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It's Mastery, not Magic: Blueprint for Enhancing Safety Culture

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Abstract

It's a new era for safety culture. Gone are the days of perceiving culture as a static, top-down pyramid where training is considered a check-off-the-box to-do that transforms performance into being "safer" after a single dose of learning. Peak safety competence doesn't happen overnight, like magic; it's cultivated. Safety is a journey, and the road to get there requires longevity, consistency, and commitment fuelled by continuous learning. Its practices are embedded into the organization's culture, largely manifested by how management codifies knowledge, and learning and development.

This paper explores the definition of a learning culture, the value of knowledge management, and the benefits of using technology to facilitate continuous learning. Practical tips and real-life examples of learning and development programs that positively impacted safety culture will be shared. Top three components of a learning and development plan will be identified to reveal a blueprint to improve your organization's safety culture.

1. Introduction

The 2005 Texas City Refinery explosion in the United States and the Buncefield fire in the United Kingdom led to legislative changes that drove corporate safety culture to the foreground of process safety. Media coverage and public opinion shifted, calling for workplace safety an ethical responsibility of a corporation. It instilled a moral imperative that demanded that organizations do better to protect their people, surrounding communities, the environment, and society at large. From a certain point-of-view, this was considered the "humanizing" of an organization. Ironically, automation and other new technologies are commonplace and have introduced new risks. Change is also constant, and with this digitalization comes more competition and regulation, especially in today's tightening market. As such, process safety is subjected to a myriad of new operational and regulatory challenges.

It's a new era for safety culture. Gone are the days of perceiving culture as a static, top-down pyramid where training is considered a check-off-the-box to-do that transforms performance into being "safer" after a single dose of learning. Peak safety competence doesn't happen overnight, like magic; it's cultivated. Safety is a journey, and the road to get there requires longevity, consistency, and commitment fuelled by continuous learning. Its practices are embedded into the organization's culture, largely manifested by how management codifies knowledge, and learning and development. As an industry, this work is never-ending. We still have a lot to do, as evidenced by the Coalition of Accident Prevention, which claims that, on average, an industrial chemical accident happens every 2 days in the US.[i]

Organizational learning and development (L&D) programs are fundamental to fostering a proactive safety culture to help prevent and reduce incidents. This paper explores the definition of a learning culture, the value of knowledge management, and the benefits of using technology to facilitate continuous learning. It draws from an organizational development (OD) perspective to apply theory to process safety practice. The success of an L&D program is dependent on three key components, as will be demonstrated, that form a blueprint to improve an organization's safety culture.

2. [Process] Safety Culture: A Definition

The concept of a corporate safety culture was first used in 1987 in an Organisation for Economic Co-operation and Development (OECD) Nuclear Agency report on the Chernobyl disaster.[ii] Interpretation and confusion surround the definition of a "safety culture" or "process safety culture" (terms will be used interchangeably). This is likely because the concept of culture is also open to many – often subjective – definitions. Case in point: Merriam-Webster dictionary contains six definitions of the word "culture" as a noun. Understanding safety culture does require defining organizational culture as a starting point. Drawing from leading OD scholars Terrence E. Deal and Allan A. Kennedy, the concept of organizational culture is defined as "the way we do things around here".[iii] Organizational culture is embedded through shared beliefs, values, rituals, and behaviors consisting of multi-levels[iv,v]. Contemporary OD literature maintains that organizations have many subcultures. Thereby safety culture is a subculture that is influenced and impacted by the organizational culture.

Although Deal and Kennedy's concept is one of the earliest definitions first appearing in their book Corporate Cultures: The Rites and Rituals of Corporate Life, published in 1982, it continues to stand the test of time and is frequently referenced. Even the American Institute of Chemical Engineers (AIChE) Center for Chemical Process Safety (CCPS) draws on it when defining process safety culture:

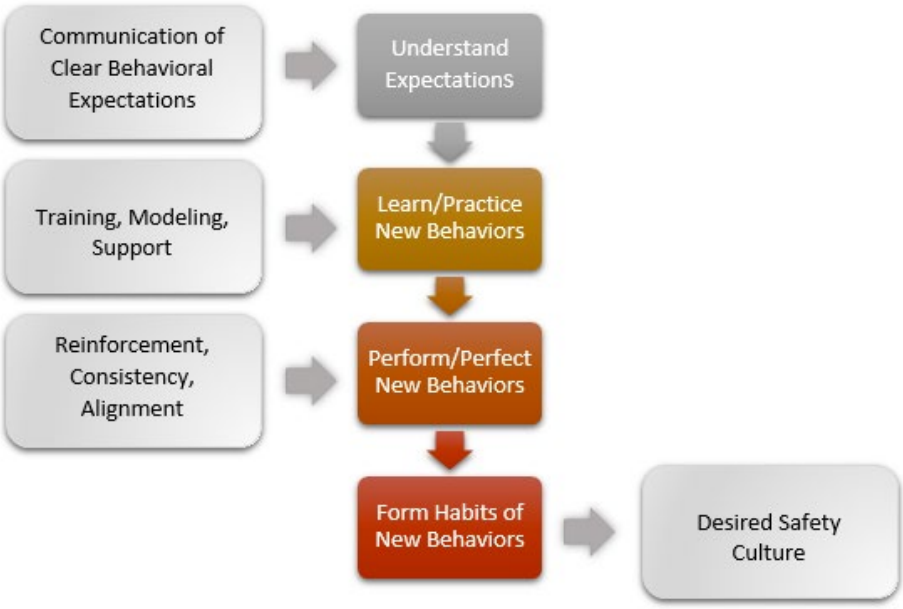
"Process safety culture has been defined as 'the combination of group values and behaviors that determine the manner in which process safety is managed'. More succinct definitions include, 'How we do things around here,' 'What we expect here,' and 'How we behave when no one is watching.'"[vi]

CCPS outlines ten core principles of process safety culture in *Essential Practices for Creating, Strengthening, and Sustaining Process Safety Culture* (2018). Discussion of each principle is beyond the scope of our paper, however noteworthy as they touch on an act or behavior. According to CCPS, a "sound or strong positive process safety culture is the pattern of shared written and unwritten attitudes and behavioral norms that positively influence how a facility collectively supports…its PSMS, resulting in preventing process safety incidents"[vii]. Behavior and collectiveness

are also highlighted by the U.S. Department of Energy (DOE): "In a strong safety culture, there is reinforcement, consistency, and alignments that help everyone perform and perfect new behaviors".[viii]

`How is this accomplished? It requires cultural change, which calls for behavioral change. As CCPS explains, "successful cultural change requires that expectations of new attitudes and behaviors be communicated and reinforced"[ix]. DOE well illustrates this statement in Figure 1:

Figure 1: DOE's Process for Changing Behaviors to Change Culture



Source: The Center for Chemical Process Safety (CCPS) of the American Institute of Chemical Engineers (AIChE), Introduction to Process Safety Culture. Accessed 15 May 2023

Attitudes and behaviors must be adopted and hence learned to stimulate positive change. Learning impacts action, which translates into improvement to enhance safety systems and performance. Thereby it reasons that organizations need to foster a learning culture mindset to build and sustain a proactive safety culture.

3. Toward a Learning Culture

Similar to the terms "culture" or "safety culture," there also is no universally accepted definition of a "learning culture". Simply put, a learning culture is a corporate environment that supports and

encourages continuous learning. This environment actively creates learning opportunities, and the group is receptive to learning and growing, which enriches engagement in return. It's become synonymous with "learning mindset" or "growth mindset". Although an in-depth discussion is beyond the scope of this paper, it is worth noting that a learning culture or culture of learning is not to be confused with a learning organization, which is far more substantive and systemic. However, adopting a learning culture puts the company on the path to becoming a learning organization. In recent years, the Association for Talent Development has devised a particularly good definition:

"A culture of learning, or learning culture, is one in which employees continuously seek, share, and apply new knowledge and skills to improve individual and organizational performance. The importance of the pursuit and application of learning is expressed in organizational values and permeates all aspects of organizational life."[x]

Applying this to process safety equates learning to competency, and safety is immersed as the concept of performance. The route to positive safety change is learning.

