A systemic lessons learned and captured knowledge (SLLCK) model for project organizations.

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Abstract

A significant challenge for government and business project organisations is to ensure that lessons are learned and that mistakes of the past are not repeated. Both the knowledge and project management literature suggests that the lessons learned process in practice rarely happens, and when it does it fails to deliver the intended results. This paper proposes a conceptual systemic project management lessons learned and captured knowledge model derived from the Swiss cheese model for safety and systemic failures, where captured knowledge from lesson learned is distributed and applied across a network of variables such as individual learning, culture, social, technology, process and infrastructure.

Keywords: Project Knowledge Management, Lessons Learned, Learning, Culture

Introduction

There is a government and business need to successfully manage programs and projects, to learn from success and failure, and to capture, disseminate and apply lessons learned [1-4]. The PMI’s Project Management Body of Knowledge (PMBOK® Guide) [5] identifies the importance of collecting and documenting lessons learned and implementing process improvements. The PMBOK® Guide knowledge areas also reference the lessons learned process. However, in practice organisational learning from projects rarely happens and when it does it fails to deliver the intended results [6-13].

In this paper we present a research project that has developed and validated a systemic lessons learned and captured knowledge (SLLCK (pronounced Silk)) model, and identified some of the facilitators and barriers to capturing knowledge from lessons learned by projects. In the literature review we provide a broad examination of the key elements of knowledge, people and systems in the context of lessons learned. Next we introduce the SLLCK model and describe its development from the literature. We then present the method and findings of the validation study and a revised SLLCK model is proposed. Finally we discuss the findings within the framework of the literature and speculate on practical applications and future research opportunities.

Literature review

The scope of the literature review is contained to what is known about the efficacy of current organisational lessons learned processes and the nature of organisational knowledge and how it is constituted from the accumulation of individual knowledge and distributed through a living network that comprises individual relationships and social, cultural, and organisational practices and processes.

On lessons learned

The dissemination and application of project management lessons learned is critical to organisational programs and projects achieving success [14]. Williams [11, p262] identifies that there is a need for “...wider research into how lessons can be disseminated throughout an organization and incorporated into organizational practice”.

Overall there is a significant dissatisfaction with lessons learned processes as they are. Milton [9] has found that out of 74 organisations that attempted lessons learned, 60 per cent were dissatisfied. Williams [15] found that 62 per cent of 522 project practitioner responses had a process for learning lessons and of those only 11.7 per cent followed the process. Furthermore, O’Dell and Hubert [16] found that whilst the lessons learned process is popular, it fails to deliver the intended results as lessons are identified and are often not followed through and applied within the organisation.

Institutions such as NASA also have issues surrounding lessons learned. Following reviews in 2000 of NASA’s Mars Program, Space Shuttle wiring problems and the implementation of NASA’s ‘Faster, Better, Cheaper (FBC) project, NASA implemented action plans to improve sharing of experiences and lessons learned [17, 4]. In 2002 the Government Accountability Office found that NASA lessons learned were not routinely identified, reviewed and accessed by project managers [1]. A recent 2012

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NASA Office of Inspector General audit report highlights that NASA project managers are still not routinely using the lessons learned information system (LLIS) to contribute new information or to search for lessons learned identified by others [4].

A review of the BP Deepwater Horizon accident investigation revealed how lessons learned of previous “well control event incidents” and “lines of communication” were not acknowledge or addressed and was a contributing cause to the failure [18, 19]. NASA today uses the BP Deepwater Horizon incident as a lessons learned case study paying particular attention to communication deficiencies around government oversight, disregard of data, testing, changes to process, safety culture and lessons learned from previous incidents [20].

There are few signs that any lessons are being learnt in the public sector [21]. For example the Australian State Victorian Government Ombudsman examined 10 major ICT business transformation projects during 2011 and identified that despite the extensive guidance, reports and literature available, agencies are still making the same mistakes around planning, governance, project management and procurement.

