NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

AWARENESS, ACCESSIBILITY, AND USE: A MODEL TO IMPROVE THE NAVAL SPECIAL WARFARE LESSONS LEARNED PROGRAM

by

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June 2020

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REPORT DOCUMENTATION PAGE			*Form Approved OMB No. 0704-0188*

1. AGENCY USE ONLY *(Leave blank)*	**2. REPORT DATE** June 2020	**3. REPORT TYPE AND DATES COVERED** Master's thesis

4. TITLE AND SUBTITLE AWARENESS, ACCESSIBILITY, AND USE: A MODEL TO IMPROVE THE NAVAL SPECIAL WARFARE LESSONS LEARNED PROGRAM	**5. FUNDING NUMBERS** W0A20
6. AUTHOR(S) William Race and Brian K. Bird	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) Naval Special Warfare Command, San Diego, CA 92155-5599	**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.	**12b. DISTRIBUTION CODE** A

13. ABSTRACT (maximum 200 words)

Naval Special Warfare (NSW) seeks to improve their Lessons Learned Program (LLP) to better transfer and conserve knowledge within the community and maintain a competitive advantage over adversaries. What actions are needed to improve the program so that the knowledge created is easily transferred and conserved for future use? This thesis explores the existing LLP, identifies shortfalls, and determines what, if any, technology should be applied to improve the program. Specifically, it applies organizational design, information science theory, and user interviews to analyze the LLP, and then presents the interview findings and develops a conceptual model for program improvement. This research finds that NSW should apply the Awareness, Accessibility, and Use (AAU) model to address the three most prominent human-centric shortfalls within the LLP before applying any new technology. Addressing the lack of awareness, poor accessibility, and low use that exists within the program is a first step toward building a solid foundation that will better support the emerging technology that NSW wants to leverage in the future.

14. SUBJECT TERMS Lessons Learned Program; LLP; lessons learned; knowledge conservation; after action reports; organizational behavior; artificial intelligence; knowledge flow; Naval Special Warfare; United States Special Operations Command; knowledge flow theory; the adjacent possible; Awareness, Accessibility, and Use; AAU	**15. NUMBER OF PAGES** 89
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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MASTER OF SCIENCE IN DEFENSE ANALYSIS
(IRREGULAR WARFARE)

from the

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LIST OF ACRONYMS AND ABBREVIATIONS

AAR	after-action review
AAU	awareness, accessibility, use
AI	artificial intelligence
AOR	area of responsibility
ATC	Advanced Training Command
BAR	before-action review
BDA	big data analysis
CAARD	collect, archive, analyze, resolve, disseminate
CAPT	Captain, O-6
CDR	Commander, O-5
COVID-19	Corona Virus Disease-2019
CT	counter-terrorism
DET	SWCC Detachment
DOD	Department of Defense
DOTMLPF	doctrine, organization, training, materiel, leadership and education, personnel and facilities
FDC	force development course
GPC	Great Power Competition
GWOT	Global War on Terror
HR	human resources
IDTC	inter-deployment training cycle
IT	information technology
JOTC	Junior Officer Training Course
KF	knowledge force
KM	knowledge management
KP	knowledge power
KW	knowledge work
KFT	Knowledge Flow Theory
LCDR	Lieutenant Commander, O-4

LLP	lessons learned program
LLM	lessons learned manager
LT	Lieutenant, O-3
PLT	SEAL Platoon
NDS	National Defense Strategy
NSS	National Security Strategy
NSW	Naval Special Warfare
NSWC	Naval Special Warfare Command
NSWCEN	Naval Special Warfare Center
NSWG	Naval Special Warfare Group
OILs	observations, insights, and lessons
PLC	Platoon Leader Course
RADM	Rear Admiral (Upper Half), O-8
RFI	request for information
SBC	Chief Special Boat Operator (SWCC Chief, E-7)
SBCM	Master Chief Special Boat Operator (SWCC Master Chief, E-9)
SBCS	Senior Chief Special Boat Operator (SWCC Senior Chief, E-8)
SBT	Special Boat Team
SEAL	Sea, Air, Land
SOF	special operations forces
SOC	Chief Special Operator (SEAL Chief, E-7)
SOCM	Master Chief Special Operator (SEAL Master Chief, E-9)
SOCS	Senior Chief Special Operator (SEAL Senior Chief, E-8)
SWCC	Special Warfare Combatant Craft Crewman
TRADET	Training Detachment
TRP	SEAL or SWCC Troop
TTPs	tactics, techniques, procedures
USSOCOM	United States Special Operations Command
VIRT	valuable information at the right time

ACKNOWLEDGMENTS

First, we want to thank our wives and families for supporting our endeavors across the country and back again. Their unconditional support, patience, and immovable grace is unequalled. We love you. Second, we want to thank our triple-threat advisory team of Dr. Shelley Gallup, Dr. Hy Rothstein and Dr. Cheryldee Huddleston for their efforts working to tie together our many disorganized yet valuable ideas into a coherent and worthwhile discourse. Also we want to thank our "unofficial" advisors, Dr. Erik Jansen, Ms. Anne Gallenson, and Lyla Englehorn, for their support and idea-generation sessions. Also, we are grateful for the entire faculty, staff, and student body of the Defense Analysis Department for challenging us to think critically and recognize the true value of our experience. A special thanks goes to SOCM (ret.) Kirby Horrell and his team for providing inside access to Naval Special Warfare Lessons Learned Program. Finally, immeasurable thanks to our Brothers in the Teams. They provided raw feedback and invaluable insights for our research while we got cultured and absorbed some vitamin D in Monterey. In the end, this product is for all of us. HOOYAH!

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I. INTRODUCTION

As stated in the 2017 National Security Strategy (NSS), "The competitions and rivalries facing the United States are not passing trends or momentary problems."[1] For Naval Special Warfare (NSW) to remain relevant as a combat-credible special operations force postured to answer the nation's call, a more effective means of conserving the knowledge of the Special Warfare Operator is now crucial, more than ever. As former Defense Secretary Jim Mattis stressed in his 2018 National Defense Strategy (NDS), "We face an ever more lethal and disruptive battlefield, combined across domains, and conducted at increasing speed and reach."[2] The timely transfer of observations, insights, and lessons (OILs) of operators deployed around the globe is necessary to establish an efficient feedback loop for NSW to keep pace with our nation's adversaries.

A. PURPOSE

Any study on how to improve a lesson's learned "program" (LLP) should begin with studying the human element. In the current environment, lessons learned are a human-centric activity. First, humans are required to input their "lessons" from past and recent experiences as data into a "system." Humans, working with that "system" then analyze the data, format as required, and output combinations of data as information. Finally, humans must retrieve, or "pull" the information, or be "pushed" this information for application to a scenario or environment as "knowledge." The repeated processes of input, analyze, output and apply results in a conservation of knowledge.

Current technology has a role in a lesson's learned system for storing, organizing, and presenting lessons learned, and emerging technology has the potential for analysis and knowledge creation with little human interaction or input. However, even with advanced

[1]White House, *National Security Strategy* (Washington, DC: White House, 2017), https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf.

[2]Department of Defense, *National Defense Strategy*, (Washington, DC: *Department of Defense*, 2018), https://dod.defense.gov/Portals/1/Documents/pubs/2018-National-Defense-Strategy-Summary.pdf

technology, there still exists a requirement for a human-in-the-loop to make the system effective and useful for conserving knowledge. By studying and developing the human element of a lessons learned program versus simply applying more technology to the system, the opportunities for greater knowledge conservation are increased and the overall program is improved.

B. BACKGROUND

Presently, NSW lacks a human centric strategy to raise awareness or encourage the use of the LLP as a tool for conserving knowledge, mission planning, and to learn from past experiences that maximize future development. The NSW LLP is a database that receives, stores, and disseminates documented information of real-world NSW special operations, deployments, and exercises conducted by NSW professionals. The current design of the LLP collects information and facts captured through an after-action report (AAR). This collection of information is stored as data within the internal NSW network. Figure 1 denotes the path of the AAR from originators at the lowest operational levels (platoons, detachments, elements) to Naval Special Warfare Command (NSWC) and United States Special Operations Commands (USSOCOM) Joint Lessons Learned Information System (JLLIS).

