Presented to the Interdisciplinary Studies Program:

UNIVERSITY OF OREGON
APPLIED INFORMATION MANAGEMENT

Applied Information Management
and the Graduate School of the
University of Oregon
in partial fulfillment of the
requirement for the degree of
Master of Science

IMPLEMENTING LESSONS LEARNED BEST PRACTICES IN PROJECT MANAGEMENT

CAPSTONE REPORT

Tim Vignos
Enterprise Project Manager
Pitney Bowes, Inc.

University of Oregon
Applied Information
Management
Program

December 2014

Academic Extension
1277 University of Oregon
Eugene, OR 97403-1277
(800) 824-2714

Approved by

_____

Dr. Kara McFall
Lecturer, AIM Program

Implementing Lessons Learned Best Practices in Project Management

Tim Vignos

Pitney Bowes, Inc.

Abstract

For good reasons, project organizational structures are becoming more dominant in business. Project managers must strive to continuously become more effective at managing projects by learning lessons from previous projects. This paper provides project practitioners and their managers with information on the benefits of lessons-learned practices and the next steps for improving existing practices.

Keywords: project management lessons learned post-project review project post mortems best practices

Table of Contents

Introduction to the Annotated Bibliography

Problem

"Making good decisions is a crucial skill at every level" (Drucker, 2006, p. 120). Successful business organizations should learn from past decisions in order to apply the lessons to related decisions in the future. Repeating poor business decisions that the organization has made in the past is a real and costly business risk. Stated positively, companies that make the best informed decisions will not only do better, but do better than their competition in the marketplace, be more successful, and be more profitable (Koenig & Srikantaiah, 2004). The method or process of applying historical information to make better informed decisions is known as applying lessons learned.

Lessons learned can be gleaned from both operational and project-oriented work. Operational tasks are ongoing, and although there may be cycles and variances, the tasks repeat over and over. As a contrast to operational work, projects are unique and have a distinct lifecycle of four stages: initiate, plan, execute, and close (Thomas, 2011). The Project Management Body of Knowledge (PMBOK, 2013) defines a project as "a temporary endeavor undertaken to create a unique product, service or result" (p. 3). Project management is widely viewed as the standard for overseeing projects to successful completion (Thomas, 2011, p. 2). In describing project management with more process detail, the PMBOK (2013) defines project management as: "the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements" (p. 6).

Specific to project management, lessons learned are holistically defined as "the shared knowledge that allows project managers and the organization to grow and projects to mature" (Gordon & Curlee, 2011, p. 177). Incorporating qualifiers of relevance and validity, Schindler

and Eppler (2003) define lessons learned as "key project experiences which have a certain general business relevance for future projects. They have been validated by a project team and represent a consensus on a key insight that should be considered in future projects" (p. 220).

The demand to make better business and project decisions has a double challenge as businesses become more project oriented, and because the lessons-learned process requires specific attention and discipline in order to be properly performed. Williams (2008) asserts that "the need to manage projects successfully, learn from each other and from one project to the next, is of vital importance as management becomes more project based" (p. 248). Williams (2007) also describes the discipline challenge of capturing the lessons learned in project management by stating that "projects are, by nature, temporary organizations, and any learning that is accumulated in a project will largely dissipate at the end of the project unless attention is paid to the collection and dissemination of that knowledge" (p. 9).

Even though the need to capture lessons learned is recognized and should be a common practice in project management, it is almost never effectively accomplished (Cleland & Ireland, 2008). "The problem of how to learn from projects has long been an issue with project-based organizations" (Williams, 2007, p. 6). Even if lessons learned are properly identified and recorded, Cleland and Ireland (2008) find:

> They are rarely reviewed at the start of new projects to ensure they do not happen again. This is probably the most important information that we can gather from our projects, because so many of the problems and challenges on one project are relative to future projects. (p. 199)

In review, successful decision making is a skill and contributes to the success of the business (Koenig & Srikantaiah, 2004). Business is becoming more project oriented; "the most

popular unit of work in organizations is a project" (Desouza, Dingsøyr, & Awazu, 2005, p. 203). As organizations expand the use of projects to achieve objectives, the need to successfully execute projects grows, as does the need to learn from project successes and failures. The logical extension of this idea is that as businesses become more project oriented, ensuring that projects become more successful through the effective implementation of project lessons learned processes will contribute to businesses being more successful.

Purpose

The purpose of this study is to examine literature to provide the background and recommended best practices for implementing a lessons-learned process to be incorporated into a business organization's project management practices. For the purposes of this study, best practices are defined as "optimum ways of performing work processes to achieve high performance" (Loo, 2002).

Businesses execute activities to deliver profitable results; there must be a realized benefit or value from investing time and resources to perform any activity, including project management lessons-learned activities. If the lessons-learned business activities do not yield a value or a benefit, the processes should not be performed. Anbari, Carayannis, and Voetsch (2008) state that "the value of post-project reviews is derived from the effective flow of information concerning lessons learned in various projects to enhance the performance of current and future projects, project management, and ultimately the entire organization" (p. 636). Therefore, the first key goal of this study is to identify literature that defines the need for and the business value associated with the performance of project lessons learned.

Rowe and Sikes (2006) describe the lessons learned process using a five-step workflow consisting of: (a) identify comments and recommendations that could be valuable for future

projects, (b) document and share the findings, (c) analyze and organize the lessons learned for application of the results, (d) store lessons learned in a repository, and (e) retrieve for use on current projects. Within this general framework, there are multiple approaches to capturing and using project lessons learned. Once the project management need and business value are established, the second key goal of this study is to identify literature that informs specific best practices in the implementation of project lessons-learned practices within an organization's project management framework.

Research Questions

Main question. How can a business structure its project management processes so that project lessons learned are effectively captured, retrieved, and applied in order to make project execution more efficient and project outcomes more positive and predictable?

Sub-question. What methods can be used to successfully implement project management lessons-learned best practices?

Audience

This study is of significance to project management practitioners who are interested in initiating or improving lessons-learned practices for their organizations or teams. The primary project management audience either has a lessons-learned process that is not functioning properly and needs to be improved, or does not have a lessons-learned process. Both of these audiences need background information to recognize the need for and value of implementing such a process and the methods to move forward with successfully implementing the process. Relevant audience members for this study include managers or directors in project-oriented organizations, Project Management Office (PMO) leaders, practicing project managers, and managers responsible for project teams.

Search Strategy

Reference searches primarily utilize three tools: (a) the University of Oregon Libraries' Quick Search tool, (b) the Project Management Institutes (PMI) library of publications, and (c) Google Scholar (scholar.google.com). The benefit of the University Quick Search tool is it provides no cost / full text versions of all journal sources; the weakness is that it is limited to the databases defined below. The University Quick Search tool is used to produce an initial list of potential reference sources using the key words and criteria established below.

