From Organizational Memory to a Learning Organization: A Government Experience in Transition

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Abstract—**Due to the changing nature of the market place, both in private and public sectors, the United States (U.S.) Federal Aviation Administration (FAA) has embarked on a Lessons Learned (LL) program designed to capture experiences from current and soon-to-retire employees. This program is critical in promoting the "doing-more-with-less" concept, and is viewed favorably in this time of budget constraints. The LL program was designed to capture lessons and potential best practices gained from programs, projects, and other activity successes and failures. The FAA operates in a dynamic environment in which changes are necessary and inevitable. Our goal is to transition from an organization that relies on corporate memory to one that embraces change and adapts to the new environment through continuous improvement. This change in culture will foster the notion of the FAA becoming a learning organization.**

Index Terms—**Lessons Learned (LL), Government, Best Practices, Innovation, Changes, Transition, Learning.**

I. INTRODUCTION

There is a lesson to be learned with every experience in life. Many define Lessons Learned (LL) as knowledge gained through experience. LL as a practice does not have extensive theories, postulations, or speculations about what to do or how to do it. LL as a practice pertains to identifying, describing, and capturing true and practical experiences of individuals or groups. LL typically includes experiences gained from operations, engineering, administration, managerial, and maintenance activities. It is a reflection of what is done right, what can be done differently, and how others may benefit from these experiences. Most importantly, it allows similar activities to be performed more effectively in the future. LL focus on what others have done before, in turn eradicating the need to "re-invent the wheel." This often leads to avoiding previous problems and pitfalls. The Federal Aviation Administration (FAA) believes that implementing an LL program conserves resources and enhances safety.

II. GOVERNMENT PERSPECTIVE

A. Budget and Attrition

The United States (U.S.) FAA is facing challenges that require the agency to look for ways to perform work with reduced resources. In addition, the FAA demographic is one

in which many personnel, including engineers and air traffic controllers, are eligible for retirement. The resulting corporate memory loss is difficult to quantify and may impact mission effectiveness. This could lead to loss of institutional knowledge, core competencies, and mission-related expertise. While explicit knowledge often resides in the agency's publications and websites, there is a need to capture tacit individual knowledge, experience, and know-how that is currently untapped or in danger of being lost forever.

Along with knowledge and experience lost, new personnel coming into the agency are facing challenges. Without reliable LL systems, they often have to start their projects or assignments from scratch. Start-up time for new employees increases as they deal with legacy issues. The time required for these new employees to become productive is therefore increased.

B. Organization Changes

The FAA is implementing organizational changes designed to streamline operations, remove "stove-pipes," and develop reporting channels to increase efficiency and accountability of personnel. The changes in leadership, management styles, plus technological advances potentially affect how the FAA conducts business. For example, performance-based organizations require programs to capture data and report metrics on parameters that address specific functional activities. This exercise may require additional time, effort, and resources on the part of the organization to develop and monitor measureable goals reflecting activity. Also, organizational change involves the movement of people, and when personnel accept new assignments, knowledge from the previous duties may need to be enhanced. Consequently, knowledge used in previous asks may be lost if not captured.

The change to a platform in which an employee develops his/her documents or knowledge base may impact the organization. This is the part of technological change that usually can be justified because of improvements in tools, reductions in resources, and ease of use. Nevertheless, the need for training as well as the ability to deliver such training can be a concern.

III. TRANSITION FROM A MEMORY TO A LEARNING ORGANIZATION

Through the LL program, the FAA is transitioning from a memory to a learning organization. The transition is taking place in several steps as shown in Fig. 1. It evolves from awareness to communication, participation, sharing, and finally full engagement. Under this new paradigm, the FAA

can in time become a learning organization as its LL program reaches maturity.
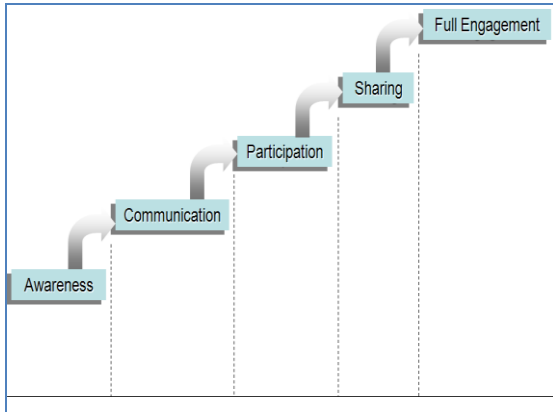

Fig. 1. New LL strategic paradigm

A. The Awareness and Communication Stages: Develop Document Repositories

Many organizations realize at some point that they have accumulated mountains of paper without the ability to search and retrieve specific information. There may be a lack of documentation about a specific process, and programs frequently depend on the memory of a key person to know where things are, how they work, and who is using them. When that person leaves the organization, knowledge about this process usually goes with them. The quantity of information that we generate and manage is growing at a substantial rate. Transforming paper to the digital media definitely has its advantages. However, managing massive amounts of information can be daunting. Some organizations select to deal with these challenges by passing the responsibility of document storage to an external contractor.