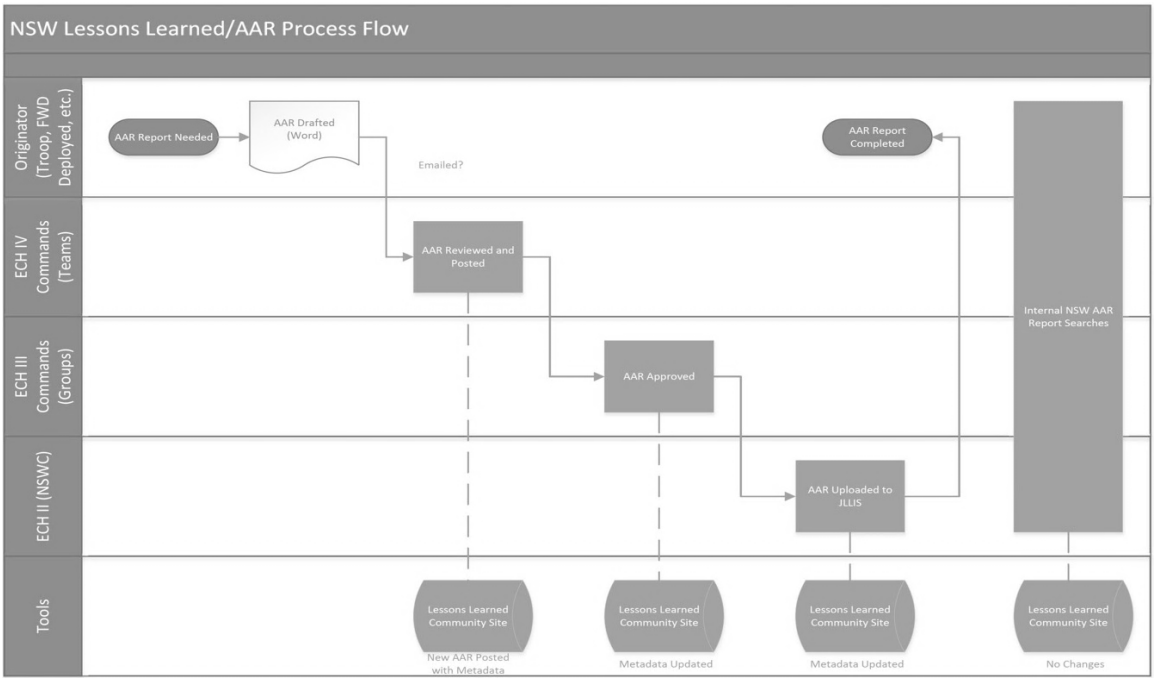

Figure 1. NSW AAR Process Flow[3]

Conspicuously absent from this process flow is a quality analysis of the information contained within the AAR, updates to the stored data, and a feedback loop back to the originator. As Frederick Hayes-Roth emphasizes through his Valued Information at the Right Time (VIRT) approach, the flow of high-value information "raises the productivity of every operator enormously by assuring each can give immediate attention to truly valued information."[4] As the NSW professional is expected to operate in a rapidly changing environment against sophisticated adversaries, an effective LLP will capture tacit and explicit knowledge, analyze it, and return it to the operators quickly and efficiently. An LLP that includes this efficient feedback loop of valued information will gain the trust of

[3]Patricia Wagner, "NSW Lessons Learned Process [1].pdf" (March, 2019), referenced in Shelley Gallup, *Improvement to the Naval Special Warfare Command Lessons Learned Program*, Report No. NPS-20-N096 (Monterey, CA: Naval Postgraduate School, 2019), 7.

[4]Frederick Hayes-Roth, *Valued Information at the Right Time (VIRT): Why Less Volume is More Value in Hastily Formed Networks*, (Monterey, CA: Naval Postgraduate School, 2006), http://hdl.handle.net/10945/3670, 1.

the NSW professional, incentivizing an organizational change in behavior to the collection and dissemination of collected knowledge.

Mark Nissen states, "Understanding the kinds of knowledge that are important in an organization's particular environment is essential for promoting the most important knowledge flows."[5] The collection of information from NSW professionals who understand the importance of, and believe in, an enhanced LLP will advance the retention of knowledge, assuring its feedback to future operators.

The following two examples illustrate some of the knowns and unknowns of the current LLP. The first example reflects the known loss of institutional knowledge that is now becoming relevant again in the current global security environment. The second explores unknowns of the inefficacies and lack of involvement of the LLP by both its managers and NSW leadership when dealing with mishaps and near misses.

1. Knowledge Degradation

In order to align with the 2017 NSS and the 2018 NDS, NSW is charged with organizing, training, equipping, and sustaining its force to "conduct special operations and activities as part of the joint force to support networked combatant command operations and campaigns against state and non-state actors to protect and advance U.S. policies and objectives."[6] Since 2001, like most Special Operations Forces (SOF) organizations, NSW has concentrated its main effort towards the Global War on Terror (GWOT). However, as stated in the Summary of the 2018 NDS, "Inter-state strategic competition, not terrorism, is now the primary concern in U.S. national security."[7] Therefore, NSW is expected to be "resourced, ready, and capable of executing all its assigned missions and activities as

[5]Mark E. Nissen, *Harnessing Knowledge Dynamics* (London: IRM Press, 2006), 14.

[6]United States Special Operations Command, *2020 Fact Book* (Tampa, FL: United States Special Operations Command, 2019), 14.

[7]Department of Defense, *National Defense Strategy*, 1.

directed."[8] As the U.S. strategic policy shifts its focus from the GWOT to the Great Power Competition (GPC), NSW acknowledges the importance of reexamining its proficiency in warfare skillsets other than urban combat in desert or mountainous climates. Namely, in response to the reemergence of Russian and North Korean malign activities, NSW is placing emphasis on revitalizing its tactics, techniques, and procedures (TTPs) in the winter warfare domain.

In the last decades of the twentieth century, SEAL Teams were deployed to specific geographical areas of responsibility (AORs). SEAL Teams TWO and FIVE were assigned to AORs that required advanced skillsets in cold weather tactics and winter warfare—SEAL Team TWO operated with European and Scandinavian partners whereas SEAL Team FIVE focused its efforts on the Korean Peninsula. Prior to September 11, 2001, both SEAL Teams TWO and FIVE produced SEAL platoons capable of operating with their respective international partners in the harshest conditions winter has to offer. However, the enormity of a two-front GWOT coupled with a reorganization of NSW deployments largely expended its resources, forcing operators and trainers alike to triage skillsets geared toward desert and urban warfare, with the exception of operations conducted at higher elevations in Afghanistan. After almost two decades of the GWOT, U.S. strategy is faced with security challenges that are frustrating the international system—Russian aggression in Eastern Europe and a North Korean dictator provoking the U.S. and it regional partners to name a few.[9] This imbalanced international order is resulting in the need for NSW to rekindle relationships with our international partners located in cold weather environments.

As a new generation of operators fills the ranks of NSW, those with experience operating in cold weather have either separated from service or have since retired, leaving a significant gap in knowledge. That fact raises the question: What resources do current NSW operators have at their disposal to form the foundation of winter warfare TTPs? The

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[8]United States Special Operations Command, *SOCOM 2035: Commander's Strategic Guidance*, (Tampa, FL: United States Special Operations Command, 2016), 11.

[9]Department of Defense, *Defense Posture Statement 2017* (Washington, DC: Department of Defense, 2017), 17–22.

NSW operator is resourceful and resilient and will find a way to overcome the challenges imposed by the aforementioned gap. However, such improvisation should not be a common practice. This current challenge only highlights the need for a robust and active LLP—one that is known and trusted across the NSW formation, accessible, and most of all, used by the warfighter and mission planner. An LLP that receives meaningful input and analysis with an efficient feedback loop to the greater NSW community will avoid future gaps of knowledge as the force adapts to the nation's shifting security priorities.

2. Mishaps and Near Misses

Mishaps and near-misses are an important part of the lessons learned process. While not desired by any element, they provide important feedback on shortfalls in equipment, poorly conceived or executed procedures, or failures in planning. The lessons learned managers (LLM) are not directly involved with the collection of any information regarding these incidents, and once they are in receipt, are unlikely to produce any products or feedback to the entire force because such reporting is not required. The LLMs often rely on passive collection of the information, waiting to receive final inputs instead of actively pursuing pertinent lessons learned that can be "pushed" to the NSW community in a timely manner. Timeliness and relevance are key to developing buy-in to the LLP and are two elements missing from the current LLP construct.

When mishaps or near misses occur, especially one that results in injury or significant equipment damage, the first question always asked is "What happened?" The answer is often not known for months, years, and sometimes never. The lack of readily accessible answers creates a challenge to future persons participating in the same or similar event, as there is potential for the same incident to occur, with the same, or even worse results. If operators are not presented with the facts in a timely manner after the incident occurs and do not have access to products related to the incident for future reference, how are they supposed to learn, to conserve the knowledge gained at another's expense, and avoid being put in a similar situation? This is a significant shortfall within the current LLP.

C. SCOPE AND METHODOLOGY

This study focuses mainly on the human-related aspects of the LLP. People have experiences that create data potentially useful to others in the future. The data needs to be recorded and stored, often aggregated with other data to create information. People also analyze the recorded data and information and are able to draw conclusions and create and apply this information as knowledge. Those conclusions and learned knowledge are then disseminated or stored for access and application by future practitioners. By looking at the human aspect of the LLP, the intent is to provide human-centric recommendations for improvement.

While there is a place for information technology (IT), knowledge management (KM), and artificial intelligence (AI) within the larger topic of lessons learned, it is outside the scope of this study. If the human element is missing, or under-represented in a lesson learned system, any improvements, breakthroughs, or resources expended to implement technological solutions will fall short of its desired efficacy due to lack of use and engagement by users.

D. RESEARCH METHODOLOGY

This research will attempt to answer the following primary and secondary lines of questioning:

Primary question: How can NSW update the LLP to raise awareness of the system and its uses, improve accessibility and ease of use to all members of the community, and most importantly, promote greater use of the program by NSW personnel?

Secondary Questions: How does NSW update the LLP strategy to be more human-centric? Why do more NSW members not use the existing program? Is the program valuable? Why does an LLP matter? What role will technology play in the future of the LLP?

The research techniques will comprise the following steps:

1. Search literature of pertinent LLP documents as provided by NSW.

2. Review applicable literature from disciplines of organizational design, knowledge and information, design and design thinking, business and organizational change, and innovation.

3. Conduct interviews of current NSW personnel for developing a snapshot of the user experience with current iteration of the LLP.

4. Conduct user-centered design event to analyze the problem and ideate potential solutions.

5. Analyze results of interviews and design challenge to develop solutions designed to answer the primary and secondary lines of questioning.

6. Propose solutions and suggest foundational pillars of a comprehensive LLP strategy for NSW.

E. OVERVIEW

This capstone is organized as follows:

Chapter I: This chapter provides the purpose, background, and research methodology of the capstone.