Not surprisingly, the underpinning of a learning culture is learning. Edgar Schein, the forefather of the field of organizational culture, states:

"The learning culture must have in its DNA a 'learning gene,' in the sense that members must hold the shared assumption that learning is a good thing worth investing in and that learning to learn is itself a skill to be mastered".[xi]

Therefore, learning must be embedded. It needs to become part of the organization's framework within the organizational levels that make up the broader culture of the organization. Based on a review of scientific literature, for it to be successful, it's a necessity that the embedment occurs within all three levels of an organization: organizational, team, and individual, as summarized by the Chartered Institute of Personnel and Development (CPID) 2020 report on *Creating Learning Cultures: Assessing the Evidence*[xii]. In short, learning needs to become part of 'the way we do things around here'; integrated into daily organizational life, continuously promoted and practiced.

The process of becoming a learning organization takes dedication and time. OD literature suggests that it involves acquiring and interpreting information to transform it into knowledge[xiii], meaning something actionable that can boost and improve performance. Again, it is imperative to reiterate that the transformation of knowledge needs happen across and within all three organizational levels – not at the same time. Still, for this process to materialize results and for the organization to develop a learning culture, this transformation and sum of knowledge are fundamental.[xiv] This exchange is representative of knowledge sharing and identifies the value of knowledge as an asset. This process of converting information into knowledge and its relation to improvement also reinforces the notion

that learning needs to be continuous. Secondly, it raises the importance of preserving this knowledge to ensure that new learning is absorbed into the overall organizational culture.

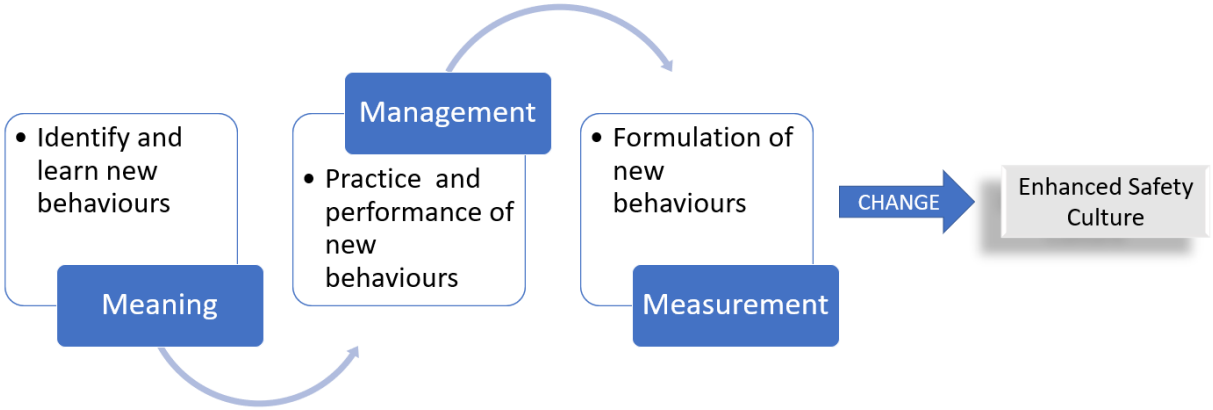
For process safety, it's vital to ensure that competence and lessons learned are passed on and preserved to help prevent near-misses and process incidents, thereby underscoring the significance of knowledge management. Knowledge management refers to how an organization classifies, stores, and disseminates information.[xv] If you will recall in Figure 1, there are three pillars (communication of expectations, training, reinforcement) central to cultivating new behavior actions to develop a strong culture, and they require a strategy to share and manage knowledge.

Advances in technology provide a major benefit for organizational knowledge sharing and the management of knowledge. The internet, video technology, and learning management systems enable organizations to create and disseminate information relatively easily and quickly. Changes in technology have also made knowledge management and sharing more economical and feasible for organizations regardless of location or size. Furthermore, as technology is deeply emersed in daily life, the adoption curve tends to be less steep than it would be for organizations even five to ten years ago. Technology also enables the crucial elements of consistency and alignment, portrayed in Figure 1, to play a key role in affecting behavior that leads to safety culture change. The benefits will become even more apparent when highlighted in the Examples section of this paper.