The digital revolution of documenting offers challenges such as tool selection; versioning and formatting; keeping information current; governance; the classification and retrieval of documents; archiving and backup process; security; confidentiality; and privacy. In addition, designers must consider other user demands, which include allowing collaboration in the same document and sharing new mobile platforms.

The LL team realized a need to capture and store FAA corporate knowledge in a centralized location. They began by examining existing practices of information capture and storage. Typically, FAA personnel place draft and final documents in a shared drive accessible to personnel within a project or program. The advantage of a shared drive is that the information is readily accessible. However, shared drives may become littered with multiple versions, duplicate files, same file content with different file names, and the like.

The LL team recognized the need for capturing documents and maintaining information and sought a better solution. They began to look for a way to capture and retain useful information while streamlining the volume of documentation. The LL team developed an LL program with the following objectives in mind:

- Facilitate the exchange of experience and sharing of information.
- Break down communication barriers.

- Lead to process improvement.
- Ultimately develop best practices.

In addition, the team arrived at the conclusion that a successful LL system should be:

- Easily adaptable.
- Able to incorporate suggestions.
- Responsive to needs.
- A viable source of past experience.

With these basic concepts in mind, the team began to examine tools that would support the storage and accessibility of information. The team selected Microsoft SharePoint. The FAA has been using this system for some time and refers to it as the Knowledge Services Network (KSN). The team established a password-protected site called Learning from Experience and Operations (LEO). The advantage of using KSN is that FAA personnel have access to the website, requiring only an active KSN account with an updated password.
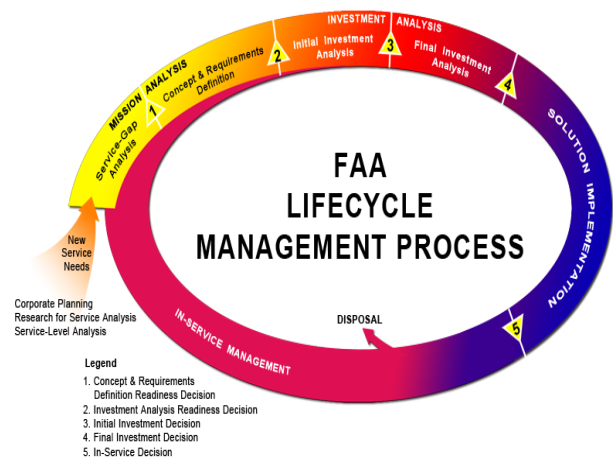

Fig. 2. FAA's lifecycle management process

The LL team looked for ways to improve usability and adaptability. LL articles were categorized to parallel the FAA's Acquisition Management System (AMS) lifecycle phases, which include Mission Analysis, Investment Analysis, Solution Implementation, and In-service Management.

The LL team also set up a system to review and approve LL "articles" submitted by others. The key to this review is to assure that articles submitted conform to LEO guidelines, use plain language, and are written in a manner not to offend other users.

LL files that reside on the KSN are consistently backed up and secure. The LL approach also allows users to submit their LL in a confidential manner. In addition to LL articles, LEO includes Frequently Asked Questions (FAQ) that provide clarity for a program or operation. LEO also includes Story Telling (ST), which is an LL in oral form captured in an audio, digital, media file where an author relates his/her experiences about an issue and its resolution.

With this basic structure in place, the team was ready to move into the next major phase.

B. The Participation Stage: Documentation to Knowledge

The LEO website is a set of databases, documents, image and sound libraries, links, and guidance with easy-to-

navigate structures. Most importantly, LEO contains knowledge depicted as pieces of expert information applied to special situations explaining the "how to" – not just the "what is." With its vast documentation and knowledge collection, this repository has the potential to transform the FAA organization into a new realm where decision makers implement documented references and extend the knowledge base of employees.