Chapter II: This chapter provides background on the organizational design of NSW and describes the current system and processes of the LLP. This chapter also describes the Star Model and Congruence model as it has been applied to this study.

Chapter III: This chapter explores the findings of the interviews conducted with NSW operators and explores the major themes relevant to this capstone.

Chapter IV: This chapter further explores the findings, presenting an overview of the design challenge, Knowledge Flow Theory (KFT) and how it supports the need for an LLP. It also addresses the role of technology in the current and future iterations of the NSW LLP.

Chapter V: This chapter presents conclusions based on the findings and analysis, as well as recommendations from the authors to improve NSW LLP.

II. ORGANIZATIONAL DESIGN

In this chapter the organizational design of Naval Special Warfare (NSW) and the lessons learned program (LLP) are discussed in the context of different frameworks. We use Jay R. Galbraith, Diane Downey, and Amy Kates' Star Model as well as Delta-Mercer's Congruence Model to describe shortfalls, inefficiencies, and misfits within NSW and the LLP, as well as highlight areas of focus for our research.

A. THE STAR MODEL

In order to offer solutions to better conserve knowledge and improve the organizational behavior of the NSW professional as it relates to the LLP, it is imperative to first examine the program from an organizational design lens. The organizational theorist, Jay Galbraith, developed his Star Model as a way to "analyze an organization and provide a framework for management to influence employee behavior."[10]

> In the Star Model, design policies fall into five categories. The first is strategy, which determines direction. The second is structure, which determines the location of decision-making power. Processes have to do with the flow of information; they are the means of responding to information technologies. Rewards provide motivation and incentives for desired behavior. And finally, the selection and development of the right people — in alignment with the other policies — allow the organization to operate at maximum efficiency.[11]

In *Designing Dynamic Organizations: A Hands-on Guide for Leaders at All Levels*, Jay R. Galbraith, Diane Downey, and Amy Kates provide a compelling argument that "in the twenty-first century organization design is more, not less important."[12] Galbraith, Downey, and Kates continue, "Organizations that actively strive to become dynamic and

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[10]Jay R. Galbraith, "The Star Model," Galbraith Management Consultants, accessed May 5, 2020, https://www.jaygalbraith.com/services/star-model.

[11]Jay R. Galbraith, "The Star Model."

[12]Jay R. Galbraith, Diane Downey, and Amy Kates, *Designing Dynamic Organizations: A Hands on Guide for Leaders at All Levels* (New York: American Management Association, 2002), x.

reconfigurable through prudent organization design and continual state assessments will gain resiliency in an increasingly multifaceted, fast-paced, and unpredictable business landscape."[13] NSW should endeavor to meet this challenge of becoming "dynamic and reconfigurable," as the global security environment is also "multifaceted, fast-paced, and unpredictable." A properly designed LLP, well nested within the larger NSW organization, provides a useful tool for reaching this objective.

This chapter will apply the Star Model framework for organizational design to the NSW LLP, to enhance understanding of how the program can better transform facts into information, and information into knowledge. First, an examination of the initial three categories of design policies within the Star Model—*Strategy, Structure,* and *Processes and Lateral Capability*—will highlight ways the NSW LLP could benefit the operator in a complex era of interstate strategic competition. Second, an analysis of the fourth and fifth categories—*Reward Systems* and *People Practices*—will show how incentives and human resources could influence the overall effectiveness of the NSW LLP. Figure 2 below illustrates the relationships between the five points of the model.

Figure 2. Galbraith's Star Model[14]

[13]Galbraith, Downey, and Kates, *x*.

[14]Jay R. Galbraith, "The Star Model."

Each point of the Star Model is informed by direct observations of the NSW LLP, official NSW instructions and after-action reports, and interviews of Sea, Air, Land (SEAL) and Special Warfare Combatant-Craft Crewmen (SWCC) operators. This detailed study of the NSW LLP's organizational design will offer the framework necessary to make a more efficient LLP input, output, and feedback loop. Ultimately this will improve the organizational behavior of NSW as it relates to the LLP to achieve a more lethal force for countering violent extremist organizations and rogue regimes in the era of Great Power Competition. It is important to note that the scope of this study is focused on raising awareness, improving accessibility, and increasing overall use of the LLP to assist in mission planning, training, doctrine, and resourcing for the NSW operator. An in-depth analysis of, and recommendations for, application of emerging technology to the NSW LLP are outside the scope of this project.

1. Strategy

The *Strategy* category of the Star Model encompasses the most important design policies such as the organization's vision, direction and purpose, mission, goals, and the organizational capabilities required to maintain a competitive advantage in the operating environment.[15] The *Strategy* category is the lynchpin of the other four categories and determines the criteria for selecting the best arrangement of the other design policies.[16] According to Galbraith, Downey, and Kates, "Strategy allows you to project a picture of the future—where you are going and what the organization needs to look like to get there."[17]

After careful examination of the Commander, Naval Special Warfare Command Instruction (COMNAVSPECWARINST) 3000.4B which outlines the responsibilities of

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[15]Galbraith, Downey, and Kates, *Designing Dynamic Organizations: A Hands on Guide for Leaders at All Levels*, 3.

[16]Galbraith, Downey, and Kates, 22–57.

[17]Galbraith, Downey, and Kates, 24.

the NSW LLP, it becomes clear that the LLP does indeed have an overarching strategy: "To provide a procedure within NSW to collect, archive, analyze, resolve, and disseminate (CAARD) observations, insights and lessons (OILs) to appropriate units or proponents charged with affecting change."[18] The instruction adds, "The intent is to correct systemic institutional deficiencies and to ensure application of Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities (DOTMLPF) methods are employed to improve mission effectiveness."[19] However, the strategy lacks a method to raise awareness of the LLP to the most important component of NSW: the operator of the SEAL Platoons or SWCC Detachments.

The NSW command structure consists of three echelons of command, beginning with Naval Special Warfare Command (NSWC), led by a SEAL Rear Admiral (Upper Half) (RADM) and a senior SEAL Master Chief (SOCM). Reporting directly to NSWC are eight SEAL Captain (CAPT) and SOCM or senior SWCC Master Chief (SBCM) led commands including NSW Groups (NSWG) which contain the operational level commands, and the NSW Center (NSWCEN), responsible for the training and education of NSW Operators. NSWGs oversee a variety of NSW Teams, each led by a SEAL Commander (CDR) and SOCM or SBCM and are organized by mission specialty. For example, NSWG ONE contains SEAL Teams ONE, THREE, FIVE, and SEVEN, while NSWG FOUR oversees three Special Boat Teams (SBT). Each SEAL Team is broken down into SEAL Troops (TRP), led by a SEAL Lieutenant Commander (LCDR) and SEAL Senior Chief (SOCS). The SBTs are also broken down into TRPs, however they are led by a SEAL Lieutenant (LT) and SWCC Senior Chief (SBCS). Each SEAL TRP comprises two or three SEAL Platoons (PLT) of approximately 16 operators and led by a SEAL Lieutenant and SEAL Chief (SOC). Each Special Boat TRP consists of three Special Boat

[18]Naval Special Warfare Command, *Naval Special Warfare Lessons Learned Program*, COMNAVSPECWARINST 3000.4B (Coronado, CA: Naval Special Warfare Command, 2016), 2.

[19]Naval Special Warfare Command, 2.

Detachments (DET) led by a SWCC Chief (SBC). A simplified version of this command structure is shown in Figure 3.

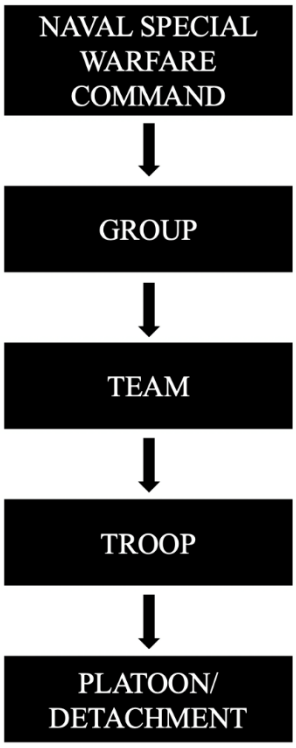

Figure 3. Simplified NSW Command Structure

The NSW command structure is included to better paint the picture of the hierarchical nature of NSW. There are nuances to the NSW command structure not included in the above figure, as these nuances do not add or subtract any significant value to the research.

Every SEAL and SWCC TRP is charged with conducting an 18-month inter-deployment training cycle (IDTC) to gain an adequate level of combat readiness in preparation for a six-month deployment. Operators interviewed consistently expressed a lack of knowledge that a program that captures lessons learned from their workup and deployment existed. An effective LLP strategy to raise awareness of the overall program

will limit operational tempo degradation while foreseeing and accommodating necessary changes in response to complex adaptive environments and enemies.[20]

Organizational capabilities are required to deliver on strategy.[21] Galbraith, Downey, and Kates define organizational capability as an "integrated set of skills, technologies, and human abilities that create a competitive advantage for the organization."[22] The current strategy for the LLP does not define organizational capabilities focused on raising awareness among its formations, resulting in a decreased competitive advantage for NSW. Operators do not advocate for or endorse the objectives of the LLP. As operational requirements increase in an imbalanced international order, the demand for NSW to possess enhanced capabilities to counter peer/near-peer competitors in multiple warfare domains will increase. Therefore, a continuous examination of tactics, techniques, and procedures (TTPs) through the collection, conservation, and analysis of relevant knowledge—lessons learned—will be paramount to remaining a competitive, lethal, and relevant fighting force.

2. Structure

The structure category of the Star Model determines where formal power and authority are located.[23] Galbraith, Downey and Kates emphasize that these design policies are oriented around the formation of people and organizational components at each level of a hierarchy (for decision-making and management) and their roles, responsibilities, and relationships within the organization.

