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Managing project lessons learned within the City of Cape Town metropolitan municipality

33rd IPMA World Congress Presentation

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Inspiration that led to study - Bell UH-1 Iroquois (Huey)



DEATH FROM ABOVE – the Vietnam War-Era Huey

- Produced: 1956 – 1987 (about 17 000 units).
- First turbine powered helicopter – Lycoming T53-L-13.
- Renowned reliability and durability.
- Easy to maintain.
- Versatile configurations.
- Famous for medevac role – casualty transport.
- Payload: 997 kg (additional to fuel and crew).
- Range: 511 km.
- Max Cruise Speed: 204 km/h.
- Charter Service – CCT Waterfront.



Picture: UH-1H (Huey) firefighting helicopter / Benjamin William Pearce

Vietnam War – 1954 to 1975

- North Vietnam (Vietcong) vs South Vietnam and Western allies.
- Vast jungle and mountains proved difficult to traverse.
- Traditional ground troop warfare proved ineffective.
- Guerrilla tactics applied by the Vietcong.
- Setting of traps and improvised munitions from basic materials.
- High rate of casualties due to booby traps and mines.



- **Deaths:**
 - 2 000 000 Vietnamese civilians.
 - 1 100 000 North VC soldiers.
 - 250 000 South Vietnamese.
 - 58 220 US troops.
- Approx. 390 000 wounded transported via Huey medevac.
- On average 100 mins to reach hospital/facilities.

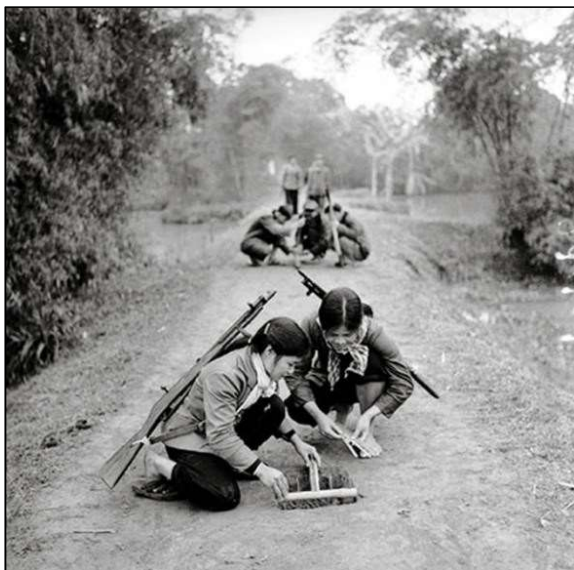


Source: US National Archives and Records Admin 1966. NAID: 530610 Photo: James K. F. Dung, SFC

Vietnam War – Improvised Weaponry and Munitions

Booby Traps:

- Improvised weaponry and munitions (Booby traps)
- Part of guerrilla warfare tactics deployed.
- Used to devastating effect on morale.
- Made from natural, recycled and discarded ammunition/munitions.
- Use of natural camouflage, bamboo materials and copper wire.
- Designed to maim instead of kill.