The benefit of the PMI publication search is that many of these sources are proprietary publications of the association and very germane to the search criteria; the weakness is that it is limited to the proprietary publications. The PMI publication search is used to identify articles and books that contain information on project management best practices, particularly those that apply to project lessons-learned processes.

The benefit of Google Scholar is that it is a powerful search engine and has a very wide database of sources for its searches, including results beyond the University Library databases; the weakness is that it is more limited in access to full-text journal articles. Google Scholar is used to create broad lists of search results specific to project lessons learned; the results are evaluated to identify sources that meet the criteria specified below. When a Google Search yields a result without full text access, the Library often has that article in the full text format.

Databases. The Quick Search tool searches four databases: (a) Academic Search Premier (more than 8,000 academic Social Sciences, Humanities, General Science, Education and Multi-cultural journals); (b) JSTOR (archive of 2,700 academic journals in Arts and Humanities, Life Sciences, Ecology, and Botany); (c) Project Muse (580 academic journals in the Arts, Humanities, and Social Sciences); and (d) Web of Science (access to the Science Citation Index,

Social Science Citation Index, and Arts and Humanities index). Searches are left broad without the application of any of the many subject category search filters (e.g., Business).

Key words. The search terms used alone or in combination are: *project, project management, lessons, learned, lessons learned, best practices, post project review, knowledge management, project management office*, and *maturity model*.

Documentation Approach

All searches with relevant results are tracked in an Excel spreadsheet with coding and sorting rules applied for ease of use. The columns of information stored are quality (green for the best sources, yellow for sources that may be used to supplement a best source, and red for sources that will likely not be used), sort letter (for simple alphabetical sorting), search tool and search word(s) used to identify the source, full citation, full abstract, and hyperlink to the separately stored full-text article, if available. All references are also identified and categorized in the spreadsheet using the following categories: (a) background or context of the problem, (b) specific focus on the problem, or (c) information that supports potential solution alternatives; some references fulfill more than one of the categories.

All books are purchased or obtained through the University of Oregon Library; all non-book sources are available in full text.

Reference evaluation criteria. All references are evaluated using a set of consideration factors documented in a University of Oregon Library guide by Bell and Frantz (2014). Bell and Frantz (2014) present five evaluation criteria areas, the: (a) authority of the author and the background of the publisher, (b) objectivity of the author, (c) quality of the work, (d), currency of the work, and (e) relevancy of the work. Each criterion is applied to each potential source in the following manner:

- Authority – Most sources are from peer-reviewed journals and the authors possess academic or industry-related professional credentials. The remaining sources are from subject area textbooks or industry related books, with similarly credentialed authors.
- Objectivity – Based on examination, no work appears to promote a biased goal and arguments are supported by cited sources or the authors' research.
- Quality – The quality of each work is free from grammar, spelling and typographical errors. All text and charts are properly formatted and no errors are identified.
- Currency – Even though project management is a decades-old knowledge area, currency is important to this subject because there are continuous research and information technology developments for ongoing improvement. To assure literature with relative currency is obtained, but foundational knowledge is not filtered, publication dates between 2004-2014 are used.
- Relevancy – Sources appropriate to this research topic address one or more of the following areas: project management, lessons learned, post project review, knowledge management, project management office, and maturity model.

Annotated Bibliography

Fifteen references are identified for the Annotated Bibliography in the section below. The section is divided into three organizational categories that support this study's research questions: How can a business structure its project management processes so that project lessons learned are effectively captured, retrieved, and applied in order to make project execution more efficient and project outcomes more positive and predictable? What methods can be used to successfully implement project management lessons learned best practices?

The first category contains references that provide general background on project management and lessons learned programs. The second category contains references that provide background on the benefits of project lessons learned programs. The third category contains references that identify best practices for project lessons learned. Each annotation contains three elements: (a) the full bibliographic citation, (b) an abstract or description, and (c) the summary. The abstracts are from the publisher, when available. Descriptions are written when no abstracts are available from the publishers. The summaries specifically relate the article or book's content to the research questions and needs of the paper's audience.

Background on project management and lessons-learned programs.

Kerzner, H. (2009). *Project management: A systems approach to planning, scheduling, and controlling*. New York: Wiley.

Description. This textbook is intended for undergraduate and graduate students and practitioners. Practitioners are considered to be functional managers and upper-level executives who serve as project sponsors and must provide support for projects. The text is used in the college and reference markets, and for studying for the PMP (Project

Management Professional) Certification Exam. The twenty six-chapter text is structured to address three core areas: (a) the basic core knowledge areas of project management; (b) project support functions of managing time, conflicts, and special topics; and (c) factors for predicting project success and management support. The text contains over twenty five case studies.

Summary. Harold Kerzner, PhD, is an engineer, consultant, and emeritus professor; he has published 140 papers including textbooks on engineering, business, and project management topics. This is a thousand-plus page / twenty-six chapter textbook on the principles of project management. In addition to the target audience of undergraduate and graduate students, it also addresses managers who sponsor or provide support for projects. As a comprehensive book on project management, the first ten chapters address management / organizational topics in general; the remainder of the text covers the topics of project management. Lessons learned are specifically addressed as part of project risk management.

As a very broad textbook on management and project management, this source does not have extensive content focused on this paper's lessons-learned topic area. Instead, this source is used for the necessary background on the management and project management knowledge areas.

PMBOK Guide. (2013). *A Guide to the Project Management Body of Knowledge*. Fifth Edition. Newtown Square, PA: Project Management Institute.

Description. The Project Management Body of Knowledge (PMBOK) Guide is a collection of processes and knowledge areas accepted as best practices for the project

management profession. The PMBOK Guide is published by the globally respected Project Management Institute (PMI). It is updated and revised on a regular basis. The fifth edition is the current revision.

PMI uses two perspectives to organize the project management body of knowledge. The first organizational method is Process Groups, which categorizes the work that is performed in a project. The five Process Groups are: (a) initiating, (b) planning, (c) executing, (d) monitoring and controlling, and (e) closing. Knowledge Areas are the second organizational method; the nine Knowledge Areas are: (a) communications, (b) cost, (c) human resources, (d) integration, (e) procurement, (f) quality, (g) risk, (h) scope, and (i) time. The Process Groups are mapped to the Knowledge Areas for specific project management actions.