Galbraith, Downey, and Kates explain that the functional structure, "is no more hierarchical than any other structure. Hierarchy is a result of the number and nature of

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[20]Galbraith, Downey, and Kates, *Designing Dynamic Organizations: A Hands on Guide for Leaders at All Levels, xi*.

[21]Galbraith, Downey, and Kates, 10.

[22]Galbraith, Downey, and Kates, 30.

[23]Galbraith, Downey, and Kates, 30.

management levels, distribution of power, strength of the integrative processes across organizational boundaries, and overall organizational culture."[24] The current LLP is a SharePoint database that acts as a repository of collected information and facts captured through an after-action report (AAR). Each NSWG has a Lessons Learned manager/analyst (LLM) led by an overall LLP manager at NSWC. These individuals are charged with the CAARD process as it relates to submitted AARs.

The current structure of the LLP does not promote ease of access to stored information. Limited search capabilities and cumbersome organization of data prevent efficient access to relevant information needed to inform mission planning, doctrine, and resourcing. Interviews of SEAL and SWCC operators revealed their dissatisfaction with the current design of the LLP highlighting their frustration with not being able to locate relevant information in a timely manner. It is common for operators to negate the employment of the LLP, resorting to direct communication with their peers to share lessons learned.

The functional structure of the LLP requires each analyst to manage limited organizational resources and commit to constant collaboration and integration with NSWC, their respective NSWG, and fellow analysts. These lateral capabilities are best served with constant and effective communication, education, and a continuous campaign to advertise the benefits of the LLP. Galbraith, Downey, and Kates posit, "A lack of lateral capabilities create significant conflicts such as differing views on where decision-making authority resides, false expectations between departments on the current state of the work and the needed end states, and lack of clarity for who is responsible for what actions."[25]The current LLP structure does not easily allow for this lateral communication, undermining the ability for LLMs to adequately support both decision makers and operators with relevant, timely knowledge.

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[24]Galbraith, Downey, and Kates, 77.

[25]Galbraith, Downey, and Kates, 81–82.

Direct observation of three separate LLMs demonstrated the lack of uniformity across the NSW LLP and emphasizes the importance of innovative ways to restructure the LLP to increase accessibility and efficiency of knowledge-flow. A restructuring of the LLP that promotes uniform conservation of knowledge through effective inputs from operators with focused analysis will create an efficient feedback loop to optimize SEAL and SWCC operators' use of limited time and energy towards other environmental obstacles.[26]

3. Processes and Lateral Capabilities

The processes and lateral capability category of the Star Model encapsulate design policies such as vertical and lateral processes, networks, teams, integrative roles, reporting mechanisms, and matrix structures.[27] The NSW LLP must achieve effective processes and lateral capability policies to achieve the flexibility, innovativeness, adaptivity, responsiveness to the environment, and employee commitment that typify what Galbraith, Downey and Kates term a "dynamic and reconfigurable organization."[28] Regarding the NSW LLP, these policies break down knowledge silos and fill in the capability gaps between different organizational roles.[29] Whereas the structure category establishes the vertical dimension of the LLP, Galbraith, Downey, and Kates state that the lateral organization, "allows work to get done at the level it occurs; people interact and communicate directly without having to go up through the hierarchy and through their managers."[30] Stronger lateral organizational ties between operators reduces hierarchical chokepoints and vertical processes overload, which frees up NSW leaders and other strategy planners to focus on long-term strategic issues and future plans.[31] Lateral

[26]Galbraith, Downey, and Kates, 91.

[27]Galbraith, Downey, and Kates, 135.

[28]Galbraith, Downey, and Kates, 4–7.

[29]Galbraith, Downey, and Kates, 135.

[30]Galbraith, Downey, and Kates, 136.

[31]Galbraith, Downey, and Kates, 136.

communication also links subject matter experts and decision-makers across the organization to rapidly identify solutions to problems and coordinate workflows.[32]

Vertical processes are typically associated with training and operational planning, budgeting, and the arrangement and allocation of resources.[33] The NSW LLP's limited resources stress the importance for each NSWG analyst to align with an overall LLP strategy to raise overall awareness, improve accessibility and promote greater use of the LLP. Conversely, lateral processes seek to formalize workflow, improve information and decision exchange, and aide the cross-pollination of best practices and ideas across the organization.[34] The NSW LLP should be built and promoted as a platform to enable the aforementioned information exchange and cross pollination of ideas.

As shown, in a complex and multi-dimensional global security environment, processes and lateral capability help organizations respond to changes in strategy without requiring more costly and laborious rearrangements of their structure.[35] The next section will investigate the rewards systems and people-practices categories of the Star Model to demonstrate how incentives and human resource policies must remain continually aligned with all other categories to empower personnel in the quest to become a dynamic and reconfigurable organization.[36]

4. Reward Systems

As NSW continues to be a tool of national military strength in the era of GPC, it is essential that the LLP as a whole focus not only on strategy and structure, but also a reward system designed to promote greater use of the program. As Galbraith argues, a reward

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[32]Galbraith, Downey, and Kates, 136.

[33]Galbraith, Downey, and Kates, 134.

[34]Galbraith, Downey, and Kates, 134.

[35]Galbraith, Downey, and Kates, 136.

[36]Galbraith, Downey, and Kates, x.

system will actually provide motivation and incentive for the completion of the strategic direction.[37] Employees work and interact by the measures and rewards that the organization uses to communicate what behavior and results are most important.[38]

Interviews conducted with seasoned SEAL and SWCC operators uncovered a disturbing trend that the current LLP does is not used in mission planning, training, or resource decision making because there is no incentive to do so. As Galbraith, Downey, and Kates emphasize, "A reward system defines expected behaviors and influences the likelihood that people will demonstrate those behaviors as they carry out their assigned tasks."[39] To promote a cultural shift towards the widespread and instinctive use of the LLP, it is critical that the program find ways to demonstrate to the SEAL and SWCC operators that their input is not only important but also linked directly to the lethality of the force.

As the international order continues to be challenged, it is important for NSW to retain its relevancy as a superior fighting force while the national conversation shifts from CT to strategic near-peer competition. NSW is made up of highly motivated and skilled practitioners of special operations, capable of full-spectrum conflict. The lethality and agility of NSW reside in the specialization of its members and cannot be mass-produced. Therefore, it is essential to the future of NSW to design an LLP reward system that is congruent with the structure, processes, and lateral capabilities to influence its strategic direction and organizational strategy.[40]

The four components of a reward system are metrics; desired values and behaviors; compensation; and reward and recognition.[41] Because NSW operators are active duty military

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[37]Galbraith, "The Star Model"

[38]Galbraith, Downey, and Kates, *Designing Dynamic Organizations: A Hands on Guide for Leaders at All Levels,* 189.

[39]Galbraith, Downey, and Kates, 190.

[40]Galbraith, "The Star Model"

[41]Galbraith, Downey, and Kates, *Designing Dynamic Organizations: A Hands on Guide for Leaders at All Levels*, 190.

members whose pay, allowances, and bonuses are applied from outside the organization, this section will examine all components of a reward system with the exception of compensation.

a. Metrics Component

Galbraith, Downey, and Kates carefully explain that before you can reward people, you have to be able to measure their contribution.[42] Furthermore, the design of any performance measurement system should reflect the operating assumptions of the organization.[43] It is imperative for an effective LLP to design and align a system of metrics that correlate directly with the strategy of NSW as a whole. To best measure success, the LLP should focus on the six principles of metrics for the design of its reward system: breadth, criticality, time orientation, alignment, targets, and consequences.[44]

Regarding the NSW operator, the first and second principles of breadth and criticality describe the multi-warfare capability that SEAL and SWCC personnel innately offer national security. The third principle, time orientation, offers the operator and LLP analyst a tool to look backward and toward the future simultaneously through the use of lagging and leading indicators.[45] Galbraith, Downey, and Kates describe lagging indicators as those that present past results, whereas leading indicators help to predict future performance. During the GPC era, it is vitally important for NSW operators to refrain from relying solely on previous personal achievements or face-to-face knowledge sharing. Instead, identifying current performance indicators will better prepare the NSW to correlate with an overarching national strategy and highlight future opportunities.[46]

As the United States confronts challenges posed by its adversaries, it is essential for the success of an effective LLP to ensure that all metrics are aligned vertically and

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[42]Galbraith, Downey, and Kates, 191.

[43]Galbraith, Downey, and Kates, 191.

[44]Galbraith, Downey, and Kates,192.

[45]Galbraith, Downey, and Kates, 196.

[46]Galbraith, Downey, and Kates, 196.

laterally across all NSW elements that work together.[47] Galbraith, Downey, and Kates describe this fourth principle of alignment as a tool to set the standards against which the organization's performance can be measured while defining what needs to be accomplished in a given time frame. As NSW and its LLMs determine the measures of its reward system, the fifth principle of setting targets will offer its members goals that are challenging but not impossible to reach.[48] Finally, the LLP analysts need to be aware of a reward system that creates unintended consequences as a result of an imbalance among measures or from not thinking through the difference between the desired degree of behavior and too much of a good thing.[49]

b. Desired Values and Behaviors Component

Galbraith, Downey, and Kates explain that behaviors are not a design component. Rather, they are the desired outcome of other design decisions and the manifestation of an organization's culture.[50] The culture of NSW is known as a professional warrior class prepared to respond to any challenge that confronts the nation. By raising awareness, improving accessibility and increasing use, the LLP will enable NSW to set clear values and define new behaviors that will be critical to the continuation of the warrior culture through conservation of NSW unique knowledge.

c. Reward and Recognition Component

Galbraith, Downey, and Kates suggest reward and recognition programs let employees know they are valued and are another tool for aligning behaviors to organizational outcomes.[51] It is important to note that rewards focuses on extrinsic

[47]Galbraith, Downey, and Kates, 198.