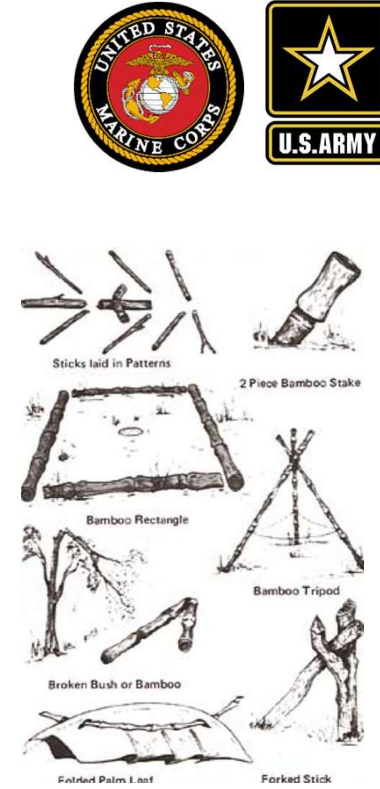
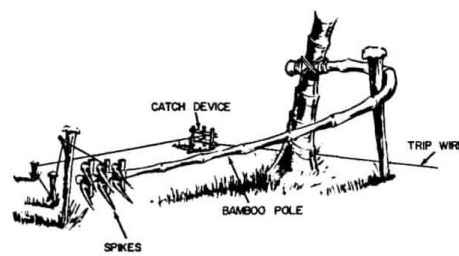
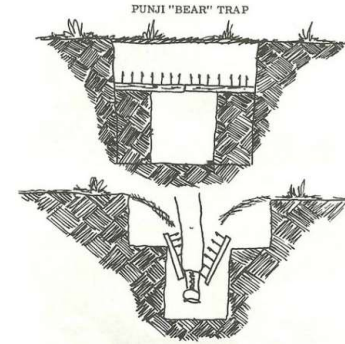
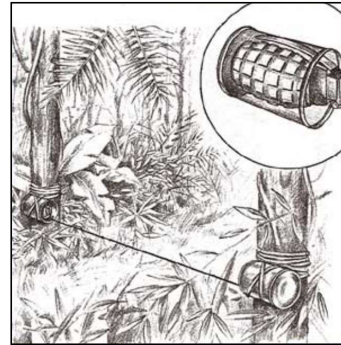
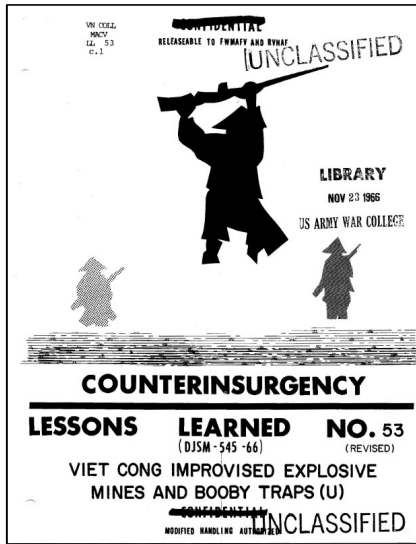
Vietnam War – Improvised Weaponry and Munitions

Effects of Improvised Munitions (Booby traps):

- Mental/psychological fatigue and demoralisation.
- Personnel injuries and casualties.
- Diverting of manpower and resource to deal with casualties.
- Delays in battalion progress.



Lessons Learned – Examples and History

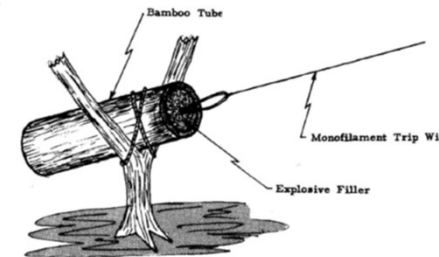


Inspiration for the study:

- US/Vietnam War (1955 – 1975) – Lessons Learned Programme
- Lesson learned reports – built on experiences in the field of battle

Countermeasures (Developed via Lessons Learned processes):

- Spotting markers/indicators in the field.
- Dispersion during advances – distance between personnel.
- Staying off the beaten path/trails or natural logical routes.
- **Lessons Learned** documentation used to brief new recruits or deployed personnel.
- Training requirements for search and destroy.



