Examining the Nexus of Workforce Development and Quality

Dr. John Robert Dew, Alabama, USA, email jrdew@troy.edu

The purpose of this white paper is to examine the nexus of workforce development and quality.

It is the 13th paper in a series of thoughts collected, organized, and promoted by the Quality in Education Think Tank (QiETT) of the International Academy for Quality (IAQ).

The first paper addressed a broader scope of topics and put into perspective the overall field of "Quality in Education", which set a common ground for further reflection and guidance of QiETT activities. The forthcoming papers, such as this one, focus on more specific topics and delve deeper into particular topics based upon the collection of international inputs from quality and education experts.

To date, this collection of white papers comprises the following titles:

1-"Quality in Education: Perspectives from the QiETT of IAQ"
2-"Large Scale Training of Quality Professionals"
3-"Inclusive Quality of Education"
4-"Continuing Education in Quality Improvement for Healthcare Professionals and its effects on organizational improvement"
5-"Current Societal Challenges to Quality and Quality Management in Higher Education"
6-"Applying Quality Theory to Educational Systems"
7-"Training and Teaching Statistical Methods for Quality"
8-"Simple Hints to Help Trainers Improve Training Quality"
9- "Student Quality Circles: A Step Towards a Total Quality Society"
10- "Solving Problems in Education Using Quality Tools"
11- "Making Online Education Effective"
12- "Integration: The Key to Effective and Efficient Quality Education"
13 "Examining the Nexus of Workforce Development and Quality"

1. Introduction

Achieving and maintaining high levels of quality and performance excellence in any endeavor – manufacturing, health care, athletics, research, education, social services, or government – does not happen through any random acts of planning or management. High levels of quality are the result of carefully designed and systematic processes that are built on the foundations of human knowledge and learning acquired through systematic study. In many organizations, effective education and training in quality methods provides the cornerstone of this educational foundation.

The thought leaders who led the quality revolution in the 20th century all recognized the importance of having a systematic approach to workforce development in order to support quality and performance excellence. When Dr. Kaoru Ishikawa published his cause and effect diagrams in the 1960's for analyzing problems and organizing improvement efforts, he included "people" as one of his major causal areas that impacts quality in the workplace. (1) Similarly, Dr. Joseph Juran defined the knowledge requirements that employees must have in order to be able to perform a job, recognizing the key role that people play in achieving quality in processes. (2) And among his famous 14 Points for Management, Dr. W. Edwards Deming recognized the important role that people play in his point number six, "Institute Modern Methods of Training on the Job." (3) Clearly the preparation and development of the workforce has long been an area of significant concern among the thought leaders within the quality field and the importance of appropriate knowledge management and employee qualifications are serious issues for quality professionals.

The importance of workforce development in achieving high levels of quality and performance excellence is reflected in the manner in which frameworks for describing quality, such as the EFQM Model, the Baldrige Criteria, and ISO 9001:2015 all include the workforce as a major factor in achieving high levels of quality. The nexus where the quality discipline influences the development of the workforce and the condition of the workforce impacts quality is significant to all organizations.

Most quality managers, however, do not have direct control over workforce development, just as they do not have control over design, procurement and the production organization. In all of these areas, quality managers must exert their influence in order to help their organizations. Quality managers clearly have a compelling need to understand and influence the workforce development practices in their organization and those responsible for workforce development need to understand the application of quality methods to workforce development processes and have an understanding and appreciation for what the workforce needs to know about quality.

This paper will examine what constitutes workforce development, how workforce development relates to the major cognitive functions within the quality discipline, aspects of workforce development that reside inside and outside an organization, education and training related to quality, and using quality methods to assess workforce development practices.

2. What is Workforce Development?

Workforce Development encompasses a wide range of methods that prepare people to become employed in a business, factory, hospital, or other work setting, and to enable people to be successful in contributing to their place of work through appropriate skills, behaviors, and knowledge. The process of workforce development enables organizations to recruit and prepare the people they need while meeting the aspirations of individuals who want employment, all of which contributes to the economic development of a community.

Skills, behaviors, and knowledge that support successful work environments begin to be developed in elementary school and are the primary focus of a high school, or secondary, education. Most secondary school curriculum focuses on general education – the language, math, reading, science, and communications skills that are essential for joining and participating in the workforce. Advanced courses in these areas, along with specific technical skills and knowledge are provided in tertiary settings such as community colleges, vocational schools, and in college degree programs. In most cases, all of this education and training just prepares the new graduate to join an organization, where he or she will then participate in instruction that is more specific to the technical or administrative function of the organization. This more detailed instruction, which is specific to the organization's policies, processes, technology, and culture, must be provided by the organization.

Workforce Development, then, covers a lot of territory and it is critical to the quality function in all organizations. Quality is all about cognition. All of the major cognitive functions that make up the quality discipline are influenced by the education and training of the individuals who will comprise the workforce in an organization. Whether we are controlling quality, solving problems, improving quality, or engaging in innovative and creative thinking, an organization's ability to successfully perform all of these quality functions depend upon the education and training of the workforce. (4)

Education or Training?

In general terms, education includes a wide range of activities that build on our ability to interpret the world around us through reading, writing, speaking, analyzing, and understanding both facts and theories in broad bodies of knowledge such as biology, chemistry, mathematics, and history. Training, on the other hand, focuses on understanding a very specific process or task, including learning the ability to perform specific tasks. (5)

While some people equate workforce development only with vocational education and training, the overall demands related to workforce development are much more complicated than this. Success in the workplace requires general education that provides competence in reading, writing, verbal communication, and the ability to interact with other people. To be prepared to enter the workplace, people need to be able to tell time, follow instructions, collect data, interpret information, perform applicable math, access a computer, and obey rules. Many companies now require at least an Associates Degree (two years of tertiary education) that provides strong general education to be even considered for employment.

