., JCPenney Co., SVI, NorthWest Arkansas Community College, and the ALPFA Institute. In 2011 he was recognized by *Hispanic-Business* magazine as one of the top 100 influential corporate executives in the nation, in 2012 he was a recipient of the "40 under 40" award by the *Northwest Arkansas Business Journal*, and in 2015 he was appointed by the Governor of Arkansas to the new State Board of Career Education and Workforce Development. Dr Arroyos has been profiled in national, regional, and community publications and is a highly requested coach, advisor, and public speaker.

Series Editor Foreword

Over the past 15 years we have seen a significant amount of discussion about the impact of technological advancement on organizations, managers, and employees. Both academics and practitioners alike have made predictions about the impact of technology on work, the workplace, and the workforce and have provided recommendations for a variety of stakeholders in relation to how they might benefit from technological advancement. This discussion has progressed from that around automation of manual tasks to digital transformation, social media, and more recently around artificial intelligence and machine learning. A growing thread within this discussion has focused upon the potential impact of these technologies on employees. Indeed, commentators have suggested both positive impacts in relation to flexibility, job creation, and opportunities for new skills development and negative effects such as issues relating to work−life balance, skills obsolescence, and job losses. There is little agreement on the likely outcomes of accelerating technological advancement; so this debate is likely to continue for some time.

Against this backdrop, there is also a concern from some practitioners and policy makers of increasing inequality and unfairness in relation to low- and middle-skilled workers. At worse, advances in artificial intelligence and robotics might worsen these issues as they have the potential to result in the automation of many of the tasks that these workers carry out. Despite these concerns, there is a lack of discussion in the academic literature about the impact that emerging technologies might have on low- and middle-skilled workers. This book addresses this gap, so I was very happy to include it within my book series *The Changing Context of Managing People*. I have included several texts already in this series that discuss technological advancement and their impact on work and on people management. However, this is the first that addresses the significant need for attention on the potential effect of emerging technologies on middle- and low-paid workers. I therefore feel that this makes a valuable addition to the series and hope that you will enjoy reading it.

Emma Parry
Series Editor
Changing Context of Managing People

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Preface

This book describes the rapidly changing use of technology to manage people, middle-skill, and low-skill employees. Virtual teams and AI systems provide unique opportunities to better engage middle-skill and low-skill-level employees. These employees are being required to enhance their technology skills at a pace that requires extensive investment of financial and technological resources. Understanding how to manage the demands of technology as it relates to the interaction of people and technology in the workplace will assist HRM in recruitment efforts and HRD in development and retention efforts.

The purpose of this work is to add to the knowledge base of human resource professionals as they grapple with the changing workplace through the rapidly changing introduction of new technologies. The pace of technological advancement is constant. Thus, HR professionals and researchers are constantly trying to understand how these changes affect employees that they are being asked to recruit, hire, develop, and advance within the workplace. The competition between people and technology with the introduction of artificial intelligence has created apprehension and anxiety among some employees and the general public as they try to understand whether or not employees will be replaced by technology. Self-driving cars and transport trucks, Amazon Go grocery stores, and other previously unimaginable changes are taking place. This book will examine some of those changes and look for research and practical implications of how people and technology can exist, harmoniously, within the workplace.

This book also provides an analysis of virtual teams, middle-skill, low-skill-level, and disadvantaged employee management that is not yet mainstream. Hopefully, this book will help to offset some concerns as the anxiety level of middle-skill and low-skill-level employees is usually highest when new technology is introduced in the workplace. Virtual teams are also continuously evolving as they have to adjust to new technologies and new employees participating in teamwork. Remote access to technology is expanding with the Cloud, Box, Google Doc, and other technologies that employees must continuously learn. Having HR professionals who understand these changes and needs will only increase an organization's competitiveness as they seek to engage and maintain technologically skilled employees.