Summary. The Guide to the Project Management Body of Knowledge, the PMBOK Guide, is published by the professional association for project management, the Project Management Institute (PMI). The project management knowledge in the PMBOK is organized by five project management process groups and by nine project management knowledge areas. The process groups describe the work performed in a project and closely parallel the project management life cycle stages of: initiate, plan, execute, and close. The nine knowledge areas, plus an additional area of project stakeholder management, are overlaid onto the process groups and define a map of project management actions carried out in the five process groups. These process groups, knowledge areas, and the resulting actions are specific to PMI. A multi-level outline method is used to define this taxonomy for this reference book. Lessons learned actions

are addressed many times in the PMBOK and are referenceable using the process groups and knowledge areas taxonomy.

The PMBOK is be used as the 'gold standard' for the definition of project management lessons learned, and for the context it provides for their roles in the process group workflow. This highly regarded reference source complements the other sources that provide research and real-life practical information. The exact method the PMBOK uses to organize information is not of interest to the target audience of this paper, but the PMBOK is recognized for its authority on the topic.

Benefits and challenges of project lessons-learned programs.

Anbari, F., Carayannis, E., & Voetsch, R. (2008). Post-project reviews as a key project management competence. *Technovation, 28*(10), 633-643. doi: 10.1016/j.technovation.2007.12.001

Abstract. There is a general belief that post-project reviews are beneficial. However, such reviews are not conducted in a consistent manner, if at all, in many organizations. Therefore, there is a need to discuss post-project reviews as part of effective project management. This paper explores the nexus of knowledge management and project management. It addresses the role of post-project reviews and their impact on the success of future projects, improvement of the overall performance of the organization and its long-term competitive position, and development of its learning processes. It discusses critical aspects and useful techniques in the implementation of post-project reviews. The data gathered from post-project reviews provide the historical database from which future project teams can develop meaningful project plans based on their organization's

project learning cycle. This database can provide project managers and teams with the information they need on specific staff skill set needs, and the profile of the customer and operating environment that can impact the ultimate success of projects and project management.

The paper discusses where post-project reviews fit into the project life cycle and project management processes. It assesses how such reviews can assist an organization in improving the manner in which its projects are conceived, planned, implemented, reported, and evaluated.

Summary. This article discusses the content and purpose of the post-project review and its place in the project life cycle as an important component to advance the organization's body of knowledge in project management. The authors also define how to effectively implement the post-project review. The authors describe the nature of post-project reviews, where they fit in the project life cycle, and the value of the reviews. This article asks three core questions: (a) What is the role of post-project reviews in projects, (b) What is the contribution of post-project reviews to the development of new insights and project management knowledge in organizations, and (c) What is the impact of such reviews on the emergence and development of learning processes within the organization and the ultimate improvement of overall project performance. The first question addressed in the article is very pertinent to the core research topic of this paper – how to effectively structure a lessons learned practice. The third question on the learning organization is not a specific focus of this paper's research, but is applicable to the question of the methods that can be used to successfully implement project management lessons-learned best practices.

This article is of interest to the audience of this paper as its comprehensive look at project management lessons learned both addresses the primary research question and offers recommendations for performance improvements to the project management processes applied to current and future projects and to the organization as a whole.

Thomas, W. (2011). *The basics of project evaluation and lessons learned*. Boca Raton, FL: CRC Press.

Abstract. This book is intended to be a practical guide to conducting project lessons learned. It provides tools and techniques for active engagement. It is founded on the principles of conducting project evaluations as recommended by major governing bodies of project management such as the Project Management Institute (PMI).

Summary. This author's research focuses on lessons learned repositories and knowledge management practices in project management. This book is intended to be a practical guide to conducting project lessons learned and includes tools and techniques. The goal is for organizations to use the book to implement processes and systems to support effective lessons learned.

The opening chapter of this book addresses the foundations of evaluation and how lessons learned fit into this framework. For example, an evaluation is the determination of merit (quality), worth (value), or significance (importance) and the lessons learned process is a form of project evaluation. Subsequent chapters describe a step-by-step lessons-learned process, explain what is a lessons-learned repository and why to use one, and define lessons learned best practices ("a superior method or innovative practice that contributes to the improved performance of an organization, usually recognized as best

by other peer organizations" (p. 62)). Additional chapters are included on case studies, suggested real-world scenarios, and the agile perspective.

This current book provides a background of theories as the basis for the practical execution of lessons learned in project evaluation. This material is directly related to this paper's *how to* focus on project lessons learned. Of specific interest to this paper's practitioner / management audience is the section on how to manage a lessons learned process.

Williams, T. (2007). *Post-project reviews to gain effective lessons learned*. Newtown Square, PA: Project Management Institute.

Abstract. A key component of successful project management is the ability to glean key learnings from the experience throughout the lifecycle of the project, as well as at its conclusion. However, in practice, the lessons learned from a specific project are rarely incorporated into an organization's overall policies and procedures. Without a concerted effort to reflect on specific project learning's and a designated process to implement them across the organization, lessons are lost, mistakes are repeated and opportunities for operational efficiency are missed.

Summary. This is a 110 page book published by the Project Management Institute and authored by Terry Williams, PhD, PMP. Professor Williams is Dean of a major business school in the UK, and has 25 years' experience in Operational Research (OR) and a number of books on modelling projects, project governance, and front-end analysis, including this book on learning from projects.

The first core chapter of this book is a 54 page literature survey on the use of lessons learned in projects. This chapter is organized by motivation (Why is learning lessons important? / Is there evidence that it gives some use?); knowledge, learning, organizational learning, and knowledge management; the current situation (standards and maturity models); creating knowledge; and transferring knowledge.

The next two sections of the book are the results of both a survey and interviews created to answer the question 'Do organizations learn from projects?'. In addition to the conclusions drawn, the survey results are organized by sub topics, including: What are organizations doing, How successful are these processes, What are the factors contributing to the perceived success of lessons learned, and What do you think is best practice. A short 'in practice' case study is presented.

This book is relatively current (2007) and directly addresses the identified problem of how to successfully implement a project lessons learned practice. The thoroughness of coverage on background of project lessons learned and how these programs are currently implemented will be used as foundational knowledge. There is no direct focus on what steps to take to implement a lessons learned method in the organization, but the background presented supports the case that it should be implemented, which is important to convince the practitioner and management audience of the paper.

Best practices for project lessons-learned programs.