Technical education certainly remains vital, as well. Skills such as welding, maintenance, electrical systems, laboratory analysis, coding, plumbing, construction, heavy equipment

operations, and medical applications all require carefully planned training which often includes some form of certification.

The debate over the appropriate balance of narrow training focused on skills and broader education that prepares people to participate in a work environment has been going on for over 120 years in the United States. David Sneden and Charles Prosser studied the model developed in Imperial Germany for separate vocational schools that provided specific training for factory workers. Beginning in late primaryschool, Sneden and Prosser advocated separating students into different schools based on their "probable destines." As Sneden said, "Having once conceived of the citizen as we should like to have him, we can work back to find the numberless specific forms of training by which we can produce this type." (6) Vocational education would produce people immediately ready to work in factories, which was beneficial to both the students and the industrialists.

Another perspective was championed by John Dewey, Ida Tarbell, and George Herbert Mead, who were active in the National Vocational Guidance Association which split from Prosser's National Society for the Promotion of Industrial Education in 1913. Dewey and his peers believed that adherence to Prosser and Sneden's narrow vocational model would result in workers not having involvement or responsibility for their work. Dewey proposed a blending of technical training and broader education that would prepare people to be both proficient and participative in their workplace. (7) Different countries and companies around the world have adopted approaches to workforce development ranging from the narrow skills focus to the broader inclusion of skills and participation. Major quality frameworks, such as the EFQM Model and the Baldrige Criteria lean toward the John Dewey model.

3. Quality's Cognitive Functions

Workforce development is critical to supporting the fundamental cognitive functions of the quality discipline – controlling quality, solving problems, improving quality, and innovative thinking, along with the overarching metacognitive function of assessment. These cognitive functions all center around understanding, controlling, and introducing change, which form the nucleus of the quality discipline that has evolved out of the philosophy of Alfred North Whitehead. Whitehead's philosophy about the nature of change shaped the understanding of variation in "entities" in processes which was the subject of Dr. Walter Shewhart's research that launched the modern study of quality. (8) *Quality, as a discipline, is the study of change.*

When we are controlling quality, we are seeking to prevent unwanted change from being introduced by ensuring that appropriate actions are being taken in the work place. Organizations cannot depend on proper conduct of operations if the workforce has not been educated to read and understand procedures and follow instructions. Errors, and other unwanted changes, are controlled by having a workforce that is properly trained to conduct their work and to recognize when quality control indicators, tests, or inspections indicate that processes are moving out of control. Training that is specific to the workplace must be provided to new employees when they are brought in and oriented (or "onboarded) so that errors and accidents do not happen because the new person did not understand the significance of safeguards and standard operating procedures that are designed into the workplace.

Problem-solving constitutes a second cognitive function within the quality discipline. In order to solve problems, employees need to have the education and training to understand what the work process "should" look like – understanding what is normal and acceptable and being able to recognize when a deviation occurs. They should be encouraged and expected to speak out when a deviation from expected performance appears to be happening. Employees' ability to help diagnose the immediate cause of a deviation from "should" (the classical definition of a problem offered by Kepner and Tregoe), depends on their education and training in understanding how their work system and its technology function. (9) Employees need to be trained in an organization's problem reporting system and its corrective action system, if these systems exist. Prudent organizations invest in teaching their employees to use scientific methods for examining deviations and to avoid jumping to conclusions without clear evidence and diagnostic thinking. It is vital for employees to understand the difference between common causes of variation which are inherent in a system and special causes of variation which are caused by unwanted changes being introduced into the system.

Education and training in the workplace are likewise vital to a third area of quality thinking, the concepts and methods of continuous improvement. As Dr. Juran reported, the understanding of how to improve a process is often already present in a work group among employees who understand what Juran called "the knack." (10) People make many observations about their work processes and may have many ideas regarding how processes can be improved, if their participation in making improvements is solicited. Participation can be encouraged through special structures such as suggestion systems, quality circles, and cross-functional teams, or it can be engrained in how work teams function. The better the education and training within the workforce, the greater the ability for individuals to develop observations for how processes may be improved. A well-informed workforce can also help the organization avoid mistakes that can happen when so-called improvements are proposed, as well, if we will listen to them. The latest is not always the greatest, and all that glitters is not gold, when it comes to change. The training that an organization provides to new employees should include the organization's approach to encouraging and systematically enabling continuous improvement. While it is highly desirable for continuous improvement methods to be embedded in secondary and tertiary curriculum, an organization cannot rely on this and must invest in teaching its continuous improvement methods to its workforce.

Innovative and inventive thinking processes are yet another cognitive function of the quality discipline and expand beyond the thinking processes used for refining processes used in continuous improvement activities. Education and training can be very valuable as springboards for launching creative ideas for redesigning processes, products, and workplaces. Most approaches to innovative thinking engage people in overcoming their habitual way of seeing and thinking about situations. Structured brainstorming and exercises using metaphorical thinking and art work are used to jolt people out of their normal frame of reference. Alex Osborn, for example, proposed a structure approach to generating new ideas to support suggestion systems which he called brainstorming. (11) William Gordon led the Harvard Synectics Program that established much of our understanding of how creative thinking happens. (12) In many cases, innovative ideas are generated by accessing and harnessing knowledge and understanding from different technical skill sets and different disciplines. Geinrich Altshuler, the creator of the Theory of Inventive Problems Solving (TRIZ), noted that creating a new solution to a technical dilemma often requires the ability to tap into knowledge from another field entirely. (13) On the

other hand, what we have learned to be "true" can sometimes inhibit our ability to break out of what Altshuler described as psychological inertia. The American futurist and physicist, Herman Kahn, cautioned against what he called "educated incapacity" whereby our current knowledge keeps us from learning new things and taking meaningful action. (14)