This book is appropriate for Business, Human Resource Development, Human Resource Management, Information System, and Workforce Development professionals and scholars. Chapter 1, "Introduction," provides an introduction of rapidly changing technologies into the workplace that has made it more important for organization leaders to understand how to manage technology, middle-skill, and low-skill employees in the workplace. The knowledge of employees within these levels in the workplace is the least known. There are varying levels of influence in workplaces, and the dynamic between people and

technology has implications for human resource professionals throughout the world as they grapple with change from technological advancement and human improvement.

Chapter 2, "Middle-skill-level Employees and Technological Environments," describes how a majority of human resource executives report that their inability to attract and retain middle-skills talent frequently affects their firm's performance. Middle-skills jobs, those that require more than a high school diploma, less than a four-year college degree, and pay above the national living wage, account for nearly half of labor demanded in the United States. As technology transforms the workplace, digital skills are becoming increasingly important and in higher demand. In today's dynamic workforce, managers are facing managing and developing interdisciplinary and multilevel teams while combating a technical skills divide (lack of qualified workers), making it difficult to recruit and retain a high technology, middle-skill-level workforce. This chapter focuses on addressing unique challenges relevant to recruitment, upskilling, and management best practices as they relate to integration of technology and middle-skill-level workers in a highly successful workplace.

Chapter 3, "Virtual Teams and Technological Environments," identifies the challenges faced by virtual teams and offers solutions to meet those challenges. Basic underlying concepts behind virtual teams are provided along with the most popular forms of virtual teams. Organizational, crowdsourcing, and peer production/online communities are the most common forms of virtual teams. Understanding these basic concepts will help HRD and HRM professionals to develop virtual teams that are suitable for middle- and low-skilled workers. The chapter also presents the various types of communication technologies used in virtual [teams] along with the pros and cons associated with each type.

Chapter 4, "A Hiring Paradigm Shift through the Use of Technology in the Workplace," addresses the graying of the workplace which is forcing a paradigm shift in workplace hiring policies. The baby boomers' generation, with their large number in population and years of work experience, plays a large role in shaping the American workplace. As this large group of workers is aging, managers are faced with the need for greater understanding of not only how to accept but also how to reskill and integrate emerging workplace technologies into this older and experienced workforce. Additionally, HR researchers have suggested that organizations undergo a cultural shift in order to develop ways to compete globally using technology. Understanding the benefits of creating people advantage within organizations is described within this chapter.

Chapter 5, "Artificial Intelligence, Employee Engagement, Fairness and Job Outcomes," defines AI as the ability of a computer system to sense, reason, and respond to the environment. Computer systems with advanced AI can engage in sensing, reasoning, and responding in the most complex and dynamic environments. AI systems are being adapted rapidly by organizations to help manage their workforce. The reason for the popularity of AI is twofold. One, organizations now have access to huge amounts of data (i.e., big data) about their business operations which can be leveraged to make more efficient and effective management decisions. Two, advances in AI now afford organizations the

ability to capture and process this data in real time. Organizations can now incorporate the latest information into their decision making even in the most complex and dynamic competitive markets. Despite this, management through AI also presents new challenges to employees who are now both directed and held accountable by AI.

Chapter 6, "Designing and Managing Technology Innovation Training and Development for Middle-skill, Low-skill, and Disadvantaged Workers," explores many factors that may influence training and development of middle-skill, low-skill, and disadvantaged workers. Within the United States and world-wide there are many middle-skilled, low-skilled, and disadvantaged workers whom training and development professionals must consider as organizations seek to expand their workforce and increase productivity using technology. Temporary agencies employ many middle-skilled, low-skilled, and disadvantaged workers; however, there is very little information regarding how effective these agencies are in developing these workers beyond the skill level with which they enter the agency.

Chapter 7, "Managing People and Technology in the Workplace," explores how people and technology are managed in the workplace. It examines how data and data analytics in AI, human resource information system (HRIS), learning content management systems, learning management systems, and talent management software have become major components of human resource and workforce development. Middle-skill, low-skill, and disadvantaged employees are being asked to use their knowledge, skills, and abilities (KSAs) to evaluate and understand technology systems, technology resources, and equipment in the workplace. HRD and HRM professionals must understand the competencies (Ulrich, Brockbank, Yeung, & Lake, 1995) and resources needed to achieve harmony and balance between people and technology use in the workplace.