**On knowledge**

To identify with organisational lessons learned one needs to understand what organisational knowledge is. Today, in the context of the organisation, knowledge exploration is attributed to Drucker [22] (knowledge as management resource and power), Wiig [23] (knowledge as a form of belief), Polanyi [24, 25] (distinction between tacit and explicit knowledge) and Davenport and Prusak [26, p5]:

> Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. ...In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms.

Polanyi’s [24] work formed the foundation for Knowledge Management (KM) theory authors Nonaka and Takeuchi [27, 28]. Tacit knowledge is subjective, environment-specific, personal, and is difficult to communicate. Explicit or codified knowledge is objective, easily communicated and transferred without in depth experience [27]. Polanyi [25, p4] stated “…we can know more than we can tell” and contends that humans create knowledge by involving themselves with objects through a process. Nonaka and Takeuchi [27] propose that tacit knowledge consists of cognitive and technical elements. The cognitive element is based on Johnson-Laird [29] “mental models” (schemata, paradigms, perspectives, beliefs and viewpoints) where humans create working models of the world in their minds. The technical element is the existing know how and skills.

**On networks**

The term network is used to describe how the component parts of an emergent useful phenomenon are connected together. Two key examples of what are described as complex adaptive networks are networks of individuals and organisations that are associated with knowledge distribution are human cultures and the human brain [30, 31]. That is to say that knowledge is not to be found stored in some way in one spot, but rather it is distributed across a network of interconnected component parts.

Projects and organisations are often described as complex adaptive systems which evolve through adaptive exploration and the transformation of information [31-34]. Gabora [31] and Whitty [35, 30] both describe the connection of biological structures and cultural ideas and practices and how they evolve through selection and transmission and the implications for human behaviour with complex adaptive systems such as organisation.

Kaeshavarz et al. [36] and Holland [37] further describe such social complex adaptive systems as comprising individuals and organisations, and as having a distributed network of control rather than a central point of control. Furthermore, Holland [38, p25] point out how complex adaptive system rely on “parallelism, competition and recombination” to adapt to new information within a system. Moreover, Bullmore and Sporns [39] describe the structural and functional makeup of complex networks such as the human brain to comprise nodes, clusters, hubs and module parameters. Human knowledge therefore, which extends beyond the human brain, is not only stored as interconnected cells within the brain [39, 30], but it is also stored across for example organisational cultural artefacts, rituals, and practices [40], that are also interconnected, or for want of another term – networked.

**On people**

Duhon and Elias [41] reports that failure of learning valuable lessons from projects can be connected to the learning, cultural and social people factors. Maqsood [42], and Duhon and Elias [41] both highlight the need to understand cognitive psychology when examining the effectiveness of tacit knowledge in the learning process. Maqsood [42] further reports that every person has a distinctive learning technique and that learning depends on an individual’s capability to effectively acquire and use in a timely manner. Duhon and Elias [41, p1] describe learning as “…any increase in knowledge or skills that enables the learner to be more effective” in achieving their objectives.

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From the collective point of view, project teams often know they are in trouble, however they take no or minimal effort to resolve errors as owning up to failure may cause shame [43]. Duhon and Elias [41] report that a protective post lessons learned attitude weakens the process and hides the real problems of the project. When a problem is recognised they are biased to learning the least-threatening lessons. Duhon and Elias [41] argue that all in an industry sector should be learning from the mistakes of others, and that we typically view others as substandard to us and don’t believe we can learn from them. Therefore it is often hard to get relevant information on what went wrong.

The literature to date re-enforces that people factors influence the success of the lessons learned process and that a learning organisation culture is critical to successful dissemination of lessons learned [44-47]. The work of Senge [48], Nonaka and Takeuchi [27] both motivated companies to become learning organisations. Simon [49, p125] states that:

All learning takes places inside individual human heads; an organization learns in only two ways: (a) by the learning of its members, or (b) by ingesting new members who have knowledge the organization didn’t previously have. ...What an individual learns in an organization is very much dependent on what is already known to (or believed by) other members of the organization and what kinds of information are present in the organizational environment. ...Individual learning in organizations is very much a social, not a solitary, phenomenon.