While the control of quality, problem-solving, quality improvement, and innovative thinking are the four major cognitive components of the quality discipline, there is a fifth process, a meta-cognitive process (*meaning oversight, or thinking about how we think*) that we call assessment, that oversees and connects all of these cognitive areas. (15) Quality efforts start with assessments that lead the practitioner to identify activities that need to be taken to sustain or better control quality, address unwanted changes, improve processes, and seek innovative ideas. And, like the other cognitive areas, an organization's ability to engage in assessment is also influenced by workforce development. It requires a rather sophisticated level of understanding to engage in auditing, surveillance, and assessment of an organization using an international standard, an accreditation standard, or a quality criteria such as the Malcolm Baldrige Performance Excellence Criteria.

It is essential for organizations to invest in teaching their employees the concepts of quality control, how to solve problems, how to apply methods for continuous improvement, and effective methods for innovation, as well as approaches for assessing their organization through audits or the use of assessment frameworks. Likewise, there is a compelling need to embed these concepts and methods in secondary and tertiary educational programs.

4. Internal and External Workforce Development

As the U.S. Department of Commerce has noted, all organizations have an interest in engaging in workforce development both within the organization and externally in the educational system. (16)

Internally, organizations need to have a formal and structured process for orienting new employees to the workplace, training on specific skills, training on workplace rules and procedures, on-the-job training with peers or supervisors, mentoring, training in problem-solving and in methods for controlling and improving quality. The degree of formality, structure, and documentation of educational qualifications and training adhere to the concept of a graded approach to quality. The greater the potential risk of harm that can be caused by human error, the greater the level of formality and structure will be needed in education and training.

Externally, the recruitment of human resources resembles any other supply chain in that it requires planning and clear processes to bring in suitable people who can be depended upon. Organizations should proactively partner with high schools, community colleges, vocational-technical schools, and universities and may need to provide them with equipment and supplies relevant to their technical needs. Concurrently, Instructors in schools need people from "the real world" to visit their students and talk about the reality of work.

Many businesses, health-care organizations, and educational systems have established opportunities for secondary and tertiary students to serve as interns and participate in practicum courses that comprise an important component of workforce development. Internships allow

organizations to directly shape the preparation of potential employees and to evaluate their performance. At the same time, internships and practicums provide early career experiences that help students understand more fully the nature of their proposed career and to get a foot in the door with a potential employer.

Businesses, factories, and hospitals should encourage the educational institutions that provide them with a workforce to engage in quality systems or frameworks such as the use of the Baldrige Criteria. The Baldrige Criteria for Education establishes an expectation that educational systems will engage with the employers who hire their graduates. Use of the Baldrige Criteria helps facilitate workforce development for institutions and communities since it drives assessment of employers' needs and an institution's capacity and performance in meeting those needs. Many specialized accreditation programs at the tertiary level in the United States now require faculty to demonstrate how their curriculum decisions are informed by discussion and follow-up with the organizations that hire their graduates.

An Organized Process

Workforce development is not a random activity, but requires a carefully organized and systematic approach of analysis, program development, course development, execution, evaluation, and improvement. It follows the Plan-Do-Check-Act Cycle, which Dr. Deming attributed to Dr. Walter Shewhart. (17)

An effective workforce development effort begins with establishing an overall set of programmatic goals based on a thorough understanding of knowledge, skills, and behaviors required in an area's economy or for a specific sector, such as health care or transportation. (18) These programmatic goals need to include social values that encourage participation, collaboration, and skills that support workforce engagement. Then, analysis of how well the existing educational systems external to businesses are meeting these broad programmatic goals and how well the internal workforce development activities are performing needs to be conducted.

It is important to move from the general to the specific. From broad educational goals, we must focus upon specific things that people need to know and skills they need to master. This becomes the basis for specific classes, workshops, training modules, simulations, drills, or on-the-job activities, and the creation of these methods of delivery begins with identifying specific learning objectives. (19) This is true for external courses in vocational schools, community colleges, and universities, and for internal workforce development in companies, hospitals, law enforcement, and any other type of organization. Management's responsibility is to establish broad programmatic goals, embed these in hiring criteria, assure incoming people meet these criteria, provide effective orientation to the organization's culture and conduct of operations, and to have internal, specific training needs identified and met.

With clear learning objectives in place, educators and trainers need to decide on the best method for delivering content. This could be instruction in a class-room setting, instruction using videos and interactive online discussions, web-based lectures and exams, reading of procedures, practice using a simulator, table-top exercises, drills, on-the-job training, and shadowing a qualified person. Each of these approaches has advantages and draw-backs.

Attention must be given to the qualifications of content developers and instructors to ensure both technical proficiency and the knowledge and ability to teach. Instructors are some of the most valuable people in the organization because they serve as a force multiplier. If they perform poorly, they can significantly damage an organization and the damage might not be recognized for a long time. The content of training should be peer-reviewed prior to utilization.

Regardless of the approach an institution or organization decides to use, the critical step is to verify that the learner really has acquired the skill or knowledge that is needed. This can be done through verbal questioning, written or online examinations, or observation of performance by a qualified observer. It is vital to test for understanding before turning someone loose to use new equipment on a patient, operate an expensive piece of equipment, handle hazardous materials, or interact with customers. (20)

Records need to be kept to document that employees have met the appropriate training qualifications. Record keeping is important in that it serves as a measure of performance in the training process within the organization and is used to promote continuous improvement of the workforce development process. Record keeping also helps to ensure that employees are participating in training that keeps their knowledge and skills up to date.