Chapter 8, "Emerging Technologies and Trends," describes some of the many implications for middle-skill and low-skill workers as emerging technologies and trends continue to evolve related to using technology in the workplace. Managers and HRD professionals are tasked with ensuring that employees can meet organizational goals and objectives that are in accord with the emerging needs of a contemporary workforce. As the twenty-first century continues to evolve, managers and HRD professionals must remain current in strategies and practices that are effective in managing people. This chapter provides insight and suggestions to researchers on the current trends in the field that could benefit from further research.

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Chapter 1

Introduction

Workplaces use technology in just about all facets of operations. Bigelow (1829) defined technology as:

> principles, processes, and nomenclature of the more conspicuous arts, particularly those which involve applications of science, and which may be considered useful, by promoting the benefit of society, together with the emolument of those who pursue them. (p. 4)

Yet, many individuals first think of computer technology when the term "technology" is mentioned in the context of the workplace; however, technology encompasses all technology in the workplace – computer, equipment, robotics, pneumatics, and others. Organization leaders use many different types of computer-based technologies to manage employee performance when employees are operating equipment, driving trucks, interacting with customers, and just about every other aspect within the workplace. Thus, middle- and low-skill-level employees help create the context for determining technology's impact on the workforce. To understand technology's impact on low- and middle-skill-level employees, organization leaders must obtain relevant background information to understand how artificial intelligence (AI), human resource management, and human resource development (HRM/HRD) affect these employees. Much is known about virtual teams and new hiring processes but not in the context of how it affects AI and middle-skill-level and low-skill-level workers. The role of HRM and HRD in implementing AI into business processes will require major changes to existing employee hiring and development practices (Hughes, 2018; Ross 2018). The roles of employees will need to be upgraded to include new work tasks that will allow them to use problem-solving skills and autonomy.

Plastino and Purdy (2018) provide eight strategies for organizations to gain value from AI. The eight strategies are the following:

(1) Articulate AI's benefits to the C-suite;
(2) Reinvent HR into HAIR;
(3) Learn with machines;
(4) Appoint a chief data supply chain officer;
(5) Create an open AI culture;

(6) Go beyond automation;
(7) Combine AI's capabilities with the crowd in the cloud; and
(8) Measure return on algorithms. (Plastino & Purdy, 2018, pp. 19 – 21)

Their second suggestion of reinventing HR into human AI resources (HAIR) because chief human resource officers (CHROs) will be responsible for supervising AI "workers" is cogent to this book as we examine how HRM and HRD professionals can assist with hiring and development of low- and middle-skilled workers. Plastino and Purdy further suggested that CHROs will have "a much bigger role in business strategy and innovation and will need to develop a solid understanding of AI technologies and how these will shape the future of work" (p. 19). The content of this book can help CHROs develop a solid understanding of how AI technologies shape the future of work and the workers themselves.

There is a distinct dichotomy between people and technology in the workplace. Yet, the dominance of technology seems to be the prevailing theme as organizations seek to improve productivity and leverage their resources for profitability. Without technology, some jobs would never be completed in the workplace, especially aseptic production where food products must be produced free from the possibility of contamination. The environment, in general, easily contaminates humans. There are positives as it relates to technology, and there are negatives. We want to suggest a happy medium of the use of technology and the work of employees, especially middle- and low-level employees in the workplace.

