Lessons Observed

Key Points

- Historically, lessons learned processes have been founded on three elements: collection, documentation, and communication.
- A more robust and effective lessons learned process includes a number of additional steps and avails itself of the deeper insights enabled by artificial intelligence (AI).
- Lessons observed do not become lessons learned until one routinely does something different.
- Lessons—positive or negative—are gained only from experience.

Introduction

The expression goes that "we learn through our mistakes." But do we? Equally important, do others learn through our mistakes or is "history destined to repeat itself"?

The engineering, design, and construction industry is replete with lessons learned programs at industry, corporate, and professional organization levels, yet we repeat the same mistakes—despite having observed them before and being fully aware of the methods to address them. We confuse lessons *observed* with lessons *learned*.

In this Executive Insight we look at where the traditional lessons learned process may fall short. Some strategies are suggested to improve the translation of lessons observed into real lessons learned.

Lessons Learned Process

For years, lessons learned processes have been present in industry project management bodies of knowledge, such as the Project Management Institute's *Project Management Book of Knowledge* (PMBOK). These processes, in fact, have been broadly adopted into a variety of industries beyond the engineering and construction industry.

Table 1 presents a comparison of (1) historical elements of a lessons learned process, (2) the most recent guidance from the Project Management Institute as reflected in its PMBOK, and (3) the author's personal executive insights into this important management process.

Table 1 Lessons Learned Comparison		
Historical Elements	**PMI's PMBOK Guidance**	**Executive Insights**
	Identify comments and recommendations (positive and negative lessons)	**Identify** comments and recommendations (positive and negative lessons)
		Identify associated contextual patterns and constraints (artificial intelligence (AI)-enabled)
		Identify associated precursors, precedence, correlations, couplings, and root causes (AI-enabled)
Collect	**Collect**	**Collect**
		Categorize and Prioritize
Document	**Document**	**Document, including associated context** and patterns
		Validate findings and conclusions from multiple perspectives
Communicate	**Share**	**Communicate contemporaneously**, continuously, and broadly. Follow-up
	Analyze and Organize	**Analyze for root causes** and predictive features (AI-enabled)
	Store	**Store validated lessons learned** and finding and context (**Knowledge Management**)
	Retrieve (Key Word)	**Semantic Analysis**
		Institutionalize lessons learned in best practices
		Assimilate lessons learned/ best practices in operating policies, processes, and procedures
		Actuate use of lessons learned through knowledge assemblies
Typically performed at **end of project**	Typically performed **at end of project or significant phase or milestone**	**Performed continuously** in support of continuous process improvement

Historically, lessons learned processes have been founded on three elements: collection, documentation, and communication. Table 2 presents examples of worldwide events where lessons were observed and in some cases learned.

Table 2. **Examples of Lessons Observed vs. Learned**
SARS
H1N1 influenza virus pandemic
Ebola
Zika
COVID–19

The Project Management Institute in subsequent editions of its PMBOK has progressively upgraded its guidance on the elements of an effective lessons learned process to include identification, collection, documentation, sharing analysis and organization, storage, and key word-based retrieval. Each of these process outlines, however, falls short of what an effective lessons learned process demands. Each also falls short of taking advantage of artificial intelligence (AI)-enabled technologies and processes.

This Executive Insight suggests that a more robust and effective lessons learned process include a number of additional steps and avail itself of the deeper insights enabled by AI.

Additional Steps and Deeper Insights Enabled by AI

This enhanced process is focused on moving well beyond mere observation of lessons to be learned to their actualization in broader enterprises.

Key steps in this expanded process include:

1. **Identification of comments and recommendations that can be associated with or translated to either positive or negative lessons learned.** It is important to recognize and capture policies, processes, procedures, and practices that contribute to elements of success—not just those associated with underperformance or failure.
2. **Identification of factors associated with potential lessons learned cannot be considered in isolation.** A clear understanding of their context, associated patterns, and affecting constraints also is essential if we are to truly gain advantage by learning and applying these lessons. Was the beneficial outcome enabled by a beneficial and enabling context? Was the negative lesson to be learned exacerbated by a set of unusual or rare constraints? Lessons learned must be applicable in broader contexts than the project at hand if they are to have real value.
3. **Identification of any associated precursor actions or events act to shape context often long before the observable lesson materializes.** Precedence and sequence of earlier activities may act to shape or constrain the events and outcomes of interest. It is important to recognize whether these patterns and sequences of activities are normal and routine or exceptional.

Coupling of events, actions, and resources, both those readily apparent and previously recognized as well as those emergent and discoverable only under stress or out of sequence or planned execution, need to be assessed in determining repeatability and general value of any lessons learned. Artificial intelligence, with its core strengths in pattern recognition, provides new tools in assessing both contextual patterns and complex correlations. Each of these identification steps aids in the discernment of true root causes, sharpening the observable lessons to the core insights to be learned.