From the quality practitioner's perspective, organizations need to beware of weak approaches to training and weak methods that test for understanding that may be in practice in organizations. Having everyone read a policy or procedure and sign a statement that they have read and understood the information is not a reliable form of communication and training. This approach appears to be more concerned with protecting the organization from legal action if something goes wrong rather than ensuring the work is conducted properly.

The location of the workforce development function within an organization is an important question. Since the function deals with people, it is often included within Human Resources. However, since it is a function that is linked closely with an organization's technology, it is sometimes located in line and maintenance organizations. In a few cases, workforce development is located within the quality department to ensure independence of the training process.

There are advantages and disadvantages to each form of organization for workforce development. If located in the Human Resources area, the complexity of technical training may not be fully appreciated and the function can be de-emphasized. HR managers, who may have risen to leadership roles due to expertise in labor relations, employment, or benefits administration, may not fully recognize the complexity of workforce development which is a field where most practitioners need at least a Master's degree in Education. This accounts for weak, legalistic training programs that rely on "acknowledgement of understanding" forms. On the other hand, the Human Resources organization manages the hiring process and can be instrumental in developing collaboration with the school systems to enhance general education of potential employees.

There are advantages and disadvantages of locating the training function in the line organization. It may be advantageous if it helps ensure that the most knowledgeable people are

engaged as trainers and it will certainly support effective on-the-job training. If located in the line organization, however, trainers may be pressured to push people through training in order to meet the demands of scheduling.

Societal Challenges

Even when an organization does an excellent job with workforce development, there are many challenges to quality from the workforce perspective. Many of these challenges arise from the area of public policy and public health. The transportation industry in the United States, for example, is challenged to find enough truck drivers because so many potential trainees cannot pass a drug screening test. Similarly, the impact of opiates on workplace errors, accidents, and absenteeism is not fully understood. Alcohol abuse remains a chronic problem in many societies, causing absenteeism, accidents, and errors. And while some industries, such as airlines, ground transportation, and nuclear power production understand the hazards associated with fatigue from working extended hours and shift work, and have regulations to control these activities, other sectors, such as health care, appear to avoid discussing or controlling this potential source of adverse and sentinel events.

5. Education and Training for Quality

As previously noted, the thought leaders who led the quality revolution in the 20th century all offered perspectives concerning how to provide effective education and training related to the application of quality concepts in the work setting.

Dr. Joseph Juran, for example, observed that organizations can use three approaches to creating an organization's approach to quality-related training. (21) One option is for the senior leadership to define the quality education and training program, based on their own experience, commitment, and leadership philosophy. A second approach is to hire an expert from the quality field who understands training who will lay out the organization's educational and training curriculum for quality. A third approach Juran identified is to establish a task force within the organization that will identify the needs and define the curriculum. Juran identified five different populations requiring education and training related to quality within most organizations, each with different needs. (22) These five populations are front – line workers, supervisors, middle managers, specialists, and upper management. It may be fair to argue that with the wide-spread advent of self-managed or empowered work teams and the flattening of middle management ranks over the past 20 years, the supervisor and middle management ranks have been melded together into a leader – facilitator role in many organizations where these individuals provide guidance to multiple teams. Therefore, this paper will focus on three populations: front-line workers, leader-facilitators, and senior leadership.

As far as specialists are concerned, it can be noted that quality management concepts have increasingly been included in tertiary degree programs, such as engineering, supply chain management, nursing management, and other academic programs, particularly at the graduate level. The quality-related educational needs for specialists will be very specific to their discipline, but can also include the education provided to Leader – Facilitators.

Front - Line Workers

Front – line workers are those with direct contact with equipment, materials, vehicles, keyboards, patients, products, students, and customers. For this population, the quality advocate, Philip Crosby, advocated that training must be formal and structured with the emphasis on the procedures to be followed. (23) Front -line workers play a huge role in both controlling and improving the quality of processes and outcomes, if management allows them to do so.

Therefore, front-line workers need a blend of two types of knowledge. They need technical knowledge, which consists of the knowledge and skill to operate equipment, make a weld, take inventory, teach subtraction, draw blood, or assist a customer. They also need the knowledge related to controlling the quality of the work they perform and knowing how to participate in correcting problems and in improving processes through the use of quality concepts such as the input – process – output model, flow charts, cause – and-effect diagrams, data collection and charting. This area of knowledge has been well defined by the Japanese Union of Scientists and Engineers as the Seven Quality Tools, and was well presented by Dr. Kaoru Ishikawa. (24) Dr. Juran specifically recommended teaching these tools to all front-line workers. (25) If this knowledge is not already being taught to all school children in a nation's secondary school systems, as it should be, then it must be taught by organizations to their front-line workers.

Leader – Facilitators

With the introduction of self-management teams in the early 2000s, many organizations have merged the role of the supervisor and the middle manager into a Leader – Facilitator role where individuals guide the work of multiple teams of employees.

Leader – Facilitators may be promoted up from the ranks of front-line workers or they may be hired into the role with some level of tertiary educational qualifications.

The Leader – Facilitator serves as the lynch-pin for controlling and improving quality in the organization and requires a significant level of education and training over and above the knowledge that the front-line workers possess.

A Leader – Facilitator needs to understand the quality control functions that are designed into the work systems, knowing what they are, why they exist, and what they mean. Additionally, the Leader – Facilitator needs to have formal training in diagnosing problems, both to find the immediate cause of deviations that threaten quality and how to conduct root cause analysis to identify systemic causes of problems. And, the Leader – Facilitator serves as the driving force for the quality improvement function within the workplace, requiring training in Lean, Six-Sigma methods, teambuilding, conflict resolution, and creative thinking methods such as TRIZ. All of this means that organizations must invest intensely in educating and training their Leader – Facilitators.

