



**MARY KAY O'CONNOR
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When Knowledge Transfers: Connecting Lessons Learned to Organizational Memory

Kristin A. Robbins
ioMosaic Corporation
1800 Bering Drive Suite 950, Houston, TX 77057
robbins.k.tx@iomosaic.com

Kiersten Slater
ioMosaic Corporation
1800 Bering Drive Suite 950, Houston, TX 77057
slater.k.tx@iomosaic.com

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Abstract

“Accidents are not caused by lack of knowledge, but by a failure to use the knowledge that is available.” – Safety pioneer Trevor Kletz

Trending data and analysis of investigation reports suggest that many organizations are failing to learn from accidents, as Dr. Kletz famously stated decades ago, leading to similar incidents. At times, this failure to learn from mistakes can result in an even larger and more catastrophic event. The challenge that we as a process safety community face is: How do we collectively learn to proactively preserve knowledge to prevent incidents and avoid history repeating?

This paper will explore the importance of lessons learned and offer three practical strategies to foster learning, preserve knowledge, and sustain organizational memory to improve safety. Several theoretical concepts from a Health, Safety, and Environmental (HSE) context and an Organizational Development (OD) perspective will be included.

We will consider approaches to managing safety and organizational knowledge in daily operations and after an incident. Lastly, we will highlight the benefits of technology as a driver of engagement and knowledge transfer to enhance organizational memory and safety.

Introduction

Chemical and energy sectors continue to experience similar recurrent incidents and accidents despite best practices and a dedication to safety. Competence and lessons learned need to be shared and passed on to mitigate near-misses and events. Yet, it has been found that a corporate memory of an accident tends to diminish after a mere three years. This raises the question: What is missing? As an industry committed to continual improvement, we must ask ourselves what is lacking in our approach and explore ways to preserve knowledge effectively to prevent incidents, save lives, and avoid repeating history. This paper examines this topic to answer the question through a fusion of HSE and OD perspectives. We propose three practical strategies to enhance the learning process and to preserve knowledge:

- Establishing safety as a core organizational value
- Implementing the LFI model following an incident or near-miss
- Developing a robust knowledge management system

The role of technology and its benefits as an engagement driver and knowledge booster will also be discussed. By implementing these strategies, the aim is to ensure that valuable lessons are not only learned but rather retained long-term; hence it's about sustaining organizational memory to improve safety.

Embracing Change: The Role of Communication in Learning

Effective communication is integral to keeping facilities safe. Often, organizational communication becomes more significant in the days or weeks after an incident or near-miss. It is during this time that the impact is deeply felt and the urgency to prioritize safety is highest. There is a possibility for information and feedback to be shared more openly, and a call for change as well as an emphasis on learning. However, Throness writes that organizational memory loss happens even with extensive communication.ⁱ In psychological terms, this loss is often referred to as the forgetting curve where memory weakens over time especially if it is something new, there is little integration of that information over time, or if the event or information shared holds little meaning.ⁱⁱ

It is important to note that sharing is not the same thing as learning. Change occurs via learning and not simply by the act of sharing. According to the Chartered Institute of Ergonomics and Human Factors (CIEHF), "If nothing changes in terms of the way the people in the organisation think, behave or react to future events and situations, nothing has been learned".ⁱⁱⁱ The statement lends itself well to how adopting an organizational development approach is an effective strategy to lead this as it is about creating culture change and having safety as a core value embedded into the organizational fabric. Once again drawing from CIEHF, we see how integral learning and change are:

"...Learning will only be enduring if change is embedded in a culture of learning and continuous improvement. This means a culture that is open and fair, where people value and are motivated to learn and make change for the better and where the entire organization is engaged in the learning process; learning and change are considered normal".^{iv}

Cultivating new behaviors requires a strategy beyond communicating and sharing; it's about managing and retaining knowledge. We maintain that both the starting point and essence of this lies within the foundation of an organization's culture. Therefore, influencing behavior begins by influencing culture. Organizational development is the gateway toward change. Once this foundation is firmly established, it provides the space for learning to become a core value – almost part of the organization's DNA. This then in return

provides a path toward preserving knowledge to ensure that any new learning or “lessons learned” are absorbed into the overall culture of an organization.