Middle- and Low-skilled Workers and Technology Development

Middle- and low-skilled workers are of most concern when leaders plan strategies for technology development in the workplace. Middle-skilled workers are defined as workers requiring some education beyond high school but not a four-year degree. Low-skilled workers are often described as those who have no high school or high school with no college. It is evident from the research that middle- and low-skilled employees have not been of interest in the United States since the North American Free Trade Agreement (NAFTA) and the late 1990s (Bernhardt & Osterman, 2017). The reemergence of interest is still a huge issue because there is a need for jobs at these levels (Bernhardt & Osterman, 2017). Yet, the new jobs being created require skills that middle- and low-skilled employees do not currently possess. These employees' education and training do not align with the available jobs to the extent necessary for them to remain employed. These issues are not new (Smith, 2012); they are just gaining recognition as employers seek to increase productivity. Hughes's (2010, 2012) valuing people as technology concept was developed because of these issues. HRM/HRD does not exist without the employees nor does AI.

Wage Inequality and Low-skill Workers

There is sometimes confusion with individuals equating low skilled with low wage. Schmitt and Jones (2012) found that 43% of low-wage workers had some

college experience or higher which would align them with middle-skilled workers. When these educated workers are making less than \$15 per hour, it reveals the inequality that is inherent across American society. Many employees who work over 40 hours a week are also not paid the legally required overtime (Bernhardt, Spiller, & Polson, 2013). US President Barack Hussein Obama pushed for a minimum wage increase, but Congress never supported his efforts. Despite the Obama administration's efforts to deny federal contracts to companies who consistently violated labor laws using executive orders, there have been minimal changes (Bernhardt & Osterman, 2017). Advocates for a higher income for low-wage workers to help eliminate inequality have remained persistent in their efforts despite congressional-level resistance.

Since work roles have been officially documented, there has been a division of labor between high-society people and those who were considered low-society people (Greenspan & Wooldridge, 2018; Servan-Schreiber, 1967; Wartzman, 2017). Then there was the forgotten middle (Temin, 2017). Society has not changed much in this regard. Many economic scholars describe it as the dual economy (Lewis, 1954; Temin, 2015). There is also mention of the top 1% and the rest of America and the world (Alejo, Pimentel, Aymar, & Lawson, 2018). There is little perception that this divide in income will ever be eliminated (Chang, 2018; Weissmann, 2018) and that in fact AI will help the gap increase (Clifford, 2018a; Mathis, 2018). As low-wage workers' incomes increase, so does the pace of automation. As new industries are derived, there are fewer jobs being created for unskilled or semiskilled workers because their jobs are being replaced through automation (Autor, 2015; Lordan & Neumark, 2018).

Oxfam commissioned a report on how workers are losing out to wealthy owners and detailed some of the prevailing conditions leading to inequality. The conditions were determined to be:

(1) *Deregulation to reduce workers' rights*. In rich and poor countries alike, labour regulations have been reduced, often under pressure from the IMF and the World Bank.
(2) *Race to the bottom on labour*. The use of global supply chains forces countries to compete on the cheapness of their labour.
(3) *Automation and ownership of technology*. New technologies could eliminate hundreds of millions of jobs and prevent poor countries from using low-skilled labour as a path to development. Value accrued through new technology goes to the owners of the machines, rather than to workers. This has generated calls from Bill Gates and others to 'tax the robots', and give governments an oversight role in technological development to ensure the benefits accrue to the majority.
(4) *Exploitation of gender inequality*. Social norms around gender inequality legitimize paying women less and giving them fewer rights in the workplace, which in turn reduces the bargaining power of labour.
(5) *Overwhelming dominance of wealthy shareholders over corporations*. While there has been a diversity of business structures for centuries, the neoliberal

era has seen an expansion of a particularly extreme model where board-rooms, which are predominantly male, represent only the interests of wealthy investors, and all commercial decisions must be made with the aim of maximizing returns to shareholders. …

(6) *Growth of the financial sector, and the deregulation of finance and capital.* Capital is now highly mobile, moving in and out of countries and corporations, giving major bargaining power to financial markets and driving returns to shareholders above all else. The rise of the financial sector has been linked to rising inequality.