Organizations should create a matrix for ensuring that Leader-Facilitators obtain all of the types of training over time and funds must be budgeted to pay for this vital investment.

Senior Leaders

In some cases, Senior Leaders come up from the ranks of effective Leader – Facilitators or middle managers and possess a strong understanding of the importance of quality control and quality improvement. In other cases, Senior Leaders are brought in from outside the organization with the expectation that they have the appropriate knowledge and skills to lead the organization on to success. In either case, it is vital for the Senior Leader to enhance his or her understanding of quality methods by adding in a perspective about quality planning.

Dr. Joseph Juran described the quality discipline as a triad consisting of quality control, quality improvement, and quality planning. (26) The level of understanding of each of these three components of the quality discipline changes depending on one's role in the organization. The major thought leaders in the quality field all discussed the essential role that Senior Leaders play in establishing quality as a core value and strategic component of their organization. When invited to Japan to teach quality methods in the post-war era, Dr. Deming worked with the Japanese Union of Scientists and Engineers to teach the senior executives of the 45 largest companies in Japan. (27) Dr. Juran likewise conducted numerous executive seminars exclusively for senior leaders and wrote specifically to that audience. (28) Much of Philip Crosby's writing about quality is aimed at senior leaders, as well, and he was widely recognized for his ability to communicate quality concepts with senior executives. (29)

The key to educating Senior Leaders to the vital nature of the quality discipline is to enable them to associate with other Senior Leaders who have demonstrated a strong understanding of quality methods and how to apply them. Senior Leaders need the opportunity to attend executive seminars, major conferences that include executive sessions, and interactions with highly experienced quality consultants. For this type of interaction, it is vital for senior leaders to incorporate a focus on planning for quality right alongside their financial planning. Senior Leaders must ensure that investments in education and training are made to enable Front Line Workers and Leader – Facilitators to fully understand and participate in the quality control and quality improvement functions.

Perspective Transformation

Quality professionals are often challenged to help Leader – Facilitators and Senior Managers embrace an understanding of quality that is more about management principles, systems theory, and the broad concept of performance excellence that goes far beyond simply teaching someone how to use a specific quality tool. Quality managers must help leaders "turn the light bulb on" when it comes to embracing quality principles. (30)

This type of education that transforms how people think about quality and their understanding of their own organization, requires critical reflection, defined by Jack Mezirow as "a critique of the presuppositions on which our beliefs have been built." (31)

Whether we are aware of it or not, each person develops a set of *meaning perspectives* and takes actions every day based on these perspectives. Meaning perspectives are described by Jack Mezirow as high order theories, propositions, and beliefs. They are the ways that an individual

interprets experiences and serve as the criteria for making value judgments. These meaning perspectives are acquired through cultural assimilation, but may be intentionally learned. (32)

While meaning perspectives are learned in childhood, they are also strongly influenced by early experiences in the work setting and by the beliefs and behaviors of the first supervisors and co-workers that a person encounters. We learn to fit in with the cultural expectations of the organization we work in. Over time, meaning perspectives reduce our anxiety by allowing us to dismiss experiences or ideas that are unfamiliar.

The idea of meaning perspectives is the basis of the comfortable and routine way of perceiving the world that we refer to when we say that we need to get "out of the box" when seeking creative ideas, described as "psychological inertia" by Geinrich Altshuller, in the context of the Theory of Inventive Problem Solving, or TRIZ, used by many quality professionals. (33)

Learning often requires new interpretations and new comparisons that will either reinforce our comfortable meaning perspectives or create new ways of seeing the world. Perspective transformation occurs with a practice known as *reflective learning,* which is a way of describing "activities in which individuals engage to explore their experiences in order to lead to new understandings." (34) One of the earliest concepts of reflecting learning was advanced by John Dewey, who referred to it as "assessing the grounds of one's beliefs." (35) This is not about training people about how to use a specific method, but setting the stage for people to discover and embrace a new way of understanding what is actually going on around them in the world.

What is often needed in order for people to see the workplace experience in a new way is a reflective learning process that results in what the Brazilian educator, Paulo Friere, called *perspective transformation,* which is what we often mean by the expression that the light bulb comes on. (36) It is the ah-ha moment in which we see that which may be familiar from a whole new perspective.

So, the challenge for the quality professional is to design and implement settings and experiences for reflective learning that result in perspective transformation about quality.

There are many examples of quality philosophies that seek to generate perspective transformation that can be introduced through a reflective learning experience. While Dr. W. Edwards Deming devotedly taught the Control Chart methods developed by his mentor, Walter Shewhart, the higher educational message he offered was the concept he called "profound knowledge," which was a way to understand the world based on an understanding of how deeply variation influences everything around us and how we must manage organizations accordingly. (37) Philip Crosby's concept that "quality is free" is much more than a short lesson about workplace economics, but offers a perspective transformation about the hierarchy of the competing areas of quality, cost, and schedule in an organization. (38) A quality framework, such as the Baldrige Criteria, can be challenging to grasp because there are a variety of embedded meaning perspectives that create a different world view that requires some reflective learning to appreciate.

Designing a reflective practice activity with the intention to create perspective transformation also challenges the quality manager to address the issue of *reification* in the workplace.

Reification is the false belief that the circumstances around us which have been created by people cannot be changed by people. (39) Alfred North Whitehead referred to this as the "fallacy of misplaced concreteness," thinking that our workplace and social systems are concrete and cannot be changed. (40) Many quality managers already know that reification can run deep in an organization, and that this false belief that an organization cannot change, and that change should not even be attempted, is the cause of many quality problems.