Organizational Culture and Development: Gateway to Change

According to the influential work of Dr. Edgar Schein, culture within an organization is exhibited at three different levels or layers: artifacts, espoused beliefs and values, and underlying assumptions.^v Artifacts are visible and physical, such as job titles, how employees dress, and signage (i.e., safety awareness posters). Espoused values and beliefs are the organization’s communicated and written norms and ideals (i.e. mission statement or corporate safety values). They are promoted as they are presumed to be important and meaningful and intended to guide behavior and decisions. Yet, often, there is a misalignment between the values and real behaviors. As for underlying assumptions, these are the deep origin of the values, which are ingrained, implicit, and not visible (i.e., favoring safety over performance, a perception that everyone plays a role in safety). They form over time though most often influenced by leadership.

This analogy is similar to an iceberg that is often used to represent this concept, where the surface level of what is seen is a small amount and characterized as being superficial in comparison to the large root that represents embedded aspects that are not visible to the human eye and may also be unconscious or unknown (and may be dangerous - catastrophic) to the group.

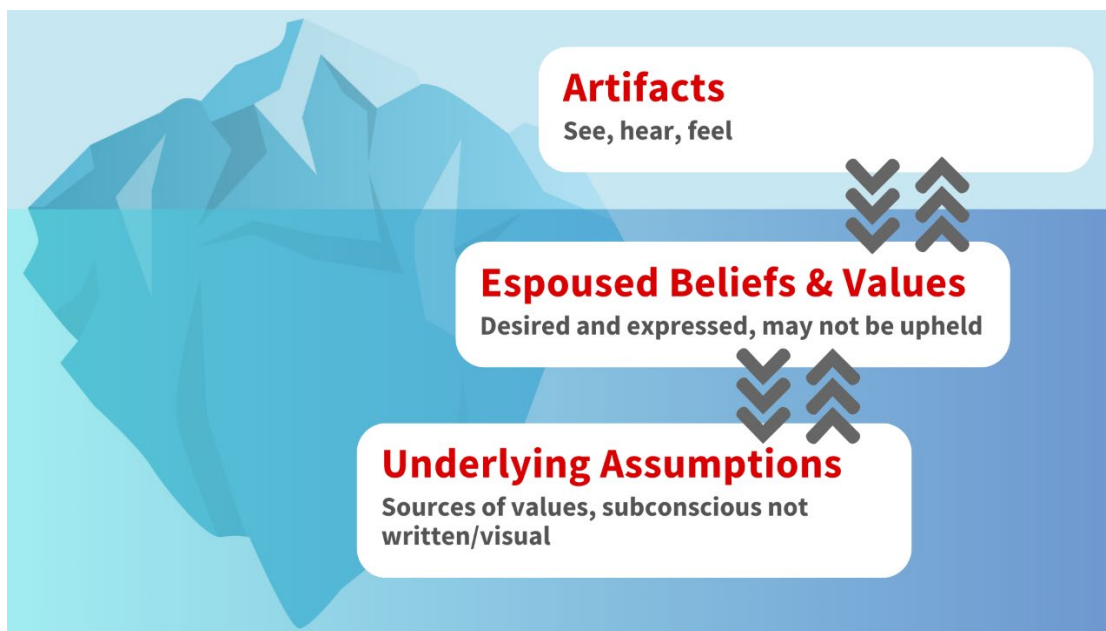


Fig. 1: Source based on E. Schein, Organizational Culture and Leadership (1985), ioMosaic Corporation.

Contemporary OD literature maintains that the basic underlying assumptions are the foundation of culture. It reasons that when we can influence these underlying assumptions, we can influence organizational culture and steer clear of any danger. However, to do this successfully requires dedication and understanding. According to Schein, although the underlying assumptions are the most difficult to influence when successful, they lead to culture change. Therefore, when the foundation shifts, behavioral change is possible. It is also important to emphasize that words are not enough. This is where the quote ‘actions speak louder words’ quite literally comes into play. Simply updating procedures or rebranding core values will not impact the foundation to create change. Safety must be ingrained – lived and seen – in everyday practices to become a core value. It needs to be incorporated into the company’s vision and strategic plans

to set up an expectation of excellence. There are many iterations of what comprise of this excellence. As it relates to culture, it needs to combine these components: strategy, assessment, coaching, and engagement.^{vi} The expectation of excellence is also not one dimension, it should involve individual, team/department, and organizational components. It needs to include compliance and competency, performance, behavioral, and attitude metrics and processes.