Duhon and Elias [41] argue that an organisation knows something if just one person knows it and that the organisation culture and structure enables that knowledge event to be used effectively. They reference actions such as: individual learning; knowledge storage (checklists and work processes); organisational changes that re-focuses knowledge; culture changes to open and act on problems; and relationship building that enables skills and knowledge to deal with organisational problems. They also state that people learn by processing information using the human central nervous system. An organisation does not have a central nervous system, so they need to create a structure to enable their personnel to learn as a group. Duhon and Elias [41] find that individual learning is a cognitive psychological process and for an organisation the learning process is social. Blackman and Henderson [50] briefly discuss how organisational learning is affected by social and intellectual credibility.

On Culture

Baring in mind what has been said about knowledge being distributed across a network, one can consider culture to be a form of network for like-minded individuals. Culture per se plays a significant part in KM, organisational learning and in the effectiveness of learning mechanisms [47, 41, 51, 44]. Dvir and Shenhar [52, p20] state that “Great projects create a revolutionary project culture. The execution of great projects often requires a different project culture, which can spread to an entire organization.” Williams [15, 11], Hislop [53] and Maqsood [42] all suggest that it is critical to understand the culture of an organisation before implementing or using lessons learned as surveys consistently reveal that the main obstacles to success are organisational people (social and culture) factors.

Reason [54, p195] defines a just culture as “...an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information – but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour.” The other important elements of a safety related culture are to have a strong reporting, flexible and learning culture [54]. Reason [54] further states that the learning culture is the easiest to engineer however is the most difficult to make work. Pettersson and Nyce [55] state that “just culture” is where individuals in an organisation want to be open about failures and mistakes. Lucier [56] argues that if you can encourage team members to document their mistakes with no fear of further action, you will be able to establish a useful knowledge system. Stastny and Garin [57] and Duhon and Elias [41] both discuss the benefits and obstacles in implementing a just culture and there appears to be a lot of similarities with the project management lessons learned process.

The work of Reason [54] with just culture highlights a lot of similarities with project management lessons learned [41]. Reason’s [54, 58] Swiss cheese model (Figure 1) argues that organisational accidents are caused by active failures and latent conditions. Reason [54] reports that the Swiss cheese model shows the implementation of “defences in depth”, where one identifies that projects have errors (holes) in them, which are brought about by human factors, and there are layers of defences to prevent them from occurring.
On lessons learned processes

The lessons learned process is specifically addressed in various project management guides, standards, methodologies and maturity models. Lindner and Wald [59] note a gap in project management practice as there is a need for more research in understanding the role KM plays in project management methodologies. Over the last 14 years the PMBOK® Guide has increased the references to the term lessons learned. In the PMBOK® Guide 4th edition there is a focus on process improvement as a result of lessons learned [5]. It is important to note that ‘lessons learned’ is not discussed anywhere except for a glossary description [5].

Reich and Wee [60, p24] recommend that the PMBOK® Guide should be “...transformed into a true knowledge guide - both imparting and recognizing the knowledge needed to complete projects successfully.” The Project Management Institute’s OPM3 Organizational Project Management Maturity Model [61] references lessons learned. However there is less guidance than that provided in the PMBOK® Guide [5]. The Office of Government Commerce PRINCE2 [62, p12] project methodology encourages project teams to “…learn from previous experience: lessons are sought, recorded and acted upon throughout the life of the project”. PRINCE2 has a single process for recording lessons learned (lessons learned log) and reporting on them (lessons learned report). The Capability Maturity Model Integration (CMMI) [63] model provides for best practice organisational process improvement. Process improvement proposals and process lessons learned are key work products and sub-processes. Midha [64] discusses the benefits of CMMI and identifies the classic approach of collecting and translating key lessons into processes. Von Zedtwitz [43] developed a capability model for post-project reviews based on the standard five-stage capability model.