(7) *Tax dodging and tax havens.* Rich corporations and individuals can avoid paying the tax they owe using a global network of tax havens. …

(8) *Race to the bottom on taxation.* Tax rates on wealth have fallen dramatically across the world in recent years. …

(9) *Increased corporate concentration and monopoly power.* Over the last 30 years, net profits posted by the world's largest companies more than tripled in real terms, from $2 trillion in 1980 to $7.2 trillion by 2013. Much of this profitability can be linked to the growing concentration of corporate power and monopolies, which in turn drive up inequality. (Alejo et al., 2018, pp. 49−50)

These economic forces are not much different than those described by Kincheloe (1999) when he asked how do we tell the workers that the American workplace is not fair. The dismantling of unions by political forces has led to the declining power of workers and increased the bargaining power for the highly paid and the owners of wealth (Alejo et al., 2018; Bernhardt & Osterman, 2017).

Low-skilled employees are often referred to as performers of low-paid, unchallenging, and uninteresting work. They are perceived to have no interest in career growth opportunities and are content with monotonous, routine work tasks. Some authors described how low-skilled employees are considered to be disadvantaged workers who are disproportionately Blacks and other immigrants. (Law & Marks, 2009; Obama, 2018). Holzer, Raphael, and Stoll (2006) described young Black males, stigmatized workers (e.g., welfare recipients), workers without recent work experience, those without high school diplomas, and other minorities as disadvantaged workers. They also suggested that the labor market has to be tight for these workers to even be considered for employment. If the labor market is not tight, they are consistently left out. This is another form of disadvantaged workers: those who are economically disadvantaged. Although there have been programs designed to help these workers, many were not helped because of biases and stigmas against them. Many of them were never provided the most successful type of training — on-the-job training (Anderson, Burkhauser, Raymond, & Russell, 1991).

The workers in these unemployment and limited hiring possibility predicaments are usually the working poor. Their pay is exploited because of their lack of experience and education (Baum & Ruhm, 2016; Nikolić & Natek, 2018). However, why are they being punished when they evidently have the skills to perform the required work tasks? Milgrom and Oster (1987) discovered that

some firms "profit by hiding talented disadvantaged workers in low-level job" (p. 454) and pay them less on average and promote them less often than other workers with the same education and ability. This type of discrimination in wage and promotion policies results in disadvantaged workers experiencing lower returns to investments in human capital than their peers do. Hughes (2018) suggested that workplace inter-personnel diversity initiatives can be developed and used by workplace leaders to pay employees for their skills, knowledge, and performance.

Phelps (1994) suggested that employer or governmental subsidies should be considered to increase the pay of low-waged workers. Haveman and Palmer (1982) also examined the role of these subsidies for workers. Bill Gates has even suggested the corporations be taxed on the robots that they use to replace or displace workers to subsidize the loss tax revenue from human workers (Delaney, 2017). Gates suggested that the funds be used to create new jobs and retrain human workers.

A fairer, more human economy is possible; however, there are many barriers to the labor market for those who are considered disadvantaged. The perceived disadvantage includes ex-prisoners and offenders (Graffam, Shinkfield, & Hardcastle, 2008). One of the barriers that is common across low-skilled, middle-skilled, and disadvantaged workers and their ability to become employed and maintain employment is the bias of HRM, HRD, and other leaders in the workplace against hiring and developing these workers. The perceptions against and mistreatment of these workers limit the potential of organizations to grow. Employer attitudes must change if the plight of low-skilled, middle-skilled, and disadvantaged workers is to improve (Danson & Gilmore, 2009; Hughes, 2014a, 2018). Organization leaders must want to help these employees and dedicate themselves to ensuring their success (Hughes, 2018). Employees need champions who are cheering them on as they seek to grow, develop, and succeed in the workplace.