Sources: - US Army Counterinsurgency Lessons Learned
 - USMC Special Issue: Vietcong Mines & Booby-traps

Lessons Learned – Within Local Government Context

“Those who cannot remember the past are condemned to repeat it...”
(Santayana, 1905)

Greater South African municipal project context:

- Importance of establishing and maintaining infrastructure within the municipal environment
- Strategy implementation and infrastructure development are driven and delivered by projects
- Project implementation success vary within different public sector institutions (Kruger & Mugumbate, 2021)
- Learning from project experience and avoiding repeat mistakes can improve project success

City of Cape Town Context:

- Importance of establishing and maintaining infrastructure within the municipal environment
- Hence the importance of successful project planning and implementation
- Continual improvement must be driven via Lessons Learned (LL)
- No evidence of formal policy or processes currently exist within CCT

Research Objectives

- Identify the **challenges** and **key reasons** why LL are not formally captured, analysed and shared.
- Investigate and consider current **practices, processes or selected examples**.
- Develop/Select a proposed **conceptual methodology**.
- Postulate the **unique benefits** of managing LL.
- **Consulting** current capital project managers on LL.

Research Design

Design and research instruments:

- Case study – City of Cape Town
- **Main research instruments:**
 - Survey: Questionnaire A – Lessons Learned Status and Approach
 - Survey: Questionnaire B – Lessons Learned Maturity (CII, 2007)
 - Nominal Group Technique Sessions A to D (Dunham, 1998; McMillan et al., 2014)
- **Population and sampling:**
 - Selected participant qualifying criteria:
 - Project managers responsible for projects **>R50m**
 - Projects of **medium** to **high** levels of complexity
 - Project managers who **actively manage projects** as part of their profession
 - **164** project managers identified to participate in surveys.
 - Response rates:

Research Instrument	Participation Requests	Responses Received	Percentage
Questionnaire A	164	75	45.7%
Questionnaire B	164	68	41.5%
NGT Sessions A to D	6	6	100%

Definitions of Lessons Learned

LL Definitions:

- PMI (2017:709) - “the knowledge gained during a project, which shows how project events were addressed or should be addressed in the future, for the purpose of improving future performance.”
- US Army defines LL as knowledge or understanding gained from experience, successful or otherwise, that causes an organisation to improve (Roe et al., 2011)
- The Construction Industry Institute (CII) (2007:1) defines LL as: “knowledge gained from experience, successful or otherwise, for the purpose of improving future performance. In an effort to promote success and achievement”

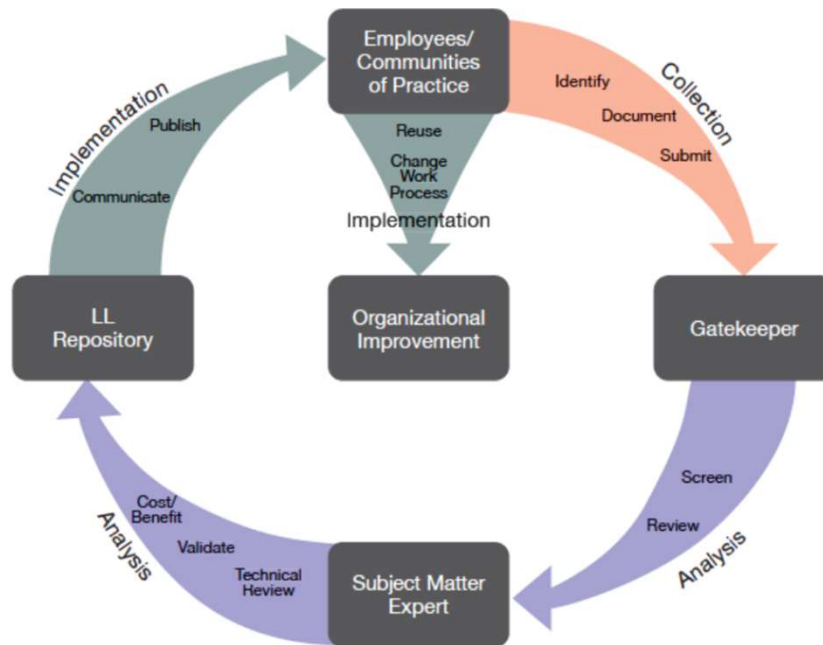
Examples (Gibson et al, 2007):

- A lesson that is incorporated into a work process
- A tip to enhance future performance
- A solution to a problem or a corrective action
- A lesson that is incorporated into a policy or a guideline
- An adverse situation to avoid
- Collective knowledge of “soon to retire” employees



Academic Literature Survey

High Level LL Process (CII, 2007; Gibson et al., 2007):



Four Levels of LL maturity (Gibson et al., 2007):

- **Level 1:** LL not performed, and the organisation is not aware of the benefits;
- **Level 2:** LL performed, however not in a repeatable or managed fashion;
- **Level 3:** LL managed and performed well, however can be improved; and
- **Level 4:** LL is managed organisation wide and aids in continuous improvement.