Methods for Reflective Learning

Reflective learning is not at all like a training class, where people learn how to construct a control chart or develop an audit plan. There are at least seven proven methods of reflective learning that quality managers can employ in the workplace to achieve a perspective transformation about quality. These are (a) Group discussions around structured questions; (b) the use of Organization – Domain Metaphor Analysis; (c) Discussion of Critical Incidents; (d) Case Study Discussions; (e) Art Exercises; (f) Force Field Analysis; and (g) engagement in authentic Root Cause Analysis.

a. Group Discussion Around Structured Questions:

This approach is based on the theory and extensive practice of Myles Horton, who noted that the best way to help change perspective is not to tell people the answers to their problems, but to get people together and to start talking. (41) This approach may be uncomfortable for some people because they are not accustomed to listening to other people and only know how to talk. The leader brings people together in a group, in a comfortable setting, and guides the group through a structured series of questions. The topic can be about a specific article that everyone in the group has been asked to read. It can be about the results of an environmental scanning exercise (SWOT analysis) from a strategic planning session, or an opportunity for a group to review the feedback from a customer survey or an employee survey. The goal is to encourage the participants to think critically and to share their thoughts openly.

b. Use of Metaphor Analysis

This use of organization-domain metaphor analysis brings a group of people from a common organization, with a common set of experiences, together to examine their organization from the perspective of a metaphor. David Deshler has suggested asking groups to think about their organization if were a machine, a family, a Monopoly Game, or the military. (42) This writer has had success in a variety of work settings with the use of sports as a metaphor to stimulate reflective learning. Manufacturing organizations often relate well to a conversation about how the factory is similar to a football game. Office groups can relate to a fast paced team sport like basketball. Individuals with similar functions who are spread out widely across a company, like purchasing managers and public relations managers can reflect on their organization as if it were a game of golf. In each of these cases, employees are encouraged to discuss the organization from the perspective of the metaphor, leading to very interesting revelations that will challenge perspectives.

c. Discussion of Critical Incidents

Stephen Brookfield has advanced the practice of using real world circumstances in a setting among peer learners to examine their assumptions about many facets of life. (43) In the workplace, co-workers can be assembled to review information about a critical incident. This could be the loss of an important customer, a quality failure in production, a sentinel event in a health care setting, an industrial accident, or an environmental mishap. A facilitator asks the participants to identify the operating assumptions that were in place that enable things to go amiss. The purpose is not to identify who is at fault, but to understand what people thought should be happening; what they thought was actually happening; and whether anyone recognized that a problem was developing.

d. Case Studies

Most readers who have participated in a graduate seminar in management recognize the case study as a popular method for reflective learning. Everyone who will participate in the discussion reads the same case study and a facilitator guides the discussion to bring out important points about meaning perspectives and meaning transformations. The *Harvard Business Review* provides many excellent articles that can be used as case studies, along with numerous examples published in graduate level textbooks on Operations Management. Likewise, Deming, Juran, and Crosby all included interesting examples in their major works that can be used as case studies in a workshop. The goal of the case study is not to show how ignorant another organization was, but to stimulate discussion about the assumptions being made in that organization and how close those assumptions are to the participants' organization when it comes to issues pertaining to quality.

e. Art Exercises

Leah Burns has provided many examples of how art can serve as a vehicle for dialogue and exploration regarding dominant meaning perspectives in a community that are also effective in a work setting. (44)

A basic exercise that can generate a surprising level of critical examination regarding the nature of an organization is to ask a group of supervisors or team leaders, or the staff in a quality department, to work in small groups of four or five people, with each group working independently on an easel to draw a picture that interprets their organization. Then, each small group is asked to share their drawing with the larger group and to explain why they described the organization in the manner that they decided on. This process can bring out the unstated beliefs that are shared in an organization that may not be at all consistent with the organization's stated policies and practices.

f. Force Field Analysis

The field of systems thinking was significantly influenced by the German social scientist, Kurt Lewin, who invented the method known as Force Field Analysis. (45) As a form of reflective learning, Force Field Analysis compels people to look at the organization from a broader systems perspective by identifying a specific objective to be accomplished (or a change to be made), identifying the internal and external forces that will support the change and the internal and external forces that will resist the change. This process helps people reflect on how their status

quo is maintained by a balance of forces known as homeostasis. To create change, the participants must identify actions to upset the balance through some combination of strengthening the supporting forces and weakening the resisting forces. The process of this discussion can result in significant perspective transformation.

Root Cause Analysis

As a methodology, root cause analysis has its origins in the Nuclear Navy with the insistent expectation for questioning everything that was the hallmark of Admiral Hyman Rickover's leadership style.(46) Most root cause analysis methodologies were developed by engineers and officers engaged in designing and deploying propulsion units and fuel for nuclear submarines. These methods later came to be embraced at nuclear power generation stations and in all stages of the nuclear fuel cycle before becoming embraced by the manufacturing and health care sectors. Regardless of the specific method employed – questioning to the void, event and cause factor analysis, barrier analysis, fault tree analysis, and other options – the objective is to stimulate critical thinking about the work setting. The criticism of some root cause analysis is that in only goes as far as identifying what Kepner and Tregoe identified as the "immediate cause" and does not move on to "thinking beyond the fix." (47) Dean Gano, one of the earliest teachers of root cause analysis who came out of the nuclear setting, has expressed the concern that some root cause methods are only being taken to a point where blame can be assigned. (48) If the root cause analysis discussion has not gone deep enough to shed light on beliefs or practices that are creating systemic problems in the organization, it may not have gone deep enough to provide reflective learning.