[48]Galbraith, Downey, and Kates, 199.

[49]Galbraith, Downey, and Kates, 197.

[50]Galbraith, Downey, and Kates, 199.

[51]Galbraith, Downey, and Kates, 212.

motivations, whereas recognition focuses on intrinsic motivations.[52] By focusing on both extrinsic and intrinsic motivations, the LLP will be able to contribute to an environment that promotes high-performing output by careful and concentrated conservation of knowledge, communicating each member's contributions and experiences to the success of the force by building a sense of belonging and pride.[53] Although SEALs and SWCCs describe themselves as silent professionals who do not seek recognition for their work,[54] an LLP that includes subtle incentives can provide NSW an enhanced organic toolset to develop stronger buy-in from the operator level. This incentivized buy-in to the LLP will continue to support NSW as premier fighting force in the tumultuous global security environment of the future. The following section discusses people practices—the final point of the Star Model framework.

5. People Practices

Although the final point on the Star Model, this does not imply that the consideration of people come last in the design process.[55] In fact, a dynamic and highly specialized organization should first focus on getting the right senior leadership—with the correct leadership style—in place to improve its chances of success. These key leaders possess a level of maturity and experience within NSW to best enact the overarching strategy of the LLP and communicate its contribution to the NSW rank and file. These leadership teams are critical to the success of the design and implementation process of an effective LLP and will aid in the organizational behavior of the NSW operator to remain an adaptable fighting force.[56]

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[52]Galbraith, Downey, and Kates, 213.

[53]Galbraith, Downey, and Kates, 212.

[54]Naval Special Warfare Command. "SEAL Ethos." Accessed May 17, 2020. https://www.nsw.navy.mil/NSW/SEAL-Ethos.

[55]Galbraith, Downey, and Kates, 227.

[56]Galbraith, Downey, and Kates, 227.

The NSW community is known for its ability to shift its strategic focus to the different types of threats our nation encounters. Galbraith, Downey, and Kates explain that as the organizational definition of success changes, so will the skills, knowledge, and behaviors required.[57] NSW possesses an innate ability to adapt quickly to various geographic challenges, contributing to its organizational flexibility, agility and responsiveness to the operating environment and enemy. This same character trait is essential to a shift in approach to the LLP.

B. THE CONGRUENCE MODEL

In addition to Galbraith's Star Model, another roadmap for understanding organizational performance is the Congruence Model.[58] In 2019, Naval Postgraduate School professor Dr. Shelley Gallup conducted preliminary research using the Congruence Model to view the LLP as an organization of interrelated parts.[59] As Gallup explains, "The model is an 'open system' in that information comes from the external environment, work is done with that information and outputs are created that are fed back into input."[60] It is important for NSW operators to understand the LLP as a systematic learning tool—one that is influenced by their input, accessible by other operators, and widely used to benefit the entire NSW formation. The Congruence Model will assist NSW Leadership with fully grasping the interplay of social and technical forces that shape the performance of its 'open system' LLP, providing a framework for future design and implementable solutions aimed at raising awareness, improving accessibility, and increasing use of the program.[61]

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[57]Galbraith, Downey, and Kates, 228.

[58]Delta-Mercer, "The Congruence Model: A Roadmap for Understanding Organizational Performance," accessed May 20, 2020, https://www.academia.edu/26617289/Delta_Mercer_Congruence_Model, 1.

[59]Gallup, *Improvement to the Naval Special Warfare Command Lessons Learned Program*, 4.

[60]Gallup, 4.

[61]Delta-Mercer, "The Congruence Model: A Roadmap for Understanding Organizational Performance," 1.

The Basic Systems Model (Figure 4) includes input, the transformation process, output, and feedback.[62] As Delta-Mercer explains, the input draws from both internal and external sources that then feeds into the transformation process—a process through which the people convert input into a product created to fulfill the strategic objectives of the organization which is then fed back to the end user.[63] Raising the awareness and improving the accessibility of the LLP across the NSW formation will assist organizational behavior toward the program to increase its use.

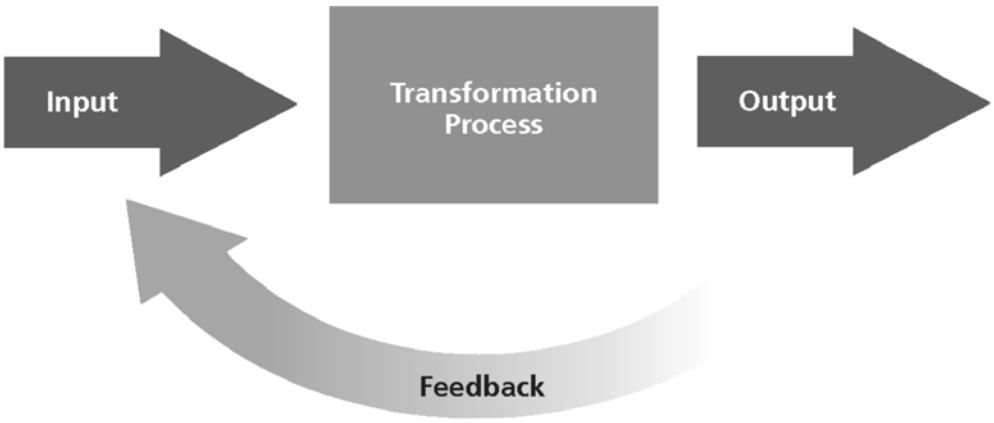

Figure 4. The Basic Systems Model[64]

C. CONCLUSION

Through continual organizational design assessments and the application of the Star Model, the LLP can properly mature and better support NSW as it pivots from CT to GPC alongside the rest of the nation, maintaining its status as a dynamic and reconfigurable

[62]Delta-Mercer, 3.

[63]Delta-Mercer, 3.

[64]Delta-Mercer, 3.

organization.[65] Galbraith, Downey, and Kates posit, "All reconfigurable organizations need learning-agile people willing to accept that their assignments will change, and priorities be reordered."[66] NSW operators possess these characteristics, making the adoption of more regular use of the improved LLP as part of their daily rhythm easy, so long as they are aware of the program, and can easily access it.

[65]Galbraith, Downey, and Kates, *Designing Dynamic Organizations: A Hands on Guide for Leaders at All Levels*, 228.

[66]Galbraith, Downey, and Kates, 228.

III. FINDINGS

The purpose of this research is to establish a thorough understanding of the Naval Special Warfare (NSW) operator's awareness, accessibility, and use of the NSW lessons learned program (LLP). Commander, Naval Special Warfare Command Instruction (COMNAVSPECWARINST) 3000.4B states the purpose of the LLP is to "govern the collection and dissemination of unit feedback derived from training, real-world operations, exercises, and miscellaneous events."[67] Additionally, as mentioned in the Naval Special Warfare Command (NSWC) information paper titled *NSWC Lessons Learned Remediation Program,* "The objective of the LLP is to ensure transparency as well as provide an inclusive forum up and down the chain of command."[68] Of notable interest to this research, the process of how the individual NSW operator perceives the collection and dissemination of his or her unique observations, insights, and lessons (OILs) represents a key understanding of shortfalls that the LLP is not currently addressing.

In 2019, Dr. Shelley Gallup from the Naval Postgraduate School authored a preliminary report addressing organizational improvement and implications regarding the NSW LLP. Gallup's report indicates a need for cultural and organizational changes to better inform NSWC's search for technological solutions aimed at improving LLP performance.[69] Gallup continues, "The LLP and its database architecture do not provide easy access and retrieval of knowledge" and "information in the current SharePoint structure is not provided in a way that addresses key concerns of the user."[70] From Dr. Gallup's observations, it became clear to the authors of this project that any improvement to the LLP should start with a focus on the operator level. Ultimately, the LLP and any

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[67]Naval Special Warfare Command, *Naval Special Warfare Lessons Learned Program,* 1.

[68]Naval Special Warfare Command, *Information Paper: NSWC Lessons Learned Remediation Program*, (Coronado, CA: Naval Special Warfare Command, 2017), 1.

[69]Gallup, *Improvement to the Naval Special Warfare Command Lessons Learned Program.*

[70]Gallup, 15

future technological considerations need to focus on the needs of the operator—those warfighters who are on the front lines around the globe representing NSW and need better information for mission planning.

Data collection was performed through 32 interviews of active-duty Sea, Air, Land, (SEAL) and Special Warfare Combatant-Craft Crewmen (SWCC) operators, both officer and enlisted, as well as NSW civilians. Constraints and limitations due to time, funding, and a high operational tempo of NSW units limited access to interviewing more operators. Therefore, the interviews conducted were designed to be sample-based and do not intend to represent all members of the NSW formation. The pool of interviewees consisted of first-tour operators to seasoned SEAL Commanders with more than 25 years of service. The positions held by those operators interviewed covered a wide range of experience—SEAL and SWCC Petty Officers, Chief Petty Officers, Chief Warrant Officers, and SEAL Officers. In addition, insight was gained from the opportunity to interview NSW civilians, many of whom are retired SEAL operators.

Each interviewee was asked a series of four questions intended to capture their level of awareness, access and use of the LLP. Three additional questions were asked to allow those interviewed to offer insight on issues that prevent more widespread use of the LLP and how the LLP might better support the NSW community. The interviewees' responses were recorded by the authors and answers compiled into a composite result.