Bjørnson, F., Wang, A., & Arisholm, E. (2009). Improving the effectiveness of root cause analysis in post mortem analysis: A controlled experiment. *Information and Software Technology*, *51*(1), 150-161. doi: 10.1016/j.infsof.2008.02.003

Abstract. Retrospective analysis is a way to share knowledge following the completion of a project or major milestone. However, in the busy workday of a software project, there is rarely time for such reviews and there is a need for effective methods that will yield good results quickly without the need for external consultants or experts. Building on an existing method for retrospective analysis and theories of group involvement, we propose improvements to the root cause analysis phase of a lightweight retrospective analysis method known as post mortem analysis (PMA). In particular, to facilitate brainstorming during the root cause analysis phase of the PMA, we propose certain process changes to facilitate more active individual participation and the use of less rigidly structured diagrams. We conducted a controlled experiment to compare this new variation of the method with the existing one, and conclude that in our setting of small software teams with no access to an experienced facilitator, the new variation is more effective when it comes to identifying possible root causes of problems and successes. The modified method also produced more specific starting points for improving the software development process.

Summary. This article is focused on improving software development processes on projects through the use of lessons learned, but the content is broadly applicable to project lessons learned. The authors introduce the article by stating that lessons learned are a central factor for success in the ability to learn from past project successes and

failures. Additionally, the authors note that companies can only learn from the past if they take the time to learn lessons from the past, and project perspectives on completed projects are a good method to accomplish this learning.

In this article, the lessons-learned process is also labeled as the retrospective analysis method and post mortem analysis (PMA). The authors evaluate the effectiveness and results of an original PMA method and their experimental / revised PMA method. The goal of the revised PMA method is to increase the level of participation and this is accomplished with causal map analysis – a brainstorming group process in which the participants iteratively use post-its and diagramming to identify deep causes. The result is a better capture of the most important positive experiences and the most important negative experiences.

This article provides detail applicable to the best practices goal of this paper. Three specific best practices addressed are: (a) focused brainstorming to elicit positive experience, (b) focused brainstorming to elicit negative experience, and (c) root cause analysis with fishbone diagrams for the most positive and negative experiences.

Boehringer, H. (2009). Knowledge is power. *PMI Global Congress Proceedings – Orlando, Florida*. Retrieved from http://www.pmi.org/learning/knowledge-power-implementing-lessons-learned-6663

Abstract. Many organizations believe the gathering of lessons learned begins with asking project participants for their feedback and ends with placing the lessons learned in a knowledge-base that is infrequently riffled through by project managers or project team members.

The whole point of gathering lessons learned is that it shouldn't be a perfunctory exercise. The key to maturing your PMO lies in how you utilize lessons learned. Leveraged properly, lessons learned can be a primary vehicle for continuous improvement in your organization. This paper explores how to mature your PMO using the anecdotal statements made in lessons learned sessions, converting them into actionable observations, which are translated into best practices. It is the best practices that are rolled out to the organization in the form of processes, guidelines, and templates. Using this methodology, you will mature your PMO and create repeatable project success!

Summary. This article starts with a historical examination of continuous improvement approaches adopted by organizations, including the example of Dr. Deming's 'Plan, Do, Study, Act' cycle used for quality control practices. Even with a long history, the question remains, why doesn't knowledge get transferred from one project to the next as a means of continuous improvement? The answer is that gathering, analyzing, normalizing, and accessing the lessons learned is not easy.

Before any lessons-learned continuous improvement can occur, the project lessons must first be gathered. The author suggests keeping this process simple, specifically by conducting a constructive meeting rather than employing various other more complex or high tech alternatives. A constructive meeting has a proper agenda and attendees are prepared and time is defined and controlled. Various meeting ground rules are suggested, but the goal is to identify both what went well on the project and what could be improved. Additionally, the effectiveness of the meeting should be assessed by asking the participants what they liked about the meeting and what could be done differently. The captured lessons learned are then included during the kickoff of the next project.

Continuous improvement through lessons learned is the theme of this article. The focus is the practical linkage of these two concepts through the plan-do-study-act cycle. The lessons-learned perspective is to repeat what went well on a project on future projects and to prevent what went wrong on future projects by translating project experiences to repeatable processes. The first step is to collect anecdotal statements, the second step is to convert the statements into actionable information, the third step is to translate actionable observations into best practices, and the final step is to drive the best practices into the project processes and make them repeatable. The focus of this article was on what actions to take to create these repeatable processes; it suggests options for 'how' to accomplish the change management process through cultural change and perhaps by assigning responsibility for the process to the PMO.

Desouza, K., Dingsøyr, T., & Awazu, Y. (2005). Experiences with conducting project postmortems: Reports versus stories. *Software Process: Improvement and Practice*, *10*(2), 203-215. doi: 10.1002/spip.224

Abstract. The most popular unit of work in organizations is a project. Managing knowledge in and about projects is salient for successful project management. In this article, we will discuss how postmortems can be used to capture tacit experiences in projects. Conducting a postmortem, either after a milestone or at the end of a project, is salient in order to gauge what has been learnt, what were the main issues faced, and what can be used to improve the processes of work in the future. The conducting of postmortems aids in articulation of tacit experiences into explicit forms. This enables for experiences to be better re-used in the future. Re-using of postmortem findings depends

heavily on the nature of the postmortem outcome. We will compare two kinds of postmortem outcomes—traditional reports and stories. Both types have their pros and cons, and management must choose the right kind of postmortem report to calibrate, depending on the project and learning outcomes. The article will also highlight lessons learnt from conducting postmortem reviews in several software organizations.

Summary. The key points of this research article are that: (a) projects are highly knowledge based, (b) project knowledge must be properly leveraged to avoid past mistakes, (c) re-using project knowledge requires organizational learning procedures, and (d) the organization must be able to use the knowledge to inform future behaviors. The knowledge referred to in the article is tacit knowledge, that knowledge which people are not able to express. "In order to foster organizational learning, these tacit insights need to be captured in an explicit format so that they can be re-used with ease in the future" (p. 204). The article explores how to use post mortems, either after a project milestone or at the end of a project, as a means to elicit the project insights.

This research and associated case study article focuses on the project post mortem process; the purpose is to learn from the project, not to evaluate the project. Two post mortem output types are discussed: a traditional report and a narrative or story. A case study is presented for each of the output types. The two output types are compared and five dimensions of differences are presented: (a) structure of knowledge, (b) cost to prepare, (c) richness of knowledge, (d) ease of comprehension, and (e) ease of recall-ability. Finally, the authors discuss how to decide whether to use the traditional report or the narrative report.

The domain for this article is software projects, but this restriction does not impact the value of the content or the value to the intended audience for this paper, as the lessons have broader applicability to projects in general.

Goffin, K., Koners, U., Baxter, D., & Van der Hoven, C. (2010). Managing lessons learned and tacit knowledge in new product development. *Research-technology Management, 53*(4), 39-51.