Reflective Learning and the Sine Qua Non

It is vital for Front – Line Workers, Leader-Facilitators, and Senior Leaders to all embrace an understanding that a focus on quality is the *sine qua non* for a successful organization. (49) It must be part of the organization's ecology – infused within its culture and essential in its strategic planning. Quality is radical in the sense that the word "radical" can mean "the root." Quality is at the root of any organization that will be successful. Growing an organization into a successful venture requires investing in education and training about quality that will provide a healthy root system for an organization.

6. Assessing Workforce Development Practices

Japan's Deming Prize stands as the first systematic effort to evaluate an organization's use of quality methods to recognize excellence. It is important to note that this foundational methodology clearly embraces the area of workforce development in Section B – 6 which considers "the development and active utilization of human resource and organizational capacity." (50)

Likewise, the Malcolm Baldrige National Quality Award program has recognized the vital role of workforce development in achieving organizational excellence. Over the years, the Baldrige program has gone through various iterations and the terminology has sometimes shifted, at times referring to "human resources" and at times referring to "workforce", but the

fundamental realization regarding the vital role of people in understanding and applying quality methods has remained constant.

The focus on workforce development in Japan's Deming Prize and the Baldrige Program is likewise seen in other national, multi-national, and state quality award programs around the world. The European Foundation for Quality Management offers the EFQM Model which includes "succeeding through the talent of people" as a major enabler of organizational success. In this framework, organizations must consider "how the organization manages, develops, and releases the knowledge and full potential of its people at an individual, team-based and organization-wide level, and plans these activities in order to support its policy and strategy and the effective operations of its processes." (51)

Eserig-Tena and others have noted that while some organizations may use the EFQM framework out of imitation, significant internalization of this framework may be realized when an organization seriously focuses on the issues of workforce development and deployment. (52) And, Garberova has made the case for finding that the EFQM framework provides an effective yardstick for organizations to employ in improving their human resources programs. (53)

Similarly, workforce development as a component of a quality management system, has been embedded in the International Standards Organization's 9001 series on quality management for years. Early versions of the ISO 9001 quality standard emphasized the need to identify the training required for each job and task, gaps between training needs and actual capabilities, evaluation of the effectiveness of training, maintenance of training records, and evaluating how well people understood how their work contributed to quality outcomes. In this regard, ISO initially leaned towards the Sneden and Prosser view of technical training.

However, more recently, ISO evolved into the language of "engagement of people," focusing on the capabilities, well-being, and performance of people. Bolger has made the case for the development of employee competence and understanding of the organization's quality program as key components of the ISO 9001:2015 framework. (54)

Workforce development is closely connected to how the workplace is designed, especially around the issue of participation. Many insights have been provided in the area of "sociotechnical design" of organizations by the Tavistock Institute in Great Britain and the American Productivity and Quality Center in Houston, Texas. Eric Trist, P.G. Hurst, and Marvin Weisbord have all provided great insights into how workplaces can be redesigned to achieve high levels of employee involvement that result in high levels of performance and quality. (55) (56) Their work has spread throughout organizations around the world and has influenced the expectations for employee participation that impacts the area of workforce development.

Within the Baldrige Framework, organizations use a detailed set of questions that drive the process of self-evaluation, as opposed to using a prescriptive set of requirements. In the 2021 – 2022 version of the Baldrige Excellence Framework, organizations are expected to critically assess how they approach their workforce, which is defined as "All people actively supervised by your organization and involved in accomplishing your organization's work . . ." (57)

Using the Baldrige criteria helps facilitate workforce development for institutions and communities because it drives assessment of employers' needs, as well as an institution's capacity and performance in meeting those needs. In the Baldrige approach, organizations must consider the workforce's "capability "(Your organization's ability to accomplish its work processes through its people's knowledge, skills, abilities, and competencies.), "capacity" (Your organization's ability to ensure sufficient staffing levels to accomplish its work processes and deliver your products to customers, including the ability to meet seasonal or varying demand levels.), and "engagement" (The extent of workforce members' emotional and intellectual commitment to accomplishing your organization's work, mission, and vision.).

Within the context of the Baldrige Excellence Framework, workforce development is viewed from the broad perspective that was advanced by John Dewey in the early 20th century.

In the contemporary Baldrige Excellence Framework, organizations are prompted to answer the following questions as they seek to critically reflect on the capability, capacity, and engagement within their workforce. (58)

How do you assess your workforce capability and capacity needs?

How do you prepare your workforce for changing capability and capacity needs?

How do you organize and manage your workforce?

How do you ensure workplace health, security, and accessibility for the workforce?

How do you support your workforce via services, benefits and policies?

How do you determine the key drives of workforce engagement?

How do you assess workforce engagement?

How do you foster an organizational culture that is characterized by open communication, high performance, and an engaged workforce?

How does your workforce performance management system support high performance?

How does your learning and development system support the personal development of workforce members and your organization's needs?

How do you evaluate the effectiveness of your learning and development system?

How do you manage career development for your workforce and your future leaders?

How do you ensure that your performance management, performance development, and career development processes promote equity and inclusion for a diverse workforce and different workforce groups and segments?

7. Conclusion

Workforce Development is a complex discipline in and of itself which has a profound impact on the quality of processes and outcomes in any organizational setting. While quality professionals may not exercise supervisory control over the workforce development practices in their organization, they have a significant interest in ensuring that these practices meet the organization's needs and ensuring that the workforce development practices include the teaching of quality concepts. As a discipline, quality is the study of change. In addition to understanding how to prevent unwanted change by correctly performing specific jobs and tasks, employees need to recognize and prevent conditions that are adverse to quality, solve problems that arise from unwanted change, participate in the introduction of desirable change through continuous improvement of work processes, and even participate and contribute to wholesale change through the reinventing of processes in their workplace in order to help their organizations maintain and improve their competitive position.