Leadership plays a crucial role in culture creation and change as Shein writes: “Culture is created by shared experiences, but it is the leader who initiates the process by imposing his or her beliefs, values, and assumptions at the outset”.^{vii} In other words, to impact safety culture, we need to influence our core underlying assumptions and leadership sets the tone. The values and expectations that make up these assumptions provide the framework for the entire team or organization to share responsibility in safety and to unify around it. These assumptions have a profound impact on behavior. It’s this powerful combination established by leadership that can hinder safety culture or proactively change and strengthen organizational safety if supported. Again, learning plays a pivot part in cultural change as according to Shein, “cultural change inevitably involves unlearning as well as relearning and is therefore, by definition, transformative.”^{viii} It reasons that an opportunity to instill a proactive learning environment can be developed through this change, one that supports and encourages knowledge sharing and safety. The objective now becomes how can an organization successfully take this learning, especially within the context of this paper, a lesson learned, and retain it? We maintain that a successful transfer of knowledge requires adaptation of a model to increase the likelihood of organizational memory and retention.

Implementing Lessons Learned into Organizational Memory

There is much literature that supports the notion that the process of learning from incidents empowers organizations to become more proactive in managing risks and preventing future incidents. An approach that is well-documented and endorses a learning environment focused on safety is a Learning from Incidents (LFI) process model. For effective learning to facilitate organizational change, it must be woven into the entire lifecycle of an incident or near miss, rather than being treated as a final step following an incident.^{ix} We understand this to signify that it should be embedded within the culture of the organization, which connects to the OD theory discussed earlier.

This methodology is designed for organizations to thoroughly analyze the root causes and consequences of incidents to prevent the recurrence of similar occurrences. The LFI model is considered an effective formula to derive lessons from incidents by steering organizations through distinct phrases of learning.^x The objective is to transform incident information into knowledge that is retained within the organization, potentially leading to modifications in behavior or processes that improve safety.

The LFI model is broken down into multiple stages: acquiring information, investigating and analyzing the incident, planning interventions, intervening, and evaluating the effectiveness of the actions and the learning process itself. This process intrinsically fosters continuous improvement and learning through reflection and adaptation. This will become evident through an examination of each stage as follows.

The initial stage (acquiring information) begins with the reporting of an incident and recognizes the noteworthy aspects of the situation to learn from. This stage collects input for the learning process. This includes collecting data on incident: what happened, where it occurred, who was involved, and all other relevant information.

Investigating and analyzing is the second phase of the LFI model. This step includes defining the investigation’s complexity and scope, collecting evidence, and performing analysis. It also involves

interviewing witnesses, examining data, and piecing together the events that led to the incident. During the analysis, the gathered data helps identify the root causes and factors that contributed to the incident. Common tools for finding potential causes include root cause analysis, fault tree analysis, and human factors analysis, which help uncover equipment failures, human errors, systemic issues, and organizational factors. For LFI to be effective, it is important to understand both the immediate and deeper causes of the incident, as well as ways to prevent similar occurrences in the future. The best outcomes are from insights based on factual data rather than personal biases or assumptions.

The planning interventions stage involves the development of an action plan and recommendations based on the analysis findings. This helps determine the priority and urgency of corrective actions. Recommendations address root causes, and any contributing issues identified during the incident investigation. These recommendations include procedural, equipment, training, and organizational culture changes that prevent similar incidents from occurring. A key part of this stage is prioritizing and selecting corrective actions that are presumed to be the most effective. Corrective actions must be based on the data and evidence gathered during the incident investigation. Each proposed action must undergo a comprehensive risk assessment to evaluate the potential risks associated with its implementation or lack thereof. The effectiveness of corrective actions can be assessed using a prioritization matrix that compares criteria such as impact, resource requirements, feasibility, and urgency. Through integrating these approaches, it becomes possible to identify the actions that yield the most significant potential benefit.

Implementation of the proposed action plan and recommendations developed during the analysis occur during the intervening stage. Actions or recommendations might include allocating time, money, resources, updating procedures, providing training, and making any needed modifications to a system or process. For a successful intervention implementation, there must be effective communication and collaboration.

The last step of the LFI is to assess how well the action plan worked and to make recommendations. If any of the actions performed were ineffective, the reasons behind the ineffectiveness should be identified and evaluated. The lessons learned should be incorporated into the organization's practices and procedures. The end-goal of this stage is a clear change in behavior and/or technical processes that will boost overall safety performance.