Abstract. Every new product development (NPD) team learns a unique set of lessons in solving the many problems that arise in a typical project, and it is important to ensure that these lessons are shared. Since much of the learning is tacit in nature, it is difficult to articulate, to capture, and to disseminate. Therefore, managers face a challenge in trying to stimulate project-to-project learning. Many companies hold post-project reviews (PPRs)-meetings at the end of projects to determine the lessons learned and document them for the future. However discussing a project, noting down the lessons learned, and entering them into a database is not sufficient. Our research at five leading German companies shows' that written reports fail to convey much of the key learning from NPD teams and so managers need to focus on stimulating individual learning and running PPRs in specific ways to generate and transfer tacit knowledge. Managers also need to integrate PPRs with other mechanisms, such as mentoring schemes and knowledge brokering, to stimulate the flow of lessons learned and tacit knowledge.

Summary. The domain for this research article on lessons learned is new product development. Although the project domain is specific, the lessons-learned content is generic and applicable broadly to project management in general. The specific lessons-

learned / project management task reviewed in the article is the post-project review. The type of project knowledge addressed is tacit knowledge, defined as "difficult to articulate, hard to record, based on experience, and intimately connected to the way we carry out tasks and solve problems" (p. 40). Tacit knowledge is distinct from explicit knowledge, which is readily identified, explained, and documented.

This article includes significant information on the 'how to' for lessons learned, specifically the post project review, and includes detail on: (a) establishing the importance in the organization; (b) timing, location, and duration of the post project review; (c) attendees; (d) the role of the facilitator, creating the right atmosphere and facilitation methods; (e) use of metaphors and stories; (f) social events linked to the post-project review; and (g) dissemination of post-project review results. Notable points for the audience of this research are how lessons are learned and how management must recognize this process in terms of encouragement, support, and rewards.

Julian, J. (2008). How project management office leaders facilitate cross-project learning and continuous improvement. *Project Management Journal, 39*(3), 43-58. doi: 10.1002/pmj.20071

Abstract. The purpose of this study is to shed light on how project management office (PMO) leaders facilitate cross-project learning and continuous improvement. Twenty leaders of PMOs were interviewed; findings were validated by two focus groups. The research reveals that PMO leaders facilitate cross-project improvement by embedding accumulated knowledge from past project experiences into project management routines that are utilized across multiple projects. The research also points to the phenomenon of

"red light learning," where lessons learned sessions can be enculturated as punitive, undermining individual and organizational learning. Recommendations focus on enhancing the social capital of the PMO leader and improving the quality and quantity of reflective practice over the course of the project life cycle.

Summary. Three topics from this article are related to this paper's focus on project management lessons learned methods and best practices: the project management office (PMO) organization, cross-project learning, and continuous improvement. In organizations with a PMO, lessons learned are typically supported under this organizational structure; the PMO approach and continuous improvement both fit into the best practices question for this paper. The basis for lessons learned is to pass the lessons learned to other in-process and future project teams; the authors label this approach as cross-project learning. The article's fourth core topic of organizational learning is related to the research questions but is not a focus of this paper.

Project management offices have evolved to have various responsibilities related to centralized coordination of projects. A high percentage of PMOs are established in order to improve "performance outcomes, lessons learned, and support for project managers" (p. 44). Because of its central role, the PMO is in a good position to house lessons-learned processes.

The author conducted a study to explore three research questions (p. 44): (a) What are PMO leaders' perceptions of their responsibilities related to transferring lessons learned from one project to the next, (b) How do PMO leaders facilitate learning from past project experiences for the benefit of current and future projects, and (c) What do PMO leaders perceive to be the enablers and barriers to sharing lessons learned for the benefit

of current and future projects. Based on the research, the article provides four recommendations for PMO leaders and other managers who are seeking to improve their organization's ability to learn from past project experiences (p. 55): (a) focus on accumulating social capital across multiple communities by establishing a network of strong relationships built on trust, professional development, and mutual understanding; (b) focus equal emphasis on learning from successful projects as those projects that appear to have failed or run off-course; (c) reflect over the course of the project rather than only at project closure; and (d) establish conditions more conducive to productive reflection in lessons-learned sessions by utilizing a skilled, 'neutral' facilitator.

Newell, S., Bresnen, M., Edelman, L., Scarbrough, H., & Swan, J. (2006). Sharing knowledge across projects limits to ICT-led project review practices. *Management Learning, 37*(2), 167-185. doi: 10.1177/1350507606063441

Terminology. ICT = Information and Communications Technologies

Abstract. A common strategy to transfer knowledge from projects is for project teams to capture 'lessons learned' and store these on a database for others to access. This strategy is widely adopted but such databases are not widely used. This article explores why cross-project knowledge transfer fails, using data from 13 projects in six organizations. Following Cook and Brown, the analysis focuses on why knowledge captured from one project is typically not used as a 'tool of knowing' by others. The results suggest that the knowledge captured is not deemed useful and/or project teams lack awareness that there is knowledge that could be useful to help them improve their processes.

Summary. The importance of executing projects well is driven by the fact that organizations are increasingly using project teams to accomplish specific tasks and to increase flexibility. However, a problem with project-based organizations is that knowledge acquired in one project is not used in other projects. The goal of this article is to identify barriers to this cross-project knowledge transfer and to suggest ways for organizations to better this knowledge transfer for project teams.

Despite the commonly accepted process of performing project reviews at project completion and at project milestones, capturing the knowledge, storing the knowledge (for example in a database), and then retrieving it with keywords, the authors note that this project review practice is not helpful. From one study, the main identified problem was lack of time. The authors also note that, even if the review takes place and the knowledge is stored, there are limits to the extent that lessons learned are used. The focus of this study was not on the 'lack of time' problem, but on the process that was followed.

The methodology of the empirical study was an exploratory, qualitative investigation of thirteen projects across six organizations in different business sectors. Each organization had been operating for at least thirty years and on average employed over 50,000 people. "The study was aimed at understanding the processes by which project-based knowledge and learning are created and transferred in organizations across sectors" (p. 170).

A general finding of the study was that "strategies for capturing and transferring knowledge across projects were implemented widely but were not all that useful" (p. 180). Where the learning was determined to be useful, it was more heavily dependent on

social networks and informal dialogue. More detail on the findings is presented, followed by recommendations for project teams.

There are two specific suggestions from this article of ways for organizations to improve the transfer of project knowledge that are worth considering for this paper's goal to identify methods for lessons learned. The first is the use of an intermediary; for example, the person in this role helps the team learn from the experiences of others. The second suggestion is to encourage the capturing of process knowledge rather than product knowledge during a project; process knowledge is likely to be more widely useful.