A. HOW DOES THE NSW LLP WORK?

All interviews began with the above question, designed to be open-ended, in order to gauge the level of awareness of an LLP within NSW. As stated in COMNAVSPECWARINST 3000.4B, the primary objective of the LLP is to "provide a procedure within NSW to collect, archive, analyze, resolve, and disseminate (CAARD) collected and analyzed observations, insights and lessons (OILs) to appropriate units or

proponents charged with affecting change."[71] Without the operator's input, the CAARD process is unable to produce the results necessary to effect any change at all.

These operators interviewed identified the after-action report (AAR) as the only formal documentation that they were aware of for sharing knowledge within the community. More important to all interviewees was the informal "pass-down' or "turnover" that occurs as one element prepares to relieve another in any given area of responsibility (AOR). As stated by a 15-year SEAL Lieutenant Commander during an interview on January 29, 2020, "The only thing that works well for passing information and knowledge is good team-guys taking care of good team-guys." There were clearly differences of understanding about how the LLP works, especially with regard to the CAARD process. Most operators described the collection and archival of AARs, but only one SEAL Officer interviewed could explain, in detail, the purpose and objective of the LLP. Individual operators also responded with the following comments regarding how the LLP works:

- Operators are unaware that there is an LLP
- Operators are unable to explain where a submitted AAR is routed to after submittal to the Operations Department
- Operators do not know how to contact their respective lessons learned manager (LLM)

This composite answer to this first question highlights the overall lack of awareness of the LLP across NSW, both of its existence and how it can be used to support and enhance NSW operations. As noted, almost every operator and civilian interviewed indicated a severe lack of awareness of the program's existence and even less awareness of how it is supposed to work. This question and subsequent answers highlighted the first prominent theme of the research: a significant lack of awareness of the program.

[71]Naval Special Warfare Command, *Naval Special Warfare Lessons Learned Program,* 2.

B. HOW DO MISSION PLANNERS USE THE NSW LLP?

The primary objective of the LLP, as stated in the COMNAVSPECWARINST 3000.4B, "is to correct systemic institutional deficiencies and to ensure application of doctrine, training, materiel, leadership and education, personnel, and facilities (DOTMLPF) methods are employed to improve mission effectiveness."[72] This second question of mission planners was designed to assess how NSW leaders use and employ the LLP for mission preparedness—both for training and real-world operations. All 32 operators interviewed stated that they have never observed mission planners using the LLP to plan a training event, exercise, or combat mission. Additionally, individual operators raised specific concerns:

- Mission planning is time sensitive, and the LLP is too cumbersome to navigate to find any useful information in a timely manner
- Mission planners do not consider the LLP during any phase of work-up or deployment
- Mission planners only read the AAR of those they are relieving
- Mission planners do not always have access to either the LLMs or the SharePoint site

These responses directly contradict the stated purpose of the LLP. If the program exists to correct deficiencies and help with mission readiness, the non-use of such a program results in organizational waste of time and resources. This question and its resulting answers highlighted the second and third major emergent themes in the research: the LLP is not easily accessible, and subsequently is not used. If staff, operational, and mission planners have access to and use the LLP during their planning processes, whether for missions, budgets, or training schedules, significant resources of time, money, and

[72]Naval Special Warfare Command, 2.

human capital can be saved by preventing duplication of work, poor allocation of resources, or highlighting known risks.

C. WHAT IS THE JOURNEY MAP OF THE DOCUMENTS/PRODUCTS SUBMITTED TO THE NSW LLP?

Operators interviewed who were aware of the LLP were asked to describe the journey map of any document or product submitted to the program. In order for the LLP's objectives to be met, key OILs and the AAR source documents from NSW operations and training events need to be collected, archived, analyzed, resolved, and disseminated.[73] This question was designed to highlight the operators' knowledge of how a document, such as an AAR, moves from collection to dissemination within the LLP. Over half of the operators interviewed could not describe how the AAR reaches the LLP once it is submitted to their respective Team operations department. Those operators able to explain the CAARD process offered one primary concern regarding the journey map of documents submitted to the LLP—any product sent to the LLP is posted "somewhere on the portal" with no mechanism or pathway for feedback or dissemination to the NSW formation.

Specific comments regarding the journey map of documents included the following:

- The LLP is only a repository for AARs.
- The LLP is designed for input only, lacking a feedback mechanism to the rest of the community.

This question and resulting answer further support the first emergent theme of lack of awareness of the LLP. To best leverage any system, it is important to be aware of how it works and the end state that is expected. Due to a lack of understanding the way the LLP is supposed to work, operators cannot leverage the latent knowledge power held within the

[73]Naval Special Warfare Command, *Naval Special Warfare Lessons Learned Program: Enclosure 1* COMNAVSPECWARINST 3000.4B, (Coronado, CA: Naval Special Warfare Command, 2016), Naval Special Warfare Command, 2.

system. They toil inefficiently within their own spheres, neither aware of, nor able to access valuable resources ostensibly contained within the LLP. In order for the operator to view the LLP as a useful learning tool, and not just another administrative requirement, it is imperative for NSW to educate its members on the impact that their input has on the wider community. As the Congruence Model illustrated, the transformation of the input generates the meaningful output, which is then fed back to the community. Members' understanding of the journey map of a submitted document will contribute to the foundation of changing NSW's organizational behavior toward the LLP to increase its use.

D. WHAT ARE THE BENEFITS OF USING THE NSW LLP?

This question was designed to understand the desire of an operator to seek out information and knowledge that resides within the NSW community. To improve mission effectiveness, COMNAVSPECWARINST 3000.4B establishes the process to "prioritize OILs that impede the ability of the warfighter to accomplish the mission for resolution and oversee integration of lessons learned into DOTMLPF, research development, acquisition, and planning activities in order to sustain, enhance, and increase NSW's preparedness to conduct current and future operations."[74] All operators interviewed expressed a desire for a program that can be easily accessed to provide a platform for sharing, retaining, and retrieving knowledge across the NSW formation.

The interviewed operators frequently reported an eagerness to have an LLP that is easily accessible to "allow members to learn, ask questions, and most importantly, not repeat mistakes." Through the interviews, it became clear the operators desire a platform that prevents them from "starting from scratch" when it comes to mission planning, training, or deployment considerations. The NSW operator would be inclined to use lessons learned in order to focus more intently on risk-to-force and risk-to-mission factors, ultimately increasing the effectiveness and lethality of the NSW community. Other comments on the benefits of a useful LLP include:

[74]Naval Special Warfare Command, 2–3.

- Provides a starting point for future projects/missions
- Verifies and or validates ideas
- Offers access to historical documents to prevent repeating another operator's mistakes

The composite answer to this question clearly indicates a need for an accessible system to encourage more use, supporting the second and third themes of the research. Tacit knowledge exists across the force that can support the NSW mission, but that knowledge is inaccessible because it exists in the minds of a select few, resides deep in the folders of personal and command share drives, or is gathering digital dust on an obscure portal page. Creating an accessible platform for users is key for improving the LLP.

E. WHAT ARE SOME OF THE ISSUES WITH THE NSW LLP?

If the NSW LLP acts as the formal organization of receiving, analyzing, and disseminating knowledge, the informal organization is the "good team guy taking care of other good team guys." As Gallup points out, "Quite often informal organizations can exist within the formal organization where policies and instructions are out of date and people find more efficient ways to do the work."[75] Prevalent among those interviewed were feelings that the LLP lacks community-wide impact. Several operators offered examples of submitting an AAR with relevant OILs regarding a mission or training event and receiving no feedback or confirmation of receipt from the LLP. More importantly, operators were concerned by the perception that their input was not being widely disseminated across the NSW formation.

As stated in COMNAVSPECWARINST 3000.4B, Enclosure 1, dissemination is the process that "ensures that implemented lessons are broadcast to the appropriate

[75]Gallup, *Improvement to the Naval Special Warfare Command Lessons Learned Program*, 5.

individual, group, or organization in a timely manner."[76] In the perceived absence of dissemination, or feedback to the force, the NSW operator will continue to rely on the receipt and pass-down of OILs using the informal system of face-to-face—good team guys taking care of good team guys.

It is important to note that those interviewed who were aware of the existence of the NSWG LLMs complimented their efforts to disseminate relevant information on their own initiative and upon request when time allowed. The level of responsiveness from the LLMs to the force as a whole is "something to be commended." However, the concern that most operators have regarding the LLMs is that they are a "single point of failure." In addition, the LLMs remain location and temporally static. They do not move around to training sites, or travel overseas; and are not accessible after-hours, when deployed operators may need to contact them.

Another common concern of those interviewed was the lack of "buy-in" of a program mandated by higher echelons without considering what the operator desires. According to these interviews, this lack of understanding of what is needed at the operator-level leads to "frustration in the platoon hut and poor product submission, leading to atrophy of the system, and lack of overall use." Some operators view the LLP as just another "requirement," adding to the inundation of daily tasks placed on the NSW operator. These findings degrade the LLP as a whole and impede the transfer, analysis, and conservation of knowledge within the NSW community. Other issues described by individual operators include:

- A significant lack of awareness of the program
- The LLMS are a single point of contact and potential failure
- A perceived lack of time to search for the information desired

[76]Naval Special Warfare Command, *Naval Special Warfare Lessons Learned Program: Enclosure 1*, 4.