O’Dell and Hubert [16, p69] stated that the lessons learned approach typically focuses on a few key questions:

- What was supposed to happen?
- What actually happened?
- Why was there a difference or variation?
- Who else needs to know this information?

The major challenge is to then get employees to participate and reuse the captured knowledge [65, 16, 66]. Milton [66] describes the KM lessons learned process stages as learning before, during and after. The literature on lessons learned processes provides many variations on essentially three process steps ‘identification, dissemination (transferring) and application’. Common literature capture techniques found are: reflection, lessons learned sessions; after action reviews; project debriefings; close out meetings; post project appraisals/reviews; case study exercises; community of practices; project milestone reviews; post mortems, project histories; project health checks; and project audits [67-69, 10, 15]. Literature on knowledge disseminating and transfer often refers to codification, verification, storing, searching, retrieving, knowledge sharing and training [70, 71, 65, 16, 10, 15].

A number of methods are used to disseminate knowledge lessons learned. Two methods of interest are 1) process methods and 2) social based methods. Process based methodologies are those lessons learned where the knowledge is reflected in an organisations policies, processes and procedures [7, 64, 72, 10, 15]. Social based methodologies are those lessons learned that are not easy to break up and transfer knowledge from one person to another [73, 45]. Fernie et al. [45] argue that knowledge sharing is best performed through the communication of individuals. Two identified social-based processes are networking and mentoring [73, 74]. Knowledge application often requires a significant effort, commitment, understanding of people behaviour for both the organisation and individuals, as this is the area where the process typically breaks down and fails [41, 7, 15].

On technology and infrastructure

The literature provides numerous technology solutions of storing, recording and accessing lessons learned, the key is to identify what works for an organisation and constantly monitor, update and keep it current and relevant [15, 11]. Technology is a critical element to knowledge dissemination. Quite often technology is blamed for failure in knowledge dissemination [15]. As with all process flows, ensuring the right people are involved, the right systems and infrastructure (facilities, equipment and materials) is critical in laying the foundation down for lessons learned to be effective [75].

The SLLCK Model

The SLLCK model is grounded in the literature above. It is an attempt to network together by means of an adaptation of the Swiss cheese model, the various features of social and cultural learning with the processes, infrastructure and technology that support them. The model has, over a period of two years, undergone a number of iterations. Initial reviews of the literature pertaining to lessons learned focused on the dissemination of lessons learned and a preliminary model was developed (Figure 2). This version highlighted the people, process, learning and technology variables that influence the dissemination of lessons learned between the project team and the organisation. The model was derived and based on the reverse relationships of the Reason [54] Swiss cheese model where the variables all need to align to effectively disseminate lessons learned.

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Following an extended detailed literature review it became clear that the model needed to focus on both the dissemination and application of lessons learned. The literature already shows that identification of lessons learned appears to be done quite well in most organisations, whereas the dissemination and application of lessons learned fails to deliver the intended results [6-13].

**Figure 2 – Preliminary lessons learned model**

The extended literature review highlighted the people element (learning, culture and social aspects), the system element (technology, process, and infrastructure) and the integration of the elements that form a knowledge network that captures and therefore influences the dissemination and application of lessons learned between the project team and the organisation. The output of the extended literature review was analysed using a grouping-categorisation matrix and associated mind maps. The deductive content analysis process assisted in the development of a revised SLLCK model (Figure 3).

**Figure 3 – A ‘systemic lessons learned and captured knowledge model’**

The model, as with its predecessor, is based on the reverse relationships of the Reason [54] Swiss cheese model where the variables of learning, culture, social, technology, process and infrastructure need to align and be effective to disseminate and apply lessons learned. The reverse relationship refers to the fact that the open holes in the variable layers represent the various facilitators in each of those areas that enable the dissemination and application of the identified lessons.