Rezania, D., & Lingham, T. (2009). Towards a method to disseminate knowledge from the post project review. *Knowledge Management Research & Practice*, *7*(2), 172-177. doi: 10.1057/kmrp.2009.9

Abstract. In this paper we review several issues associated with post project review and dissemination of knowledge in information technology projects. We reflect on our practice of coaching project teams. In identifying the role of social pressure in forming teams' perception of their performance, we suggest what could potentially be an interesting and fruitful avenue of future research on an approach to post project review and dissemination of knowledge in organizations.

Summary. With the basis that project reviews are valued as an integral component of project management and the organizational learning cycle, this article is a reflection by the two academic authors on their experiences coaching project teams on the team process in order to develop a framework for project evaluations which will result in organizational learning. They provide a short background on team coaching and then

reflect on their work on twelve IT project teams. An example of a key concept included in their findings is that the project evaluator must "help the project team externalize and see their problem as a story that exists outside of them" (p. 176). Although there is a specific focus on team learning and the instrument used to assess the learning, this information is applicable to project learning, also known as project lessons learned.

Rowe, S. & Sikes S. (2006). Lessons learned: Taking it to the next level. *In Proceedings 2006 PMI Global Congress Proceedings, Seattle, Washington*.

Abstract. Capturing lessons learned should be an on-going effort throughout the life of the project. This mindset should be strongly encouraged by the project manager from day one. Whether we are using lessons learned to prepare for current projects or for identifying project management process improvements, we learn from project failures as well as project successes. By not learning from project failures we are doomed to repeat similar situations. By not maximizing on project successes, we miss opportunities to implement good processes and practices to successfully complete existing and future work.

Summary. This article is from the proceedings of a Project Management Institute global conference. The authors are practitioners, their focus on lessons learned is positive in tone - "they represent the organization's commitment to project management excellence" (p. 1) and is practical in content - "this paper … provides solutions to assist with the transition from your current level to the next level" (p. 1). Relative to the article's title 'taking it to the next level', there are three levels defined, and each has a series of related steps for achievement.

Level 1 organizations start with a defined process, basic tools, and techniques. 'Basic' is the key word at Level 1, but leadership should encourage the use of the process, tools, and importantly, the results (of the process). The lessons-learned process has five steps that become more involved with each of the progressive levels. The five steps of the process are: (a) identify, (b) document, (c) analyze, (d) store, and (e) retrieve.

For Level 2 organizations, the process has become part of the culture and is consistently applied; the process and documents have also been refined and are more efficient. At Level 2, analysis has begun on the stored lessons learned and there is a process to do so. At Level 3, the completed analysis from Level 2 is used to calculate executive level metrics for review and action.

As with many business programs, the authors stress the need for management's support and commitment; a good way to build and sustain this commitment is with actionable metrics targeted for them in terms of concise content and format. This is particularly relevant to the management audience of this paper. The step-wise progression of a lessons learned process is applicable to the 'how to' goal of this paper and shows a path from getting started to maturity.

Schindler, M., & Eppler, M. (2003). Harvesting project knowledge: A review of project learning methods and success factors. *International Journal of Project Management, 21*(3), 219-228. doi:10.1016/S0263-7863(02)00096-0

Abstract. This article presents an overview of proven methods to record experiences from projects and discusses their use in project management. We distinguish between process-based and documentation-based debriefing methods. Process-based methods

focus on a procedural approach to capture key learnings from a project. Documentation-based methods serve as appropriate representation formats or structures for project insights. The article bridges the current gap between theoretical insights into this topic and the managerial reality today. It discusses central project debriefing problems such as the lacking willingness to learn from mistakes or the lacking discipline in the use of project management manuals. We conclude the article with recommendations on how debriefing processes can be integrated successfully into project procedures.

Summary. The problem defined by the authors is that despite the need for project debriefing, there is a great variance in whether or not the debriefing is actually deployed: "knowledge and experiences gathered in different projects are not being systematically integrated into organisational knowledge" (p. 219). The article examines reasons for this gap, and, as a result of their research survey, "presents various key success factors for effective debriefing methods" (p. 219).

The article starts with the positive reasons to perform lessons learned and then establishes the problems of project learning. Project learning is desired and the systematic retention and use of project experiences benefits the company in various ways such as: enabling project comparison for problem solving, reducing project risks, and the achievement of long term sustainable competitive advantage. The authors label the knowledge loss problem as organizational amnesia once the project team moves on after the project. They support the existence of the knowledge loss problem with examples from literature and business.

Prior to describing success factors for project learning, the article provides a thorough overview of two project debriefing methods: process based and documentation-based.

"Process-based methods stress the relevant steps and their sequence in course of a project's time line while documentation-based methods focus on aspects of the contentwise (sic) representation of the experiences and the storage of contents within the organization" (p. 221). The authors focus on two process-based methods with specific tools to implement the proposed steps: the Post-Project Appraisal (PPA) and the After Action Review (AAR). The PPA has a strong learning element, uses an independent team, and examines completed projects about two years after completion to include possible late effects. The AAR helps the team learn applicable lessons immediately and was originally developed by the US Army. The goals of the AAR process are team learning, trust building, and team integrity building. The AAR process has been called *quick and dirty* - it asks these four questions and captures the answers:

- What was supposed to happen?
- What actually happened?
- Why were there differences?
- What can you learn from this experience?

Three documentation-based methods are presented. In the first method, Micro articles, magazine-like half-page articles are authored in a specific format. In the second method, Learning Histories, 20-100 page chronological stories are written in order to capture tacit knowledge and overcome the limits of conventional codification approaches. A check list with guiding questions is used for the third method, RECALL; these lessons are entered into a database.

Based on the above methods, the authors then identify the key success of project learning. The first is that a "regular gathering of key experiences was judged as most relevant,

having a positive impact on both the motivation of the team (who could directly profit from the lessons learned) and on the quality of the gathered insights" (p. 224). The second success factor is the use of a specific *debriefer*, a facilitator for the debriefings. Thirdly, the lessons learned process must be institutionalized into the project phases and be part of the project's goals.

This article is on the limit for the currency goal of this paper, but its content is well aligned with the goals to identify possible lessons learned processes and best practices. Because of their practicality and feasibility, the lessons learned success factors presented in this article are highly targeted to the practitioner and management audiences.

Williams, T. (2008). How do organizations learn lessons from projects—And do they? *IEEE Transactions on Engineering Management*, *55*(2), 248-266. doi: 10.1109/TEM.2007.912920

Abstract. The need to learn from one project to the next is clearly of vital importance, but is often neglected. Furthermore, there are fundamental issues within projects that inhibit such learning, such as the temporary nature of project organizations and the fundamental complexity of projects. This paper surveys the diverse literature that can help explain these factors and help projects to learn, and describes a large survey of project managers to look at what actual practice is and how successful it is perceived, as well as some empirical work. From this, a number of general conclusions are drawn as to how to create project organizations that are learning organizations.