Technology Disruption of Traditional Work

The demand for goods and services determines how many workers are affected by unemployment or new openings in the workplace. Technology eliminates positions for workers but not the work itself (Bowen & Mangum, 1966a,1966b; Ross, 2018). Technology can be a disruptor to the job stability of many workers (Aron, Dutta, Janakiraman, & Pathak, 2011; Rosedale, 2017; Xu, 2011). As noted by Brynjolfsson and McAfee (2014):

> [...] there's never been a worse time to be a worker with only "ordinary" skills and abilities to offer because computer, robots and other digital technologies are acquiring these skills and abilities at an extraordinary rate. (p. 11)

The quality of jobs available can be reduced by the introduction of automation and technology, but there is still a need for workers. Human beings still want human touch (Naisbitt, Naisbitt, & Philips, 1999).

"[T]he emergence of greatly improved computing power, artificial intelligence, and robotics raises the possibility of replacing labor on a scale not previously observed" (Autor, 2015, p. 4). All of these suggestions of the increase in the numbers of employees replaced by technology have led to the increase in automation anxiety (Akst, 2013; Simon, 1966) among workers. To alleviate the anxiety employees should be informed that not all technology is intended to replace their work but to complement the work that they do. Sometimes technology actually increases the demand for human labor. Most workplace technologies were developed to save workers from some manual labor tasks that were very difficult for workers to perform. Workers and organization leaders should seek ways to benefit from the synergies that are created between people and technology in the workplace (Hughes, 2012).

With the advent of big data and extensive learning content management system technologies, the use of technology to manage people and knowledge within the workplace is becoming commonplace. There are varying levels of influence in workplaces, and the dynamic between people and technology has implications for human resource professionals throughout the world as they grapple with change predicated by technological advancement and human improvement (Hughes, 2018). Workforce training in the age of automation calls for extensive changes in thought processes about the traditional concept of work. Some organizations are considering using travel time as work time — checking email during commute.

Employees and technology must actually have utility versus being perceived to have utility. A lot of technology is perceived to have utility just as employees are perceived to have potential. Until the utility and potential are actualized, they are worthless to organizations. In fact, the technology may create a deficit for the organization because of the technology development costs (Davenport & Ronanki, 2018). There have been projections that as many as 50% of all workers are at risk of losing their jobs in the next 10 years without workforce training, and in the next 5−7 years, 20 million people could be out of work (Kahn, 2018). Cities must close the education gap by online training, partnering with universities, technical schools, local schools, business community, and free two-year colleges. It all gets back to partnerships.

The Differences between Education and Training

The differences between education and training are extensive but are seldom discussed.

Banks (2002) stated:

> Education, much broader in nature than training, is designed to prepare individuals for future aspirations as opposed to current needs […]. Education focuses more on theory and background of applications as opposed to practical application. Training and education are different in many respects; however, they are similar with regard to their primary purpose, which is to transfer knowledge to an individual. (p. 3)

Education provides knowledge and skills that are transferable across multiple professions while training focuses on providing specific skills for a particular role (Kelley-Tunis, 2006). Newland (2008) explained that training "gives us the opportunity to undertake instruction that allows skills to be practiced in order to bring about a desired standard of performance or behavior" (p. 36). When education is applied and put into practice, it becomes training. Training is often measured on efficiency, and efficiency is seldom associated with education. The efficiency at which employees perform tasks is one criteria through which training is measured. An old example was the typing speed. A new example would be the number of calls fielded by a call center representative.

Another difference is critical thinking. Many organizations seek employees with critical thinking skills and want educators to develop these skills in students, but it takes a combination of education and training to fully develop critical thinking skills. Education can help employees better understand the context of tasks and strategically think within the organization's processes and systems. Education and training both focus on quality, but training expects quality and efficiency to occur simultaneously. Education allows the learner more time to master concepts. They both use assessments to assess quality of learning; however, the efficiency deficit is revealed in the assessment or testing processes. Many students may know information but cannot complete the tests or assessments in the allotted timeframe allowed, especially with regard to standardized tests in the K-12 systems and SAT, ACT, GRE, and so on. Proponents of testing as a symbol of quality seem to think the speed at which students can respond to questions determines the quality of their education. This may or may not be true. Education is often a precursor to training because employees must have some basic foundational knowledge upon which training can build. Some organizations, depending upon their specific needs, are focusing on skills (Clifford, 2018b, c; Pichai, 2018; Volastro, 2018) while others are focusing on general knowledge and education (Boyle, 2018). Knowledge is powerful, but the workforce is not skilled and agile to use the required tools and processes for their work: knowledge alone will not be as effective (Jo & Park, 2016).