International examples – LL programmes:

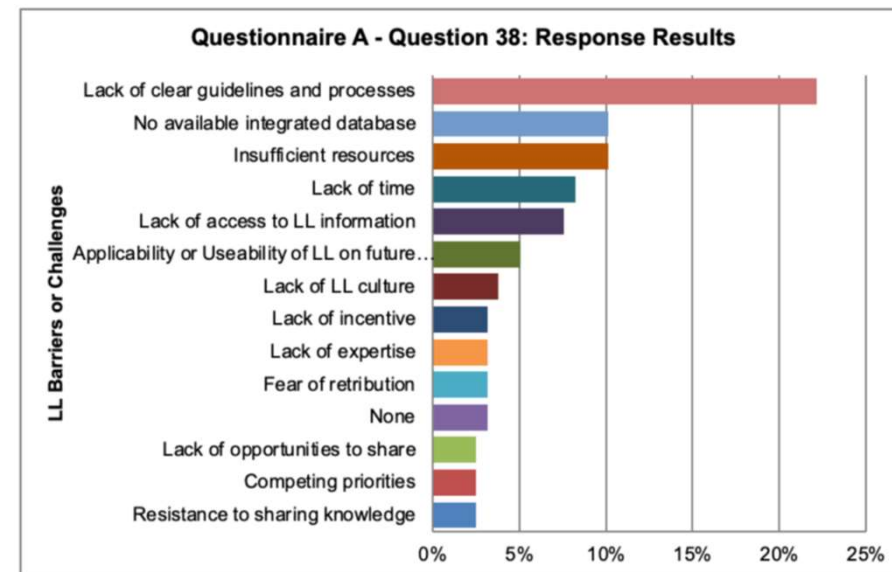
- NASA Lessons Learned Information System (LLIS) (NASA, 2021)
- Centre for Army Lessons Learned (CALL) – US Army (Roe et al., 2011)

Key areas that affect success of Lessons Learned Programmes:

- Leadership.
- Lessons Collection.
- Lesson Analysis.
- Lesson Implementation.
- Resources.
- Maintenance and improvement.
- Culture.

Barriers to Lessons Learned

Barriers/Challenges to LL (Trevino and Anantatmula, 2008)	% of Resp,	Links	Barriers/Challenges to LL (City of Cape Town)	% of Resp.
Lack of time	84%		Lack of clear guidelines or processes	22%
Lack of resources	69%		No available integrated database	10%
Lack of clear guidelines	60%		Insufficient resources	10%
Lack of incentive	44%		Lack of time	8%
Lack of management support	40%		Lack of access to information	8%



International examples – LL programmes:

- Alignment within the top 5 barriers identified (literature vs study)
- Some additional benefits also identified from free text.