The LL team consistently looks for ways to increase participation. LL team sponsors initiated a Six Sigma project with the purpose to increase LEO usage. Using the standard Define, Measure, Analyze, Improve, Control (DMAIC) Six Sigma approach, our LL team systematically defined a problem associated with the lack of participation on the LEO site; monitored the number of distinct users on the site; conducted a survey of existing users; and determined a series of steps designed to promote LEO and increase user participation. As a result, three project team members achieved green belt certification and doubled the number of distinct LEO users among FAA personnel. The Six Sigma team will continue to monitor LEO usage, and have set specific goals to attract new users.

Additionally, the LL team developed a virtual environment in which LL users can discuss topics of common interest. The LL team created Communities of Practice (CPs), which are groups of practitioners that work together or share a common interest. The groups may meet in person or in a virtual environment to share, comment, publish, learn, and use LL articles. At present, there are several active CPs covering a variety of interests. In 2011, AJE sponsored seven Six Sigma projects. Team members from these projects formed a CP for Lean Six Sigma to foster communication and exchange LL. This success is an example how AJE, through LEO, is transforming information to knowledge.

C. Sharing Stage: Knowledge to Innovation

The LL team employed a process called "knowledge mapping" as a method to identify ways to promote and disseminate lessons captured in LEO. Knowledge mapping allowed the LL team to systematically identify process input and output, as well as, the steps needed to improve knowledge sharing. Knowledge mapping is an iterative process that includes data collection, survey, exploring, brain-storming, gap analysis, social network analysis, education, and synthesis. An important aspect of this process is that the team used a series of flow-charting and visual analysis techniques to collectively identify critical steps in the process and how to accomplish them. Several "Mind-Mapping" tools exist in the market place. The LL team examined Flying Logic and Smart Draws as potential solutions for analysis.

Innovation involves application of ideas, knowledge, imagination, and initiative in deriving a better way of making a product or performing a task. In business, innovation often results from the application of an idea that would typically result in narrowing the gap between customer expectations and performance. No matter how innovation is defined, it appears that a strong knowledge base is essential. At present, the contents and processes in

LEO are set up to support the development of innovative ideas. It addresses the needs and interest of a wide audience, focuses on useful applicability of technical and operational LL, captures experiences, supports the AMS lifecycle, and links legacy systems to new FAA programs such as the Next Generation Air Transportation System (NextGen).

D. Engagement Stage: Innovation to Learning

In the engagement stage, the LL team is transforming the processes of generating LL, using LL in day-to-day activities, adapting to changes in the organization, and developing new ideas to innovate and apply LL to new programs. The team investigated different social networking mediums to foster communication and collaboration. At present, the following are available on the LEO homepage:

- KSN Alert – An email notification when a new LL article is posted
- Rich Site Summary (RSS) Reader – A format for delivering regularly changing web content
- Quick Response (QR) code – A type of matrix barcode
- Bookmark sharing – Helps the user find information on the web and collect it for easy sharing
- A quick link – LEO Short Link tinyURL.com/ LEOis4Learning allows quick access to the LEO site

The most effective way of communication was achieved through the use of CPs. The LEO environment is essential so that CP participants can collaborate and work together.

Empowerment is a multi-dimensional social process that helps people gain control over their own work. An important part of empowerment is that it is a process that fosters power in people for use in their work, lives, communities, and society. To be successful, it is important to let personnel act on issues they feel are important. CPs in LEO are designed to facilitate the exchange of lessons and ideas with the purpose of motivating practitioners to take steps to improve their own work.

IV. CULTURE OF A LEARNING ORGANIZATION

The FAA is evolving into a performance-based organization. Cultural change is not just important – it is essential. Today, the FAA is working to develop better-defined processes so employees can understand each other's work, integrate activities when possible, and work together. Personnel must be willing to share information.

Fig. 3. Program elements working toward organizational excellence

V. CONCLUSION

While the FAA is making LL strides, much work remains. Cultural change is gradual and requires patience. Organizations need to institutionalize the notion of process improvement, and documented processes must become the way of doing business. These processes coupled with LL will transition the FAA to a learning organization. The FAA mission to enhance efficiency and safety in support of the flying public will be near at hand.

The current FAA LL program faces a variety of challenges. The ultimate goal of the LEO program is to incorporate LL into the FAA culture; gain LL acceptance in the field; and develop and launch best practices.

The fundamentals of an LL program are intertwined. As illustrated in Fig. 3., there is a relationship among LL and knowledge management; best practices and process improvement; as well as succession planning and a learning organization. The key to success is to understand the interdependencies of these elements and to view these challenges as opportunities. Through patience, perseverance, and with management support, the FAA seeks achieve the goal of organizational excellence.

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