Machine Learning

With the introduction of AI into the workplace, machine learning (Rudin & Wagstaff, 2014) is becoming as important as employee learning. As a subset of AI, machine learning requires workers with expert mathematical and computer skills, but it also requires that they are ethically sound in their judgment regarding what a machine is programmed to do. Educators and policy makers must remain vigilant as they determine the guidelines for what a machine is allowed to do in the workplace (Hughes, 2018; Meil & Kirov, 2017; Tzafestas, 2018).

AI is designed to support or replace humans, as is evidenced by Amazon Go stores and McDonald's kiosks (Rensi, 2018). There are robots being introduced to flip burgers, and virtual restaurants that only offer delivery services are on the rise. The desire of humans for personal convenience is reducing the desire for

interactions with other humans. To meet the personal demands of customers and to avoid problems encountered through human interactions such as prejudice, ego, lack of motivation, and other human emotions, organizations are turning to AI. However, AI is not without its own problems of discrimination, as with Amazon eliminating its AI hiring efforts when it was found to discriminate against women. The human brain is still superior to AI systems, but the human brain is what is being used to program discriminatory behavior into AI. The human brain can evaluate, create, and problem-solve, but the human tasked with AI algorithm work must be nondiscriminatory and have the diversity intelligence (DQ) (Hughes, 2016) needed to objectively program the software to provide fair hiring practices. In some instances, AI may be the best option for selecting employees because it could be programed not to discriminate and many humans cannot stop themselves from being discriminatory because of conscious and unconscious biases.

Innovative improvements in technology were created to make employees more efficient in their work. However, there are scholars (Grace, Salvatier, Dafoe, Baobao, & Owain, 2017; Grace, Salvatier, Dafoe, Zhang, & Evans, 2018; Kurzweil, 2000, 2010; Kurzweil, Richter, Kurzweil, & Schneider, 1990) and professionals (Stephen Hawking and Elon Musk) who were or are seeking to develop AI that can become superior to the human brain's ability to evaluate, create, and solve problems. Employees are expected to help organizations learn by using a combination of their education, training, knowledge, and skills to create innovations. It appears that as technology evolves it will be tasked to usurp the education, training, knowledge, and skills of employees. This duplication is already occurring in some occupations (Choudhury, 2018; Kolodzinski, 2018). On-the-job skills training (Jacobs, 2003) is focused on the business needs, and if the technology can meet the business needs, it can be used to replace some tasks of employees. One example is in the biometric terminal that Delta Airlines has opened in Atlanta, Georgia (Steele, 2018).

The Centre for the New Economy and Society (2018) revealed several key findings as technology becomes more prevalent in the workplace and changes the work tasks performed by humans and those performed by machines and algorithms. These major transformations have the opportunity to create good opportunities for workers and widen the problems that low- and middle-skilled workers are currently facing. As the Fourth Industrial Revolution (Hirschi, 2018; Schwab, 2016) continues to unfold, companies are learning how to integrate new and emerging technologies to increase efficiency of production and services to expand their operations into new markets. Davenport and Ronanki (2018) identified three types of AI that are being used to meet business needs: automating business processes, gaining insight through data analysis, and engaging with customers and employees. These three types of AI offer many options for organizations to expand their offerings, but organization leaders must ensure that these AI options align with their workforce strategy.

The Centre for the New Economy and Society's (2018) *The Future of Job Report 2018's* key findings from their examination of the Fourth Industrial Revolution are very relevant for readers of this book. The Centre's researchers determined that there were four specific technological advances – ubiquitous