We believe that the LFI methodology is key for improving organizational memory and preserving knowledge. Organizations become more flexible, innovative, and efficient at managing risks and achieving their safety. Through investigation and analysis, facilities can acquire beneficial knowledge about potential risks, failures, and improvement opportunities. This knowledge then becomes part of the organization's memory and influences future decisions to help prevent similar incidents from occurring. An added bonus to following a LFI model process, is that an organization can collect a repository of information that can be accessed and referenced going forward. LFI allows organizations to preserve and leverage knowledge from previous incidents to facilitate learning, build resilience through training, and drive continuous improvement.

Knowledge Management: Harnessing Technology for Effective Preservation of Corporate Memory

Retaining and maintaining corporate knowledge is integral for an effective process safety management system, according to the Center for Process Safety (CCPS), helping to safeguard operations and avoid disasters.^{xi} Knowledge, therefore, needs to be captured, documented, and easily accessible. A strong knowledge management system can effectively preserve knowledge and combat loss of corporate memory

establishing a robust systemic process for knowledge, that is supported by leadership. In turn, the system bolsters safety as a core value.

Staff often struggle with identifying and capturing crucial knowledge. This is where the utilization of technology can prove advantageous. Software such as Process Safety Enterprise® (PSE), is an electronic data tracking and storage solution with well-defined workflows, robust documentation and information management features that eliminate uncertainties. It's suitable for helping teams identify, capture and retain corporate knowledge. Case in point: best practices suggest that Management of Change (MOC) within organizations is most effective when documented electronically. An MOC is a crucial aspect of the Occupational Health and Safety Administration (OSHA) Process Safety Management (PSM) 29 CFR 1910.119 regulatory standard – a standard that many organizations fall under and need to comply with. A high-quality information management solution effectively maintains an electronic MOC workflow that ensures compliance with OSHA's PSM standard. Utilizing a document control system similar to this that readily stores and retrieves documents creates customizable forms, includes action tracking to manage all tasks related to the MOC – can support with capturing and retaining this much needed corporate knowledge. Technology like PSE is aimed at the continual improvement of systemic processes by boosting and preserving of knowledge contributes toward safeguarding corporate memory and provides the framework for lessons learned to be integrated into the process lifecycle.

When combined with an information management solution, a Learning Management System (LMS) helps link compliance and competency to corporate memory. Its technology also facilitates the sharing of lessons learned internally, making it cost-effective, accessible and relatively simple to integrate. A top-tier LMS like Process Safety Learning® (PSL) contains a catalog of PSM topics and specific incidents, making connections between internal learnings and external incidents a reality to encourage engagement and reinforce lessons learned into the fabric of an organization. The centralized nature of this type of tool ensures that all employees have access to corporate knowledge and preserves it for future generations.

Conservation and effective knowledge management is vital for guaranteeing a vigorous process safety management system and safeguarding against possible operational hazards. Making knowledge easily accessible is essential in retaining collective memory and encouraging a safety-centered atmosphere at all levels of an organization. Integrating advanced technologies contributes immensely to this effort. Organizations can substantially expand their capacity to document and share safety insight, ultimately strengthening their safety processes and continuous improvement through leveraging these tools. Utilizing these systems not only addresses the issue of knowledge management but also contributes to a culture of safety and operational quality.

In Conclusion – As Memory Serves...

Ultimately, the recurrence of incidents in the chemical and energy sectors, even with a strong devotion to safety, reveals a significant shortfall in managing and retaining knowledge. This paper explored various approaches to improving learning and maintaining knowledge, including the need to prioritize safety as a core organizational value, adaptation of the LFI model, and implementation of comprehensive knowledge management systems. Effective communication and cultural development play critical roles in this process as they reinforce the successful integration of lessons learned into organizational memory.

While improved communication is essential, a fundamental shift in organizational culture is necessary to address the issue of weakening corporate memory. Utilizing high-quality technology solutions can embed safety deeply into an organization's fabric and lead to more knowledgeable personnel. These solutions offer many benefits through their ability to spread crucial safety information and help to create a continuous

improvement culture. Integrating these strategies and tools transforms how organizations learn from previous incidents and ensures that valuable lessons are effectively preserved and applied. This, in turn, fosters a proactive learning environment where safety is ingrained into organizational culture, leading to enhanced quality of operations and a commitment to preventing future accidents. Ultimately, these methods allow industries to achieve a safer and more efficient environment, where past experiences meaningfully contribute to everyday safety and excellence.

Keywords: Learning from Incidents, Process Safety Competency

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