Summary. This article's author, Terry Williams, is the same author for the book annotated above. This article is based on research funded by the Project Management

Institute; the research objective was to "identify current practices as well as what is currently considered 'best practice' for 'lessons learned' in the project management field, and to compare them with advances in understanding project behavior to identify the lessons not being learned" (p. 248). The research for this article is the same as the research for the above book, but with more detail than in the book and a focus on how-to and best practices. An additional area of interest in the article is the area of lessons not being learned, such as learnings by the individual that are not subsequently learned by the organization.

The question which forms this article's title 'How Do Organizations Learn Lessons from Projects—And Do They?' is strongly related to the survey and interview questions in the book by the same author and annotated above, 'Do Organizations Learn from Projects?'. The answers to these two questions are critical to the audience of this paper because they guide practitioners and management down the path of whether they should implement a lessons learned process, and if affirmative, how they should implement the process.

Conclusion

As organizations continue to increase their use of projects as a means of achieving organizational goals, the need for continuous improvement in project management and specifically in project lessons learned also increases. However, research shows that despite the recognized benefits, there remains a gap in achieving this needed improvement. For example, post project reviews, a component of lessons learned, are not conducted consistently, if at all (Anbari, Carayannis, & Voetsch, 2008). Additionally, lessons learned are not being incorporated back into the organization's procedures for the benefit of future projects (Williams, 2007). But research also shows that best practices are available for the organization that is interested in improving. For example, one commonly identified best practice is the use of an external or neutral facilitator during post-project reviews (Goffin, Koners, Baxter, & Van der Hoven, 2010; Julian, 2008; Schindler, & Eppler, 2003). An additional example is the role of a PMO in facilitating cross-project learning (Julian, 2008). The conclusions of a study performed by Julian (2008) provide practitioners and management with research indicating both the need for lessons-learned processes in their project management practices and a path forward with methods and proven best practices to implement the processes in their organizations to achieve the potential benefits.

This Annotated Bibliography provides information for organizations and practitioners who are interested in the topic of project lessons learned. Common ideas and themes are identified during the analysis of the selected references presented in the Annotated Bibliography that serve to benefit project management practitioners and their managers to implement and benefit from lessons learned methods. Background context, recommendations, and best-practice next steps are identified through research and in-practice findings.

Background on Project Management and Lessons-Learned Programs

The Kerzner (2009) and PMBOK (2013) texts establish the foundational knowledge on projects as an organizational type and their role in the business organization, the project management discipline for managing project execution, and the project lessons learned process and its role in project execution and continuous improvement. Anbari, Carayannis, and Voetsch (2008) compliment this information with specific background on the post-project review process; key findings from their research includes the emergence and development of learning processes within the organization and its contribution to improved project performance. Williams (2008) notes the difficulty of implementing project lessons learned due to the temporary nature of projects and their fundamental complexity.

Benefits and Challenges of Project Management Lessons-Learned Programs

A manager considering the implementation of a project management lessons-learned practice has a business interest in the benefits of the practice, namely determining if there is value in the time, effort and cost spent. Anbari, Carayannis, and Voetsch (2008) provide a succinct perspective on the benefits of post project reviews:

> They provide an important opportunity to link the effectiveness in meeting project goals, efficiency in utilizing the resources assigned to the project, and transfer of the special knowledge gained in performing the project to other projects, which is essential to the overall performance improvement of current and future projects, project management processes, and the organization as a whole. (p. 635)

The authors also note that performing post project reviews is beneficial to the overall performance of an organization, its competitive position, and the development of learning

processes. Schindler and Eppler (2003) list other benefits to performing project lessons learned such as reducing project risk and enabling the comparison of projects for problem solving.

Unlike recurring organizational tasks, projects pose unique challenges; "collective knowledge dissipates every time another project ends and its team is discharged" (Rezania & Lingham, 2009, p. 173). Williams (2007) notes that organizations that do not perform project lessons learned suffer from the repeat of mistakes from project to project and miss out on operational efficiencies. Those organizations that do pursue project lessons learned face their own challenges. Rezania and Lingham (2009) describe several issues with the post project review and barriers to the propagation of the learning gleaned from these reviews throughout the organization; these issues include treating lessons learned as unique to each project that are not applied to the organization and the failure of project teams to share with other teams due to a project's temporary nature. Schindler and Eppler (2003) detail issues with the central debriefing of projects, including unwillingness to learn from mistakes and the lack of discipline in the use of project management manuals. All of these challenges point to the need for documented best practices for use in project lessons learned.

Best Practices for Project Lessons-Learned Programs

To implement a lessons-learned process, Anbari, Carayannis, and Voetsch (2008) propose a five-step post-project review model. Their five step model touches on each of the recognized processes in the PMBOK (2013) project management model, the: (a) initiating, (b) planning, (c) executing, (d) controlling, and (e) closeout processes. Rowe and Sikes (2006) also document a five-step lessons-learned workflow that consists of: (a) identify comments and recommendations, (b) document and share findings, (c) analyze and organize the lessons learned, (d) store in a repository, and (e) retrieve for use. Thomas (2011) identifies the use of evaluations

when conducting project lessons learned as a means of determining which lessons should be captured and propagated. "Evaluation is the determination of Merit (quality), Worth (value), or Significance (importance)" (Thomas, 2011, p. 19). Williams' (2007) research findings provide additional information on what organizations are doing relative to lessons-learned processes and how successful the processes are. Rowe and Sikes (2006) present a three-tiered maturity model for lessons learned that includes a process to review the lessons stored in an organization's repository (level 2) and the use of metrics (level 3) that indicate the usefulness of the organization's lessons-learned practice.

Multiple references focus specifically on the post project review step, which also goes by other names such as the project debriefing or the project post mortem. One of the suggestions for the review step by Rezania and Lingham (2009) is to utilize an impartial evaluator. Schindler and Eppler (2003) focus on two different project debriefing methods; these methods are process-based (stressing the relevant project steps and their sequence in the project's timeline) and documentation-based (focusing on the representation of the project experiences and the storage of this content). They also suggest an impartial role in the process that they label the debriefer; the debriefer acts as a facilitator who manages the entire post project debriefing process, including the preparatory steps and documentation.