NGT Sessions – Concept Methodology

Process Step	Themes Identified	Ideas generated, discussed and refined	
Collection and Capturing	Process	<ul style="list-style-type: none"> • Formal group sessions to identify, discuss and document LL. • Need for simple, standardised and automated process 	<ul style="list-style-type: none"> • Reflection sessions to be held at specific phase completions • Include external contractors and consultants to participate
	System	<ul style="list-style-type: none"> • Online and live database platform required • Standard data field to facilitate standard and uniform capture format 	<ul style="list-style-type: none"> • Searchable via queries or keywords • Data securely stored with backup contingencies
	Resources	<ul style="list-style-type: none"> • Dedicated resources with assigned responsibility and training 	<ul style="list-style-type: none"> • Specific role assignment and training
	Organisational	<ul style="list-style-type: none"> • Host workshops for the collection of LL via informal participation – thus not depending solely on LL from projects 	<ul style="list-style-type: none"> • Incentivising participation and contribution of LL
Analysis and Storage	Resources	<ul style="list-style-type: none"> • Dedicated resources in the form of subject matter experts • Analyse LL for value contributions, applicability and usability 	<ul style="list-style-type: none"> • Review and formatting to ensure applicability and usability • Establish committee of analysts as pool of resources
	System	<ul style="list-style-type: none"> • Taxonomy and categorisation as framework for storage and retrieval • Appropriate counters, metrics and parameters to reflect content 	<ul style="list-style-type: none"> • System prompts for analysts and participants • Metrics to track progress through process steps and status
	Process	<ul style="list-style-type: none"> • Standardised, structured approach to analysis 	<ul style="list-style-type: none"> • Root cause identification with remedial actions identified
Dissemination and Implementation	Outputs	<ul style="list-style-type: none"> • Booklets, periodic reports and newsletters • Communication platforms and forums 	<ul style="list-style-type: none"> • Themes and categories of information to target audiences • Actions generated and progress tracked
	Dissemination	<ul style="list-style-type: none"> • Written communication not sufficient – need other formats • Sharing sessions/forums 	<ul style="list-style-type: none"> • Special interest groups using database as source
	Process	<ul style="list-style-type: none"> • Project managers to incorporate LL into planning process 	<ul style="list-style-type: none"> • Database queries setup to facilitate searches during planning
	System	<ul style="list-style-type: none"> • Database must be online and accessible to organisation • Intuitive interface to ease searching and digestion of information 	<ul style="list-style-type: none"> • Searchable based on themes, phases, types, disciplines • Hit counters, usage statistics and standard reporting
	Resources	<ul style="list-style-type: none"> • Dedicated resources assigned and tasked 	<ul style="list-style-type: none"> • Resources to drive implementation of corrective actions