- No transparency of the program editing process; documents are "whitewashed" as they travel up the chain of command

- A lack of follow through and communication about submitted issues

Clearly, this question and answer combination highlights the shortfalls of the current LLP to demonstrate the value to the individual NSW operator. It provides the clearest view of what is needed to improve the program: raise awareness and improve accessibility to drive increased use. With more use, natural user feedback should support further increases in awareness, better accessibility and greater overall use. If operators feel that their efforts to capture lessons learned go into an abyss of 0's and 1's, never to be seen or accessed, they are less likely to put effort into completing the task. Conversely, because they know their products and contributions are not easily accessible, they inherently are less likely to go looking for other operators' products. The cycle will continue until the LLP is able to address the shortfalls noted above and prove its ability to be useful.

F. WHAT PREVENTS MORE USE OF THE NSW LLP?

This question was designed to understand why operators at all levels simply do not consider the LLP as essential during mission planning, training events, or professional development. Those interviewed indicated three reasons that prevent more use of the LLP—lack of awareness, difficulty navigating the LLP portal, and viewing the LLP as another computer centric requirement-not as a learning tool.

First, the operators interviewed frequently indicated a general lack of awareness of the LLP across the NSW formation as the leading cause of lack of use. NSW personnel do not know about the program and therefore do not use it. Of those operators aware of the LLP, many did not know how to access the information on the LLP SharePoint portal. Additional responses to this question revealed a lack of awareness of the LLMs and the vital role they play in the CAARD process designed to conserve and share knowledge throughout the NSW community. Overall, the operators indicated a need for NSW to

introduce the LLP and its respective manager to the force during different phases of an operator's career.

Second, the operators agreed that the LLP portal is difficult to navigate—lacking a mechanism to search keywords or particular regions of the world, as an example. Enclosure 1 of COMNAVSPECWARINST 3000.4B describes the lessons learned portal as "a SharePoint-based portal system developed specifically for use by NSW personnel to further enable the NSW LLP to meet its full potential to highlight the history of all the powerful lesson learned and gives the NSW community a database to facilitate archiving the lifesaving information internal to the NSW community."[77] Any improvement to the LLP must begin with understanding how exactly the warrior-class will respond. In order to increase the use of the program, Dr. Shelley Gallup emphasizes creating an LLP that promotes employment of knowledge and access to retrieve and input new information.[78] The problem then is not a matter of a computer system being too complicated for the NSW operator, rather a matter of timeliness and efficiency. Several respondents mentioned a "two-click-attention-span"—that is, if information is not accessible within two or three screens, the operator will resort to other means of learning or retrieving data relevant to their situation.

Finally, a common perception gleaned from the interviews is that the NSW operator does not view the LLP as a learning tool but simply another requirement from leadership requiring time in front of a computer screen. It became clear that NSW operators do not understand the intent of the LLP—perhaps from the lack of awareness or the accessibility issues already mentioned. There was a consensus among those interviewed that a cultural shift is needed regarding the LLP—good team guys taking care of good team guys should include using the LLP in order to reach a broad NSW audience and not just those who are face-to-face.

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[77]Naval Special Warfare Command, *Naval Special Warfare Lessons Learned Program*: *Enclosure 1,* 5.

[78]Gallup, *Improvement to the Naval Special Warfare Command Lessons Learned Program,* 1.

G. HOW CAN THE NSW LLP BETTER SUPPORT THE COMMUNITY?

The genesis of this question resides within the main methodology of this research: user-based design, seeking actual user feedback on what the system can do to support the community. As is common in a design type methodology, the responses were varied depending on how the question was perceived by the person being interviewed. Some of the answers focused on the macro benefits of how the LLP could save time, resources, and potentially lives if used properly, while others gave specific examples of functions they would like to see in a "utopian" LLP.

Of particular interest, these varied responses largely depend on the job title and years of experience. Most of the macro-level responses came from those in positions of higher authority or NSW civilians with numerous years of experience either within NSW or the DOD in general. Their responses had a distinct DOTMLPF focus, reflecting the items that are of most concern to them. The micro-level responses came from operators who recognize the usefulness of lessons learned but are frustrated by the current state of the program. These responses provide useful starting points for immediately implementable solutions for NSW to consider for improving the LLP. Many of those suggestions are captured later in this paper. Some macro-level comments on how the LLP can support the NSW community included:

- Preventing mistakes from being repeated to save time, money, energy, lives
- Offering a starting point for future planning, or validating/verifying "new" ideas
- Providing a forum for sharing knowledge and experience to better prepare for future ops

Some of the micro-level suggestions included:

- Implement a viable search tool

- Initiate periodic communications highlighting recent noteworthy events
- Provide an ability to filter documents by AOR or specific events
- Allow for joint access – ability to leverage other SOF units knowledge

Some suggestions are already in place, as directed by NSW instructions. As outlined in the COMNAVSPECWARINST 3000.4B, to achieve its objectives, the LLP shall "Operationalize the program through the use of Before Action Reviews (BARs), Requests for Information (RFI), and periodic updates to leadership to improve existing information-sharing capabilities and support to the NSW warfighter."[79] However, this "operationalization" is not standardized across Teams, Groups, or coasts, let alone the whole of NSW.

The question of how the LLP could better support NSW was purposely left vague in order to elicit the most honest feedback and gauge the overall knowledge of the purpose of the LLP. As noted, there were two major categories of responses that indicate a general understanding of why LLP is important, while also highlighting some of the barriers to use and suggesting improvements that should be implemented to help raise awareness, improve accessibility, and increase the use of LLP.

[79]Naval Special Warfare Command, *Naval Special Warfare Lessons Learned Program*, 2.

IV. ANALYSIS AND DISCUSSION

This chapter discusses the major concepts used to analyze the research related to this project. First, the authors propose a model for improving the lessons learned program by raising awareness, improving accessibility, and increasing use. The authors refer to this model as the Awareness, Accessibility, and Use model (AAU), and is intended to provide a simple framework for improving the LLP at the operator level and setting the foundation for future installation of more techno-centric solutions. Second, the Design Challenge represents the methodology originally chosen to both analyze the problems and issues raised in the preceding chapter and ideate potential implementable solutions. Third, the theory of the Adjacent Possible supports the authors assertion that Naval Special Warfare (NSW) cannot simply improve its current lessons learned program (LLP) by adding more technology. The final concept, Knowledge Flow Theory (KFT), explores the idea that knowledge is dynamic and can be both measured and visualized. The last three concepts provide an intriguing analysis of the current program's stated purpose and goal and provide supportive discussion for the AAU Model.

A. THE AWARENESS, ACCESSIBILITY AND USE MODEL

Three prominent, interconnected, and mutually supporting themes emerged from the authors interviews with NSW operators. First, operators were not aware of the LLP, or if they were, they were not aware of how it worked to benefit the community. Second, the current iteration of the LLP was not easily accessible, neither physically through actual computer terminals or personal contact with the lessons learned managers (LLMs), nor was it accessible digitally with strict access permissions and unaccommodating user interface. Third, operators were simply not using the system, mostly because the considerable hurdles with awareness and accessibility, but also because there was not a requirement to use it, nor was there a perceived benefit. These three themes emerged repeatedly throughout the interviews, and often cut the interviews short, because if the operators were not aware of the program, there was little benefit in continuing to ask further questions. The authors

subsequently constructed a conceptually simple improvement model based around the three pillars of raising awareness, improving accessibility, and increasing use of the LLP. Figure 5 represents a visualization of the AAU model, and how it supports itself and more important, provides a foundation for the LLP.

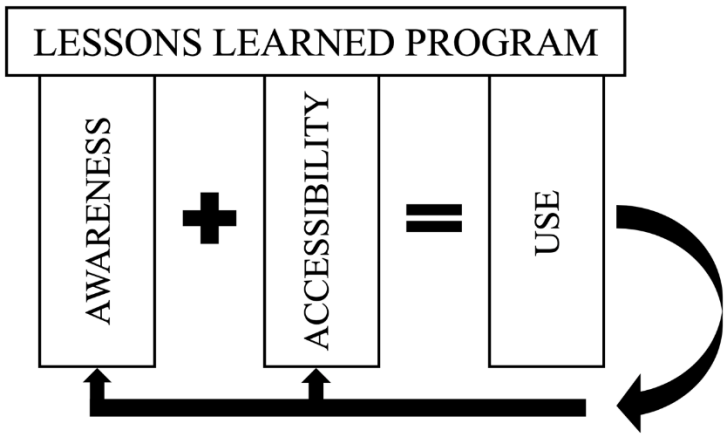

Figure 5. AAU Model

The awareness pillar is the most critical pillar of the model. If NSW operators are not aware of the LLP, the program is essentially useless. People cannot attempt to access or use a program they are not aware of. The knowledge contained within the program, however beneficial to the individual or organization, is of little value if members have no awareness of the existence of the program. Awareness must be raised in order to facilitate use of the system.

The accessibility pillar is nearly as important as the awareness pillar because once awareness is raised, operators would hypothetically be interested in exploring what the LLP might contain and attempt to access it. If barriers that restrict or interrupt this natural curiosity, the operator is liable to dismiss the program as a waste of time. These barriers could include an inability to get at a computer workstation, a lack of required credentials, or the platforms interface is too complicated and clunky. Both physical and digital barriers restrict operators' access and should be removed.

The use pillar is interesting as it provides both a main support for the LLP, but also a feedback loop to the other two pillars. Use of the LLP is the raison d'être for the program. The LLP needs to be used to justify its existence and the resources it commands. Also, with widespread use, awareness is naturally raised by more users communicating with each other about the program. Finally, properly leveraged feedback mechanisms can take input from users to improve the accessibility for the increasingly aware user base.

Breaking down the authors simple conceptual model, a simple formula emerges that can be applied to the LLP: Raising awareness and improving accessibility will drive more use of the program; increased use of the program will naturally raise more awareness, and promote more improved accessibility; and greater awareness and more improved access will continue to promote greater use. Adopting this model, along with implementation of the suggestions and recommendations in the final chapter of this paper will greatly enhance the effectiveness of the LLP, contributing to NSW's continued competitive advantage over increasingly sophisticated adversaries.