**Validation Study**

**Research Methodology**

The research method adopted is a qualitative approach using an extended literature review and a range of tools (categorisation matrix, mind and concept maps) to carry out a deductive content analysis of the data [76]. The categorisation matrix, mind and concept maps exercise is based on the three sub-processes of data reduction, data display and conclusion drawing [77]. The purpose of the content analysis is to identify the most common lessons learned elements acknowledge by other researchers which will define the key variables that are synthesised to form a SLLCK model.

To further test the SLLCK model a qualitative exploratory focus group research methodology approach was used. The focus group provides the practical experience and performs as a diagnostic tool to validate the model [78]. It also enables multiple perspectives to be clarified to achieve a solid understanding and interpretation of the model [78]. The SLLCK model was presented to a pilot focus session followed by two focus groups. Ethical approval for this study was granted, anonymity assured, research notes were taken throughout, and audio recordings were destroyed following transcription. The pilot focus session provided a preliminary run through of the focus group exercise to refine the interview structure. The first focus group consisted of five participants, the second had eleven. The participants were project, engineering and knowledge management professionals from local South East Queensland Australia organisations.

The SLLCK model was presented to each of the focus groups and they were encouraged to make comments and provide feedback on their first impressions. The SLLCK model was then broken down into elements (learning, culture, and so on) on separate worksheets. The worksheets were in the form of large sheets of paper placed on desks and walls. The focus group participants were asked to identify positive openings (facilitators) and negative impediments (barriers) that impact the SLLCK model. The worksheets were then reviewed as a group. Following the focus group sessions the audio and worksheet data was analysed and grouped under each of the elements/variables of the model.

**The Results**

First impressions from the focus group participants were that the SLLCK model does “make sense and...
gels with the reverse of the old adage that a catastrophe has several things lined up to fail”. Participants also agreed with the view that technology is seen as an enabler and that culture, social aptitude and a priority to capture knowledge from learning experiences through project is important.

The data generated from the focus group sessions is shown in Table 1. During the focus group sessions the participants were able to validate the model as they felt it supported their experience whilst reconceptualising the topic of lessons learned. Drawing on their experiences, participants were able to identify the facilitators to lessons learned (the holes in the model) and the barriers. Whilst the participants raised much of what has already been identified in the literature, they also identified facilitators (See Table 1: identified with *bold) that have limited coverage in the lessons learned literature, such as;

- The level of knowledge/credibility of individuals
- A culture of helping people; culture of respect, where knowledge/experience is respected
- Where systems are respected and form part of the everyday job
- Where people are committed to credible processes.

Frequently the participants discussed how well the model represented the complexity of the real world, and how all the multiple variables need to align to enable a lesson to be learned and then captured (remembered) in various forms across the organisation. Participants also discussed how each of the variables has a number of subsets and that the model can represent knowledge storage and found some alignment with a complex organisational brain. One participant made the statement “Do people really understand lessons learned, as the concept is thrown around all the time, however often lessons are captured, the job is considered done and lessons are not reinforced.”

Across the focus groups, participants agreed that it is the people element that is most likely to negatively influence lesson learned processes and create barriers to the dissemination and application of lessons learned in organisations. Focus group participants clearly stated that “people make it happen”. One focus group spent more time discussing culture and process, while the other was more focused on the social aspect. Participants also highlighted how systems should provide a supporting role to the people. Using the SLLCK model as a construct for the discussion, one lesson learned scenario raised demonstrated how the variables of learning, culture, process and infrastructure were opened to capturing knowledge, whereas the variables of social and technology were closed and prevent the dissemination and application of the identified lessons.

The focus groups provided feedback as to how the model can help them. Participants stated that the model helps with the change management process. That the model reflects complexity, as it is “hard to get a lesson learned through, so it is not just about having a database, it is not just about one thing it is about a series of things...I like the way it kind of stacks it up and shows it working”. One Project Manager stated that “we were getting lots of push from our KM team to get lessons learned going and get it implemented to meet deliverables, had we had the model we would have been able to present to the Directors to show them what needs to be invested in to do it properly, as it is not just about doing a process.” Furthermore, that one problem for organisations is a lack of recognition of this complexity. All the focus groups agreed that the SLLCK model conceptualises the problem well in a way that enables the problems to be discussed, and that it provides a good alignment of what has to be in place to allow the lessons learned process to deliver the intended results.