From a basis that practitioners are busy, Bjørnson, Wang, and Arisholm (2009) focus on the post mortem analysis process in order to identify effective methods that can yield useful results quickly. The authors' interest is on the method used for identifying possible root causes of project problems and successes. Desouza, Dingsøyr, and Awazu (2005) detail two methods, reports and stories, as options for the post project review step. Reports are highly structured in their presentation, low in cost, easy to prepare, have low richness of knowledge, and are difficult

to recall. Stories, on the other hand, are semi-structured at best, high cost to prepare, have high richness of knowledge, and are easy to recall. The authors also provide guidance on how to decide between reports and stories to capture knowledge to foster learning. Key recommendations include using reports if there is history for a specific kind of project, to enable traceability if resources are scarce, and to capture lessons learned on routine endeavors; and using stories if the project is unique and significant peculiarities have transpired during its life, the value of the benefits justify the higher cost, organizational impact is needed for a high magnitude event for the organization, and to drive home moral lessons.

Goffin, Koners, Baxter, and Van der Hoven (2010) address better ways to benefit from tacit learning, that knowledge that is considered valuable, but is difficult to articulate, capture and disseminate. The authors note that "discussing a project, noting down the lessons learned, and entering them into a database is not sufficient" (p. 39). The authors provide numerous recommendations such as management's needed support, the timing of reviews, the role of facilitators, and facilitation methods.

An emerging organization in the field of project management is the project management office (PMO); Julian (2008) has recommendations for the PMO in the area of lessons learned such as building trust and focusing equally on learning from both successful and failed projects. Boehringer (2009) also notes the vital role that the PMO can play in turning lessons learned into actionable observations that can be translated into best practices. He makes the important point that engaging in this exercise is a necessary step for a PMO to achieve maturity and for an organization to benefit from repeatable successes on projects.

When implementing lessons-learned processes and considering best practices, it is also critical to understand what research has shown to not work. Newell, Bresnen, Edelman,

Scarbrough, and Swan (2006) explore why cross-project knowledge fails; for example, storing lessons-learned information on a database is not widely used or useful, but efforts put into developing personal networks are useful. Other researchers have identified issues with the implementation of lessons learned best practices, including Williams (2007), whose research found the greatest perceived problems are "getting to the root causes of project outcomes and creating knowledge rather than simply collecting data" (p. 71). Williams' (2008) also found that "lack of employee time and lack of management support are the leading reasons for lessons learned not being undertaken" (p. 261).

While there are challenges to implementing project lessons-learned practices, the benefits to the organization for doing so are well documented. Kerzner (2009) tells us generally that best practices "lead to a sustained competitive advantage in project management" (p. 373). More specific to lessons-learned practices, Anbari, Carayannis, and Voetsch (2008) state that the "regular collection of lessons learned in projects, their careful storage in the organization's historical information database, and their meaningful utilization in subsequent projects are critical elements of project success and organizational competitiveness" (p. 642). The identification of best practices for lessons learned and the commitment of practitioners and their managers to implementing and championing lessons learned practices can lead to both project and organizational success.

References

Anbari, F., Carayannis, E., & Voetsch, R. (2008). Post-project reviews as a key project management competence. *Technovation, 28*(10), 633-643. doi: 10.1016/j.technovation.2007.12.001

Bell, C., & Frantz, P. (2013, July). *Critical evaluation of information sources*. University of Oregon Libraries. Retrieved from http://library.uoregon.edu/guides/findarticles/credibility.html

Bjørnson, F., Wang, A., & Arisholm, E. (2009). Improving the effectiveness of root cause analysis in post mortem analysis: A controlled experiment. *Information and Software Technology*, 51(1), 150-161. doi: 10.1016/j.infsof.2008.02.003

Boehringer, H. (2009). Knowledge is power. *PMI Global Congress Proceedings – Orlando, Florida*. Retrieved from http://www.pmi.org/learning/knowledge-power-implementing-lessons-learned-6663

Cleland, D., & Ireland, L. (2008). *Project manager's handbook: Applying best practices across global industries*. McGraw-Hill.

Desouza, K., Dingsøyr, T., & Awazu, Y. (2005). Experiences with conducting project postmortems: Reports versus stories. *Software Process: Improvement and Practice, 10*(2), 203-215. doi: 10.1002/spip.224

Drucker, P. (2006). *Classic Drucker: Essential wisdom of Peter Drucker from the pages of Harvard Business Review*. Harvard Business Press.

Goffin, K., Koners, U., Baxter, D., & Van der Hoven, C. (2010). Managing lessons learned and tacit knowledge in new product development. *Research-technology Management, 53*(4), 39-51.

Gordon, R. & Curlee, W. (2011). *The virtual project management office: Best practices, proven methods*. Vienna, VA: Management Concepts.

Koenig, M. & Srikantaiah, T. (2004). *Knowledge management lessons learned: What works and what doesn't*. Medford, NJ: American Society for Information Science and Technology.

Julian, J. (2008). How project management office leaders facilitate cross-project learning and continuous improvement. *Project Management Journal, 39*(3), 43-58. doi: 10.1002/pmj.20071

Kerzner, H. (2009). *Project management: A systems approach to planning, scheduling, and controlling*. New York: Wiley.

Loo, R. (2002). Working towards best practices in project management: A Canadian study. *International Journal of Project Management*, *20*(2), 93-98.

Newell, S., Bresnen, M., Edelman, L., Scarbrough, H., & Swan, J. (2006). Sharing knowledge across projects limits to ICT-led project review practices. *Management Learning*, *37*(2), 167-185. doi: 10.1177/1350507606063441

PMBOK Guide. (2013). *A Guide to the Project Management Body of Knowledge*. Fifth Edition. Newtown Square, PA: Project Management Institute.

Rezania, D., & Lingham, T. (2009). Towards a method to disseminate knowledge from the post project review. *Knowledge Management Research & Practice*, *7*(2), 172-177. doi: 10.1057/kmrp.2009.9

Rowe, S. & Sikes S. (2006). Lessons learned: Taking it to the next level. *In Proceedings 2006 PMI Global Congress Proceedings, Seattle, Washington*.

Schindler, M., & Eppler, M. (2003). Harvesting project knowledge: A review of project learning methods and success factors. *International Journal of Project Management, 21*(3), 219-228. doi:10.1016/S0263-7863(02)00096-0

Thomas, W. (2011). *The basics of project evaluation and lessons learned*. Boca Raton, FL: CRC Press.

Williams, T. (2007). *Post-project reviews to gain effective lessons learned*. Newtown Square, PA: Project Management Institute.

Williams, T. (2008). How do organizations learn lessons from projects—And do they? *IEEE Transactions on Engineering Management, 55*(2), 248-266. doi: 10.1109/TEM.2007.912920