Lessons Learned Maturity - CCT

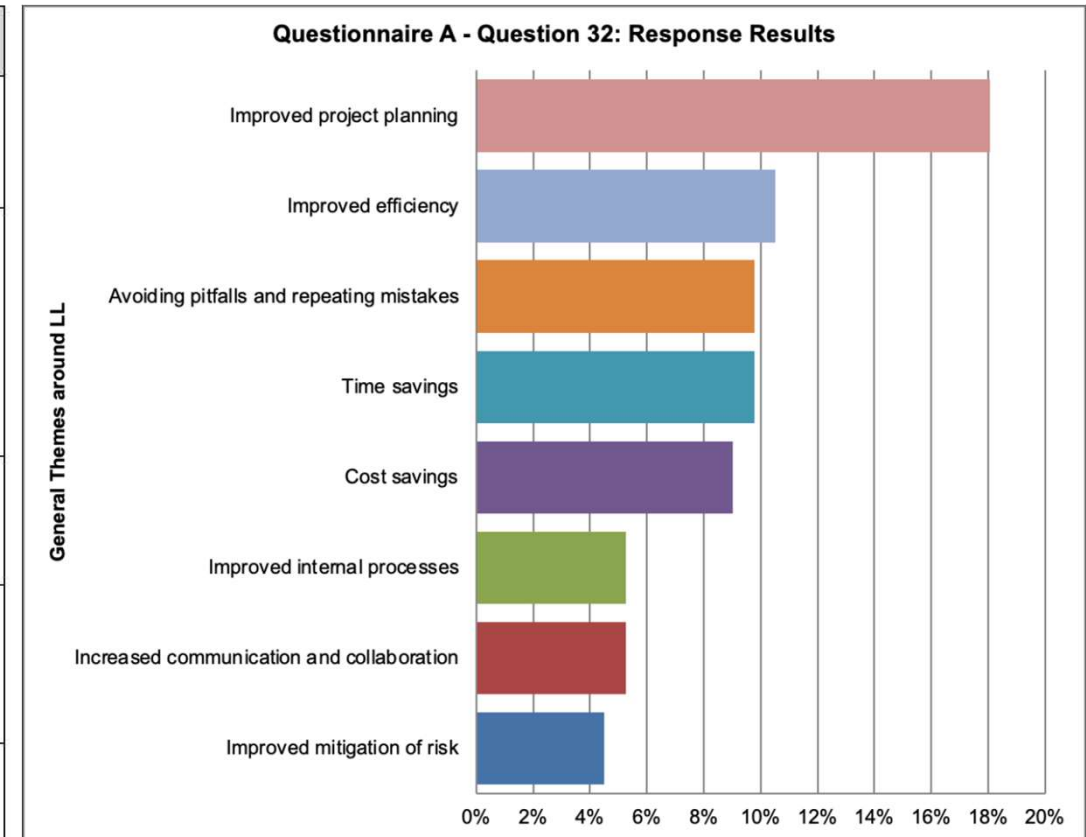
Characteristic (CII, 2007)	Related Survey Questions	Mean Score	Maturity Level Achieved	Characteristics (Gibson et al., 2007)
Leadership	Questions 2 to 8	2.44	Level 2	<ul style="list-style-type: none"> • LL mentioned and discussed by leadership • Some members practice and advocate for project LL
Collection	Questions 9 to 11	2.09	Level 2	<ul style="list-style-type: none"> • LL are collected however not standardised or structured according to a recognised methodology • No specific actors or individuals are assigned the responsibility for project LL
Analysis	Questions 12 to 18	2.18	Level 2	<ul style="list-style-type: none"> • No documented or consistent methodology for analysis • However, some analysis is done before communication
Implementation	Questions 19 to 24	2.15	Level 2	<ul style="list-style-type: none"> • Project LL are sometimes utilised by however lacking a consistent methodology for communication and implementation
Resources	Questions 25 to 29	2.08	Level 2	<ul style="list-style-type: none"> • Resource are inadequate to effectively operate and sustain a coordinated project LL effort
Maintenance and Improvement	Questions 30 to 32	2.17	Level 2	<ul style="list-style-type: none"> • Continuous improvement is not a priority, however some maintenance is conducted
Culture	Questions 33 to 35	2.5	Level 3	<ul style="list-style-type: none"> • Most individuals or groups utilise LL to enhance project work, however this principle is not observed across the organisation

Four Levels of LL maturity (Gibson et al.,2007):

- **Level 1:** LL not performed, and the organisation is not aware of the benefits;
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Benefits of Lessons Learned

Benefits of LL (Literature)	References from literature study	Benefits of LL (City of Cape Town)	% of Resp.
Improvement of future project planning	<ul style="list-style-type: none"> • Statz (1999) • Garon (2004) • Collison & Parcell (2004) • Williams (2007) 	Improved project planning	18%
Improved project delivery and performance	<ul style="list-style-type: none"> • Disterer (2002) • Newell (2004) • Parnell, Von Bergen & Soper (2005) • Williams (2007) • Gibson et al. (2007) • Trevino & Anantamula (2008) 	Improved efficiency	11%
Avoid repeat of mistakes.	<ul style="list-style-type: none"> • Trevino & Anantamula (2008) • Paranagamage et al. (2012) 	Avoiding pitfalls and repeating mistakes	10%
Potential reduction of project duration	<ul style="list-style-type: none"> • Newell (2004) • Parnell, Von Bergen & Soper (2005) • Trevino & Anantamula (2008) 	Time savings	10%
Potential reduction of project cost	<ul style="list-style-type: none"> • Newell (2004) • Parnell, Von Bergen & Soper (2005) • Trevino & Anantamula (2008) 	Cost savings	9%