4. **Collection of information related to lessons observed, as described in the preceding three points, must be contemporaneous.** All too often identification of potential lessons learned is left to the end of a major project phase or the end of the project itself. The result is the loss of opportunities to contribute to continuous process improvement and loss of contextual information essential for drawing the right lessons. Lessons observed must be much more than collected; they must be tracked and acted upon. Lessons learned registers provide one tool to record and track as they move through subsequent steps to actualization. Simply logging these potential lessons is not enough. They must be treated much the same way as we track risks on risk registers or near misses.
5. **Categorization and prioritization of lessons observed must happen as an immediate extension of the collection process described in the preceding step.** Categorization at this stage may be simple, but at a later stage we will take further advantage of the power of AI and in particular semantic analysis of the contemporaneous observations of front-line workers and supervisors. (Categorization also will benefit from a review from a broader range of perspectives that we will touch on later in this Executive Insight.) Prioritization needs to consider urgency of the import of the particular lesson as well as its potential scope, not just in the project at hand but more broadly across the organization and yes, even the industry. Categorization and prioritization classifications and scales can benefit in consistent treatment across projects, but these are likely to be bespoke (user-focused) by organization.
6. **Documentation of lessons observed must go beyond a simple recording or logging as has often been the practice in the industry.** Instead we must include sufficient information about associated context to allow us to subsequently "see" patterns. Conflicting and differing perspectives of what has happened and what should be learned are especially important given the natural tendency of groups to gravitate towards group-think. Differing perspectives often become essential as we seek to identify and focus on root causes.
7. **Validation of what we think we have observed and what we should be learning is a key step that is lacking in many lessons learned programs.** This validation of findings and conclusions builds on the breadth of documented perspectives we have identified, collected, categorized, and documented in prior steps. In many post-accident analyses, we find huge value in the differing perspectives. These offer a deeper understanding of what led up to and caused the event at hand. In the moment, bias affects thinking with respect to an emergent situation and cognitive lock, among other biases, is very common.
8. **Communication of lessons observed in real time is essential, even if we have not fully boiled the observation down to a lesson *to be* learned.** Many lessons learned programs occur only at major stage-gates or at the end of a project, by which time many observations have faded, been

lost, or are contextually deficient. Communication is much more than a dissemination of information (passive communication). It must include an engagement and follow-up aspect (active communication) to be effective. One final point on the need for contemporaneous communication: this is the essence of successful continuous improvement programs.

9. **Analysis of lessons learned, now made richer through the capture of contextual information and a plurality of perspectives, must now occur.** This analysis can be further enabled through the use of various AI tools as we seek to tease out root causes and other predictive features from what we have observed. This understanding of event precursors of various forms will provide deeper insights that can be translated into more meaningful lessons learned. The addition of an "analyze and organize" step in PMI's PMBOK represents one improvement in this area over time.
10. **Storing validated lessons learned together with associated findings and contextual information provides a richer data set than the simple storage of lessons learned called for in the PMBOK.** We are transforming a collection of simple documents into a database that lends itself to further examination and insight extraction as more lessons observed are added. As we build this data set of contextual observations, our ability to identify root causes improves. At a future point, revisiting and refreshing lessons learned based on this broader context-rich data set becomes possible, something not considered in traditional lessons learned programs. This database is an essential element of any knowledge management program.
11. **Semantic analysis is a key tool and step in mobilizing lessons learned in future instances.** It allows one to go well beyond simple key-word searches, which some lessons learned programs rely on. Semantic analyses allow full mobilization of unstructured but contextually significant information. This AI-enabled approach we encounter every day, but we have not yet fully deployed it on lessons observed contextual data. Together with other AI tools applied to contextual data, we can gain an anticipatory if not outright predictive capability of potential areas of challenge that we have previously experienced. A simpler key word-based retrieval step is where most lessons learned programs end. It can be argued, however, that up to this stage we have merely *observed* potential lessons but not yet learned anything. True learning is the result of the steps that follow.

Lessons *observed* do not become lessons *learned* until one routinely does something different.

12. **Institutionalization of lessons learned into cohesive best practices in many ways represents the first step in a coherent learning process.** Up to this stage, lessons learned have very much been stand-alone *observations*. Integration of one or more lessons learned into definable best practices provides a necessary mechanism for further exploitation and broader utilizations. Higher quality best practices result from high quality lessons learned processes that are contextually informed.

13. **Assimilation of lessons learned and best practices into an organization's operating policies, processes, and procedures represents a second step in the learning process, where we now make lessons observed a part of the organizational fabric.** Assimilation does not happen by osmosis; an active program is required.
14. **Actualization of what we have learned represents the final step in a true learning process.** We truly learn by doing. As we do, we identify further opportunities for refinement and improvement, which is part of continuous process improvement. We have moved from lessons observed to lessons learned and ultimately to true knowledge. Today's tools allow for further aggregation and integration of knowledge into knowledge assemblies analogous to the assemblies and modules we increasingly avail ourselves of in construction.

Summary

The expanded lessons learned process we have just described goes well beyond the traditional collect, document, communicate process. This Executive Insight suggests several strategies for improving the lessons learned process such that we do not merely end up with a collection of lessons observed.

Some added thoughts worth highlighting include:

- Review lessons registers regularly. Situations and context are constantly evolving.
- Lessons learned are a core element of a learning organization, one focused on continuous process improvement.
- Lessons—positive or negative—are gained only from experience.
- Knowledge assemblies enable lessons learned and best practices to be pulled forward into relevant contexts.

About the Author

Bob Prieto was elected to the National Academy of Construction in 2011. He is a senior executive who is effective in shaping and executing business strategy and a recognized leader within the infrastructure, engineering, and construction industries.