4. The 3Ms Blueprint: Meaning, Management & Measurement

The intent of this section is to present a blueprint for an L&D framework to enhance safety culture. This blueprint is loosely based on David Garvin's work on learning organizations published in the Harvard Business Journal in the 1990s. It was undoubtedly influenced by the theory of process or continuous improvement. Garvin believed that organizations failed to evolve into learning organizations because they lacked addressing three critical issues, known as the 3Ms: meaning, management, and measurement.[xvi] He considered these foundational. Organizations often could not define, establish, or articulate two of the three components: they struggled with meaning and measurement. Suppose a culture of learning is the path to becoming a learning organization; these components are the backbone of this framework. In that case, it reasons these components can be effective when applying an L&D framework to improve an organization's safety culture (see Figure 2).

Figure 2: Safety Culture L&D Framework (ioMosaic)



Source: ioMosaic Corporation

This examination of culture and learning earlier in this paper should have illuminated the significance of meaning. For new safety values, behaviors, and habits to be adapted and developed, they must be impactful to be perceived as meaningful and relevant. The role of meaning and its relationship to culture and learning was recently emphasized by Dame Judith Hackitt at the Institution of Chemical Engineers (IChemE) Hazards 32 conference in 2022 during a keynote presentation. When sharing her perspective on overcoming systematic challenges and bias as an industry (paraphrasing):

'Early on in my [government/public] career, I said…There are no new accidents; just different people making the same mistakes because of a failure to learn…now I've revised it to: There are no new accidents; just different people making the same mistakes because of the failure to recognize the relevance to them of other people's experience, and therefore not learning.'[xvii]

For lessons to be learned and information to convert to knowledge, they must be relevant and hold meaning on a personal level to prompt change. Our experience indicates that employee engagement and participation are helpful in both establishing and strengthening relevance and meaning. Establishing an L&D framework that focuses on finding what is meaningful for individuals, teams, and organizationally, and ways to increase and articulate its relevance on a personal level, should, in theory, result in encouraging forming new behaviors and values that will positively affect and respect safety.

The second component of the framework aimed at enhancing safety culture is management – as in knowledge management. Knowledge and information must be appropriately captured, stored, and

shared to maximize and preserve learning. This framework should encompass people-based knowledge as well as process or systems-based knowledge. It is advisable to embrace technology as the knowledge manager and knowledge-sharing tool. When considering what strategy or tools to implement, consider the passage of time and succession because it needs to be resilient to employee retention, silos, and organizational growth (aka scalable). New technology is beneficial toward this end, and its role in developing and maintaining a safety culture will be explored next.

Measurement is the last component of this framework. Without analysis, progress is unlikely and self-defeats the purpose of improvement. Yet, culture itself is hard to measure. Instead, learning progress and activity can be tracked and monitored by gauging the overall health or state of safety and learning outcomes. More than ever before, technology is making the complicated and daunting challenge of assessing progress and learning levels not only a reality but a relatively effortless one. With the right technology, organizations can map knowledge, identify gaps, and assess competency, all core safety awareness and performance indicators. Access to this information, in return, supports fostering and sustaining a culture committed to safety.

5. Level Up Safety Culture: Examples and Actions

This section describes three practical examples, with actionable tips, from a “good start” to “better” and “ideal” for safety culture development, highlighting technology as a tool to enhance L&D programs for process safety.

5.1 Good: Safety awareness

Creating a program to increase safety awareness is an excellent starting point for organizations to establish a safety culture. It is also good practice for mature organizations to improve or sustain their culture. Our experience suggests that integrating a Safety Moment into weekly or monthly meetings is effective. Consistency is key to its success. Starting or concluding a safety, team, department, or company-wide meeting with a Safety Moment reinforces desirable attitudes on and behaviors toward safety.

There are many great resources on historical lessons and incident summaries available in text or video format, including AIChE Process Safety Incident Database (PSID), IChemE Lessons Learned Database (LLD), Process Safety tv® (ioMosaic), and the U.S Chemical Safety Board (CSB) incident reports and videos to name a few. Information can easily be shared during team meetings and circulated before or after the meeting. This program must encourage participation. Assignment to present a Safety Moment should be rotated amongst the team as a best practice. Overall, this program aims to encourage dialogue and consistency to keep safety top-of-mind.