Discussion

The data generated from the focus group sessions (See Table 1) appears to ground the SLLCK model in the lesson learned and project knowledge management literature [14, 73, 44, 41, 47, 42, 9, 16, 15, 11, 45]. Participants were able to identify their experiences with, and further build and refine the SLLCK model (See Figure 5). The results illustrate that organisational learning is a complex process and it is clear that organisations need to enable the facilitators and remove the barriers and encourage, through their practices and processes, positive cultural, social and learning environments.

Two particular discussion that arose from the focus groups are noteworthy; that of credibility and complexity. The discussions on credibility is notable in that it occurred during both the considerations of facilitators and barriers, and the subject has limited direct references in lessons learned and knowledge management literature apart from Blackman and Henderson [50] and Liebowitz and Megbolugbe [79]. The discussion on complexity is also notable as the focus groups emphasised how the SLLCK model can resemble and conceptualise the network ‘brain’ of an organisation. This supports the literature of knowledge distribution across complex networks [31, 35, 30].

The amount of discussion time spent during the focus group sessions on culture, social and process emphasises the importance these variables play in the SLLCK model and supports the findings in the literature of Anbari et al. [67], Bakker et al. [68], Duhon and Elias [41], Hislop [53] and Maqsood [42, 69], Schindler and Eppler [10] and Williams [15, 11].
## Positive openings (facilitators) and negative impediments (barriers) within each lessons learned variable:

### People-Learning

#### Facilitators
- Right sized people
- Right people to help
- Training (effective)
- Learning from experience
- Willingness to share knowledge
- Reflection
- Knowledge level (credibility)

#### Barriers
- Takes too much time, time pressures
- Lessons won’t apply to my project
- Lessons don’t apply to my project
- Difficult to teach practitioners in other parts of the organisation
- People do not learn and continue to make the same mistakes

### People-Culture

#### Facilitators
- Identify at the top
- Routine practices
- Supportive practices / supporting culture
- Help needed (help me to help you)
- Rapid change of staff
- Internal politics (credibility)
- Technical solutions
- Understand that knowledge is power
- Know your audience
- Networking encouraged and supported
- Positive leadership
- *Respect*

#### Barriers
- Anonymous reports
- Bureaucracy
- Don’t have time
- Rapid change of staff
- Unimpressed by share floss valuable
- Don’t want to appear vulnerable and stupid
- Resistance to change
- Not my problem
- Too stubborn
- Too complex

### People-Social

#### Facilitators
- Custom staff teams
- Operate as a team
- Difficult to do this
- Satisfy different approaches (Not one size fits all)
- Do not personalise
- Interact with as many people as possible to capture information
- *Must have credibility*
- Teamwork approach
- Honesty and integrity
- Provide time for unstructured interaction
- Good enterprise social business
- Productive culture

#### Barriers
- Senior management commitment
- Not everybody uses social media
- Lack of money / funding / expensive
- Too complex
- Perceived credibility and approachability
- System is not part of your everyday job
- Not being able to find what you need when you need it

### Systems-Technology

#### Facilitators
- Expert systems
- Electronic mail
- Multiple channels of information in use
- Case studies
- End User Interface Usability Evaluation

#### Barriers
- No way to classify lesson for easy retrieval
- Not trained in use of tools
- Poor (lack of) ICT systems and processes
- Done in inconsistent ways
- Too many initiatives
- Poor Search facility
- Restricted audience
- No better solution than the system in place
- No better solution than the system in place
- Too complex
- Not being able to find what you need when you need it