Quality is about cognition, so it is important for quality practitioners to have an understanding of the types of education and training in quality concepts and methods that different people in different roles in the workplace need to understand. Concurrently, quality methods can be applied to workforce development practices to improve these practices, thereby enhancing the overall quality program and performance excellence in an organization.

Acknowledgement

The author has drawn upon several published articles to provide a holistic view of the issues related to the nexus of workforce development and quality. This includes "Turning on the Lightbulb" in *Quality Progress* (2015), "Learning About Learning" in *Quality Progress* (2018), "Quality and Cognition" from the Journal for Quality and Participation (2019) and "The Right Mix" published in *Quality Progress* (2021).

References

(1) Kaoru Ishikawa. Guide to Quality Control. Asian Productivity Organization, 1974.
(2) Joseph Juran. Managerial Breakthrough. McGraw-Hill, 1964.
(3) W. Edwards Deming. Quality, Productivity, and Competitive Position. MIT Press, 1982.
(4) John R. Dew. "Quality and Metacognition" *The Journal for Quality and Participation*. July, 2019.
(5) John Dewey. Democracy and Education. The Free Press, 1916.
(6) Sneden quote from Arthur Wirth. "Issues Affecting Education and Work in the Eighties" *Teachers College Record* (September 1977).
(7) Dewey.
(8) Walter Shewhart. Economic Control of Quality of Manufactured Product. Van Nostrand Co., 1931.
(9) Charles Kepner and Benjamin Tregoe. The New Rational Manager. Princeton Research Press, 1984.
(10) Joseph Juran. Juran On Quality Improvement Workbook. Juran Enterprises, 1981.
(11) Alex Osborn. Applied Imagination. Charles Scribner's Sons, 1953.

(12) William Gordon. Synectics. Harper & Row, 1961.
(13) Geinrich Altshullar. Creativity As An Exact Science. Gordon and Breach, 1984.
(14) Herman Kahn and B. Bruce-Briggs. Things To Come. Macmillan Co., 1972.
(15) John R. Dew. "Quality and Metacognition."
(16) U.S. Department of Commerce. *Pledge to America's Workers*, 2018.
(17) W. Edwards Deming. Out of the Crisis. MIT Press, 1982.
(18) Edgar J. Boone. Developing Programs in Adult Education. Prentice-Hall, 1985.
(19) Robert F. Mager. Preparing Instructional Objectives. Fearon Publishers, 1962.
(20) John R. Dew. Learning About Learning." *Quality Progress*, July 2018.
(21) J.M. Juran. Juran On Leadership for Quality. Free Press, 1989.
(22) Ibid.
(23) Philip B. Crosby. Quality Without Tears. McGraw-Hill, 1984.
(24) Kaoru Ishikawa.
(25) Juran.
(26) Joseph Juran. Managerial Breakthrough. McGraw-Hill, 1964.
(27) Nancy Mann. The Keys to Excellence: The Story of the Deming Philosophy. Prestwick Press, 1985.
(28) Juran.
(29) Crosby.
(30) John R. Dew. "Turning on the Lightbulb" *Quality Progress*, July, 2015.
(31) Mezirow, Jack. Fostering Critical Reflection in Adulthood. San Francisco: Jossey-Bass, 1990.
(32) Ibid.
(33) Altshuller.
(34) Boud, D., Keogh, R., and Walker, D. (eds) Reflection: Turning Experiences into Learning. Routledge & Kegan Paul, 1985.
(35) Dewey, John. How We Think. New York: Prometheus Books, 1991.
(36) Freire, Paulo. The Politics of Education. South Hadley, MA: Bergin & Garvey Publishers, 1985.
(37) Deming, W. Edwards. Quality, Productivity, and Competitive Position. Boston: MIT Press, 1982.
(38) Crosby, Philip B., Quality Is Free. New York: New American Library, 1979.
(39) Freire.
(40) Whitehead, Alfred North. Process and Reality. Macmillan Co., 1929.
(41) Horton, Myles. The Myles Horton Reader. Knoxville: University of Tennessee Press, 2003.
(42) Deshler, David. in Fostering Critical Reflection in Adulthood. San Francisco: Jossey-Bass, 1990.
(43) Brookfield, Stephen. Developing Critical Thinkers. San Francisco: Jossey-Bass, 1987.
(44) Burns, Leah. in Wild Fire: Art as Activism. Toronto: Sumach Press, 2006.
(45) Lewin, Kurt. Field Theory in Social Sciences. New York: Harper & Brothers, 1951.
(46) Rickover, Hyman. Education and Freedom. New York: E. P. Dutton and Company, 1959.

(47) Kepner, Charles, and Tregoe, Benjamin. The New Rational Manager. Princeton: Princeton Research Press. 1997.
(48) Gano, Dean. Apollo Root Cause Analysis. Richland: Apollonian Productions, 2007.
(49) Learnradicalquality.com
(50) www.juse.org.jp/deming-en/challenge/03.html
(51) www.efqm.org/
(52) Ana B. Eserig-Tena et. al. "Drivers and internalization of the EFQM excellence model." *International Journal of Quality and Reliability Management.* Vol 36, Issue 3. March, 2019.
(53) Miriam Garbarova. "Improving human resources management using the EFQM Excellence Model." *International Journal of Organizational Leadership.* June, 2017.
(54) Bruce Bolger. "Human Capital is Critical to ISO 9001:2015 Success" *Quality Digest*. February, 2018.
(55) P. G. Hurst. Autonomous Group Functioning. Tavistock Publications, 1962.
(56) Marvin Weisbord. Productive Workplaces. Jossey-Bass, 1987.
(57) NIST. Baldrige Excellence Framework 2021 – 2022. NIST. 2021.
(58) Ibid.