5.2 Better: Competency development

Investing in a Learning Management System (LMS) is an efficient strategy to increase organizational safety competency successfully. It signifies that learning is a core organizational value, laying the groundwork for learning and safety to be embedded into its culture. An LMS is a software tool for delivering, creating, and managing training. This technology has two unique aspects, which are why it is considered a more engaging and beneficial tool for building and maintaining a safety culture. The first reason is that being technology-based, it integrates learning into the flow of work, making it easily accessible to all employees. The integration should make adapting new attitudes and behaviors more natural and easier for employees. The second reason is that the LMS technology can personalize or tailor learning. The LMS is considered a learner-centric technology because the learner determines learning duration and pace. This functionality boosts engagement by making the learning experience more personal and hence aims to generate more meaningfulness. The LMS technology can also customize or tailor learning as content can be targeted to specific learners or selected by the learner – or both.

In our experience, microlearning is a powerful approach to establishing and maintaining safety competency. Microlearning is a type of eLearning where a complex topic (i.e. training course) is broken down into bite-sized content (i.e. learning modules). These are typically presented as video content within an LMS. Currently, a limited number of providers, such as Process Safety Learning® (ioMosaic), offer a safety catalog or library of safety content for an LMS. Learning occurs incrementally; in other words, it happens continuously over time and is indicative of the notion of continuous learning, which is at the heart of a learning culture. Microlearning is well suited to safety because safety is commonly referred to as a journey, and the LMS supports this journey with continuous opportunities to increase safety awareness, advance core competencies, and improve safety competency throughout an entire organization.

5.3 Ideal: Learning Ecosystem

Many companies take a reactive approach to safety and only address it after being issued a citation for a compliance requirement, experiencing a near-miss, or worse, after an incident causing fatality. Using an LMS is a proactive approach to safety because it promotes learning, as discussed in the "Better" example (5.2), which fosters a safety culture. However, this can be elevated one step further by incorporating knowledge sharing. Retaining people-based knowledge, especially their experiences and lessons learned, and communicating it across an organization is critical to developing and maintaining an organization's safety culture. For safety to be fully embedded into an organization's culture requires the establishment of a learning ecosystem where employees participate in the development – and not just the consumption of learning. It should be noted that we advocate a combined library of licensed safety content alongside company-created content.

Therefore, employees must co-create content (i.e. learning modules/training material) that is to be consumed as eLearning on the LMS and share their expertise and valuable experiences. Embracing a participatory framework leverages an LMS to its fullest potential.

An LMS supports many media types, from videos (i.e. webinars or training materials) to PowerPoint presentations, podcasts, and process or procedure documents. The tool also makes the process of uploading and disseminating the content straightforward. Our experience suggests that video modules are the most compelling. This content doesn't necessarily need to involve a full production team. Often, uploading an existing recorded webinar or recording content via MSTeams, Zoom, etc. works well. The goal is to create or adapt content that generates participation to maximize knowledge sharing across the organization. It is also an excellent strategy to expand your organization's learning catalog continuously. Having your employees write and be part of the filming of a learning module heightens engagement and makes the process more meaningful. The inclusion of familiar faces in these narratives aims to dispel the "not me, not my problem" attitude or "it can never happen here" perception generating a new level of identity, intimacy, and relatability to breed meaning that leads to altering attitudes and, ultimately, behaviors. It is also strongly recommended to include content dedicated to near misses at your facility and share solutions to challenging operational or technical issues to once again make the content more relevant, evoking a sense of meaningfulness for your team to prompt the start of behavioral change. Finally, a high-quality LMS offers analysis and key performance indicators (KPIs) to manage and measure competency, fully closing the loops as a learning ecosystem.

6. Conclusion

A proactive safety culture demands consistency and action. It's not merely a discussion. It perceives safety as a benefit and is respected by employees, not as a burden. It's about commitment, not simply awareness. The journey toward safety requires endurance, reinforcement, and continuous learning opportunities. This paper has presented an L&D framework powered by three components – meaning, management, and measurement – to embed safety into the organizational fabric for leadership teams to nurture a strong process safety culture. The framework establishes learning as a core organizational value and preserves knowledge management to encourage the adoption of new attitudes and prompt safer behavior. Technology, such as an LMS, is advantageous toward this cultivation, stewarding information into an asset whereby knowledge is actively learned and shared across an organization. In this new era of safety culture, organizations have the tools and expertise to shift from awareness to engagement and action.

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