### Systems-Process

#### Facilitators
- Willingness to conduct the process
- Executive
- Brain Storming
- Case Studies / Tell a story / Keep 2 pages - simple
- Examinations (Training, Education)
- Staff Transfer
- Functional management enforcement

#### Barriers
- Procedures not followed, don’t exist, not updated
- Post implementation reviews not done
- Takes too much time
- Lack of time to monitor
- Lack of enforcement
- Lack of understanding and commitment
- Complexity
- Don’t bother my problem

### Systems-Infrastructure

#### Facilitators
- Physical space
- Staffing schedules
- Senior management commitment
- Good user interface/usability evaluation

#### Barriers
- Legal constraints
- Good service
- Time limits
- Lack of financial/funding support
- Remote sites have limited infrastructure

### Table 1 – Positive openings (facilitators) and negative impediments (barriers) within each lessons learned variable

<table>
<thead>
<tr>
<th>Positive Openings/Facilitators</th>
<th>Negative Impediments/Barriers</th>
</tr>
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<tbody>
<tr>
<td>People-Learning</td>
<td>People-Culture</td>
</tr>
<tr>
<td>People-Social</td>
<td>Systems-Technology</td>
</tr>
<tr>
<td>Systems-Process</td>
<td>Systems-Infrastructure</td>
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Many of the facilitators and barriers identified are not directly related to the project management and knowledge management operational processes; however, they have significant consequences on how project knowledge is used within an organisation. One clear finding during the focus group sessions was the confirmation that lessons identification processes do exist and seem to work well and that the problem is with the dissemination and application of lessons learned. This causes individuals to believe the lessons learned process is working when in fact only the first part of the process (lessons identified - observed) is working. This separation of the lessons (identification) learned process is seldom discussed in the literature. The study has brought forth supporting evidence that a SLLCK model can influence the dissemination and application of project management lessons learned between the project team and the organisation.

Limitations and challenges

One of the challenges with content analysis is that the process is flexible in nature and there is no simple right way of doing it [76, 80]. The focus group approach does have some limitations and disadvantages. A unique sampling problem could arise as each of the two focus groups had similar backgrounds and experiences. The results could be dependent on the moderator and finally the groups are not intended to represent the larger population [78].

Future research

The information produced from the focus groups forms a good basis and structure for future research using an appropriate mixture of qualitative case studies and quantitative survey instruments. More consideration should be given to the alignment, interaction and complexity issues of the people and systems elements within the lessons learned organisational environment. This approach is supported by a recent project management PM World Today editorial post on Lessons Learned but Knowledge Lost [81]. In response, Wideman [82, p1] a recognised project management global expert stated:

...in spite of all the technology that is available to us today, we have not yet found a presentation format that captures the essence of this wisdom in a way that is relevant to future usage, readily searchable and easy to store. ...we have a serious cultural problem. ...we are probably condemned to continue to throw away the valuable resources.

This open public discussion highlights the significance of project management, knowledge management and the lessons learned practice and the impact a grounded model has on providing solutions to the problem.

Finally the study supports the premise that the project management lessons learned processes today can largely be considered incomplete and misunderstood. Future research themes could focus on how best project management lessons learned is represented to the practitioner community and their organisations, in a way that can be captured in project management reference books, methodologies and bodies of knowledge.
Conclusion

This research study is focussed on exploring whether a SLLCK model can influence the dissemination and application of project management lessons learned between the project team and the organisation. The study suggests that by reconceptualising lessons learned, the SLLCK model can influence the dissemination and application of project management lessons learned. This study has established that the alignment of the people and system elements could positively influence the success of an organisation’s lessons learned processes. The study found that the people element and culture factor may well be the most likely to negatively influence lessons learned in organisations. Furthermore, the study also established that several variables of the model and their elements need to align to ensure organisational lessons are learned by means of projects. Finally, the findings contribute to the project and knowledge management literature and provide an opportunity to improve project knowledge sharing, and ensure projects achieve success for organisations to maintain a competitive advantage.

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