Research Conclusions

- **Barriers/challenges** to project LL identified supports previous research:
 - Lack of clear guidelines and processes.
 - Lack of integrated database or reference.
 - Insufficient resources.
 - Lack of time.
 - Limited access to information.
- CCT personnel are aware of project LL and recognises its potential value.
- Sharing and access to project LL is limited to directorates - thus not at organisational level.
- Key themes, recommendations and system requirements developed.
- **Benefits of LL** identified supports previous research:
 - Improved project planning.
 - Improved efficiency.
 - Avoiding known mistakes/pitfalls.
 - Time savings.
 - Cost savings.
 - Improved internal processes.

Recommendations for CCT

Recommendations for CCT:

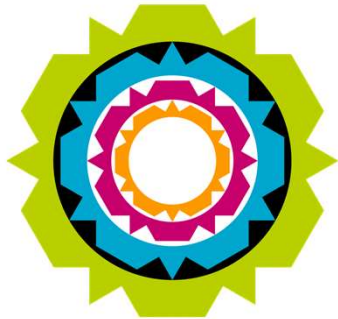
- Development and establishment of formal project LL methodology.
- Launch and support of a formal LL programme - CII (2007).
- Senior leadership are to continue actively advocating for LL.
- Monitor and track benefits of LL to demonstrate value proposition.
- Ensure dedicated and sufficient support and funding (Roe et al., 2011).
- Assign key personnel dedicated human resource allocation.
- Incorporate LL into protocols and processes via implementation strategy.
- Adequate time and training ought to be provided.
- Develop IT resources and systems to facilitate the LL programme.
- Become a teaching organisation.

Recommendations for PM's

- **Hindsight** Regarded as 20/20 vision -> use it to your benefit.
- **Collection** Ensure collection is done at sensible times and at key milestones (Not only post project).
- **Culture** Create a culture within your project environment free of judgement or fear of reflection.
- **Analysis** Ensure analysis by suitable expert toward deriving key value and detailed corrective actions.
- **Dissemination** Ensure actions are taken that can lead to meaningful improvements and benefits.
- **Sharing** Sharing experiences and learnings with the broader organisation.
- **Reflection** Positive and negative experiences lead to Lessons Learned.

Key References

- Construction Industry Institute (CII) 2007. Implementation of Lessons Learned Programs.
- Dunham, R.B. 1998. Nominal group technique: a users' guide. Madison: Wisconsin School of Business. vol. 2.
- Gibson, G.E., Caldas, C.H., Yohe, A.M. & Weerasooriya, R. 2007. An Analysis of Lessons Learned Programs in the Construction Industry. CII Research Report 230-1. no. 2nd.
- McMillan, S.S., King, M. & Tully, M.P. 2016. How to use the nominal group and Delphi techniques. International Journal of Clinical Pharmacy. vol. 38, no. 3. pp. 655–62.
- NASA Lessons Learned Information System. 2021. Overview. [Online] Available from: <https://llis.nasa.gov/lesson/2042> [Accessed: 2021-12-06]
- Office of the Chief Engineer. 2017. NASA Lessons Learned. [Online] Available from: <https://www.nasa.gov/offices/oce/functions/lessons/index.html> [Accessed: 2021-12-06]
- PMI 2017. A guide to the project management body of knowledge (PMBok guide). 6th edn. Project Management Institute.
- Roe, T., Hollars, L., Marinan, C., Solon, J. & Eck, E. 2011. Establishing a Lessons Learned Program Handbook. Centre for Army Lessons Learned (CALL) – US Army, Fort Leavenworth, KS USA.
- Santayana, G. 1905. The Life of Reason Vol. I - Reason in Common Sense. Charles Scribner's Sons. p. 172.
- Van der Waldt, G. 2014a. Infrastructure Project Challenges : the Case of Dr Kenneth Kaunda District Municipality. Journal of Construction Project Management and Innovation. vol. 4, no. 1. p. 19.



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