B. DESIGN CHALLENGE

In their book titled *The Design Way: Intentional Change in an Unpredictable World*, Nelson and Stolterman explain, "Design is the ability to imagine that which does not yet exist to make it appear in concrete form as a new purposeful addition to the real world."[80] Following the interviews of NSW operators, the authors intended to conduct a design challenge—an event to bring together a wide array of professionals from across academia, industry, and the military to ideate implementable solutions to the issues and concerns raised. As Nelson and Stolterman suggest, and as the authors concur, "To come up with an idea of what we think would be an ideal addition to the world, and to give real existence—form, structure, and shape—to that idea, is at the core of design as a human activity."[81] The ideations and results of the design challenge would have been applied to

[80]Erik Stolterman and Harold G. Nelson, *The Design Way: Intentional Change in an Unpredictable World* (Cambridge, MA: The MIT Press, 2012), 12.

[81]Stolterman and Nelson, 1.

the collect, archive, analyze, resolve, disseminate (CAARD) process of observations, insights, lessons (OILs) to enhance the LLP, giving real existence to advancing the conservation of knowledge and assure feedback to the greater NSW formation and future operators.

A design challenge event would bring together a diverse group of individuals with different backgrounds and present them with the same problem. The intent is to tap into each individual's unique experience to develop more wholesome and inclusive solutions. The challenge should be held in an open environment, where ideas are encouraged to flow freely. In *Where Good Ideas Come From: The Natural History of Innovation*, Steven Johnson explains, "Environments that build walls around good ideas tend to be less innovative in the long run than more open-ended environments."[82] The design challenge event should first focus on deconstructing any existing 'walls' between the diverse participants—encouraging them to share and collaborate in the spirit of innovation.

The design challenge event was developed by the authors, with assistance from faculty and staff at the Naval Postgraduate School, and was to be hosted at SOFWERX, in Tampa, Florida. SOFWERX is a USSOCOM-partnered venue with the mission to "Help solve challenging Warfighter problems at scale through collaboration, ideation, events and rapid prototyping."[83] Two weeks before the event, the Corona Virus Disease-2019 (COVID-19) pandemic forced federal, state, and local governments to issue shelter-in-place orders, and the Department of Defense (DOD) implemented a Stop Movement Order for all but the most essential mission travel in hopes of minimizing the spread of the virus. In response to the enormity of the situation, the event was canceled.

However, the authors encourage future researchers aimed at improving the LLP to conduct a design challenge to further examine the issues operators face with the use of the

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[82]Steven Johnson, *Where Good Ideas Come From: The Natural History of Innovation* (New York: Penguin Group, 2010), 22.

[83]"SOFWERX -- Speed Innovation Solutions," SOFWERX, accessed April 25, 2020, https://www.sofwerx.org.

existing LLP. The challenge will develop solutions aimed at further expanding awareness of the program, improving user accessibility, and increasing the overall use of the program. Ideated solutions from a future design challenge will help foster the trust of the NSW professional and incentivize organizational change to view the LLP as a learning tool and not just another computer program or piece of administrivia. In addition, this design challenge will inform future technological considerations to help transform collected OILs into more permanent knowledge across NSW by exploring the relationship between the NSW operator and the LLP in depth.

For a future iteration of the NSW LLP design challenge, participation from approximately 30–50 leading minds in academia, industry, and the military is highly encouraged. This diverse cohort of attendees would assist NSW in exploring unique ways to meet the challenges of the human aspects of capturing, analyzing, and disseminating knowledge by leveraging personal and professional expertise and experiences. In addition, it is crucial that 6–10 NSW operators attend the event to represent the concerns, constraints, and limitations faced by the warfighter regarding the LLP. Mark Nissen explains why including actual users is important: "Understanding the kinds of knowledge that are important in an organization's particular environment is essential for promoting the most important knowledge flows."[84] The NSW operators would collaborate with the rest of the participants to define current and projected issues, as well as ways to overcome those challenges of import. Stolterman and Nelson point out, "To create new designs into the real world, designers must adequately know the world that already exists, at a level that makes meaningful design possible."[85] Once the scene is set, the participants would be broken down into teams of no more than 10 professionals per team and prioritizing diversity within each team.

Each team would conduct two, 20-minute break-out rounds focused on identifying limiting factors that interfere with the intent of the design challenge. For example, when

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[84]Nissen, *Harnessing Knowledge,* 14.

[85]Stolterman and Nelson, *The Design Way,* 119.

developing or improving a software-based platform, time and money could be limiting factors. Time is a limiting factor because in order to be of greatest use, the platform needs to be rolled out expediently, but in order to avoid developing a poor platform, designers and engineers need time to properly research, design, develop, and test a platform before officially launching it. Money is also a limiting factor because there is often a mismatch between the desire for high-tech solutions, but it lacks priority against more mission-critical budget line items. It is important to identify such limiting factors early, because as Stolterman and Nelson suggest, "The availability of an infinite amount of information means that a fully rational analysis of all information is not possible."[86]

Then, following the identification of limiting factors, each team would conduct two, 25-minute rounds that ideate ways to overcome the identified limiting factors. The limiting factors influence project parameters, and help the designers narrow or broaden the scope of the end product. To overcome a limiting factor of time, the design teams might propose using the existing technology as the backbone to the new platform, in order to save time designing a wholly new platform. Often there is a tradeoff between time and money, and by utilizing an existing platform to save the time developing a new one, there would need to be a significant investment in qualified and experienced subject-matter experts to fully leverage any latent power within the existing system. This investment means spending more money, but such resources would ensure a better end product, especially if the knowledge required does not organically exist within the organization.

Finally, after taking into account the limiting factors and identifying ways to either overcome or mitigate their effects, each team would shift focus to developing short (<1 year), middle (1-3 years), and long-range (3+ years) solutions to improve knowledge sharing and conservation within the NSW community. Any ideated potential solutions would aim to increase the conservation of new knowledge with a more efficient feedback loop between operators and the LLP. Stolterman and Nelson point out, "Design is about

[86]Stolterman and Nelson, 123.

bringing things into the world that have not existed before. It is about creating the *not-yet-existing.*"[87] Johnson describes this process as The Slow Hunch:

> Most great ideas first take shape in a partial, incomplete form. They have the seeds of something profound, but they lack a key element that can turn the hunch into something truly powerful. And more often than not, that missing element is somewhere else, living as another hunch in another person's head. Liquid networks create an environment where those partial ideas can connect; they provide a kind of dating service for promising hunches. They make it easier to disseminate good ideas, of course, but they also do something more sublime: they help *complete* ideas.[88]

These "complete" ideas created during the design challenge would have been used to develop implementable solutions to improve the LLP. As Johnson mentions above, the ideas exist, but sometimes need to be brought in contact with the "missing element." The Design Challenge would have provided a venue for NSW operators who have ideas for improving LLP to mingle with others and "complete" their ideas aimed at raising operator awareness, improving accessibility, and increasing the overall use of the program.

In summary, the desired end-state of the event would include both immediately implementable and future solutions that address functionality, uses, structure, and user incentives for the NSW LLP. Each participant, regardless of background, will arrive with good ideas or hunches based on their professional and personal background. As Steven Johnson points out, however, "Like any other thought, a hunch is simply a network of cells firing inside your brain in an organized pattern. But for that hunch to blossom into something more substantial, it has to connect with other ideas."[89] The event will foster the intersection and connection of ideas to offer new perspectives on the improvement of the LLP and perhaps highlight new opportunities that have gone unexplored to date.[90]

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[87]Stolterman and Nelson, 127.

[88]Johnson, *Where Good Ideas Come From,* 75.

[89]Johnson, 99.

[90]Johnson, 77.

C. ADJACENT POSSIBLE

Dr. Stuart Kauffman proposed the theory of the adjacent possible to describe how "Biological systems are able to morph into more complex systems by making incremental changes."[91] Steven Johnson then adapted this theory to apply to ideas and innovation in his book *Where Good Ideas Come From: The Natural History of Innovation*. In Johnson's adaption, there exists a room with multiple doors, and each door leads to a new idea or concept. Once a door is opened, there exists another room with more doors, each advancing some aspect of that "new" idea or concept. Johnson describes this new room, and each subsequent room, as the adjacent possible to what exists presently and what is possible in the immediate future.[92] A simple example would be to consider the wheel. In the first room you have a round stone. The connecting rooms might contain wooden wheels, or stone wheels with some type of axel, each within the realm of the adjacent possible. The connecting rooms would not contain the automobile, or even the vulcanized rubber tire we know of today. That technology is not within the adjacent possible of the stone wheel.

For NSW, attempting to apply artificial intelligence (AI), machine learning, natural language processing, etc., to its LLP is not within the adjacent possible. As Kumar Srivastava describes, "Enterprises often embark on their big data journeys with the hope and expectation that business critical insights will be revealed almost immediately just from the virtue of being on a big data journey and they building out their data infrastructure."[93] Essentially, NSW says they want to do AI, spends money on the technology and infrastructure, and magically, in theory, they immediately begin generating new and exciting insights into their operations. Except, as Srivastava goes on to explain, that is not what happens:

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[91]Johnson, 31.

[92]Johnson, 31.

[93]Kumar Srivastava, "The 'Adjacent Possible' of Big Data: What Evolution Teaches About Insights Generation," Wired, accessed April 18, 2020, https://www.wired.com/insights/2014/12/the-adjacent-possible-of-big-data/

> What enterprises almost always find is that data sources are in a disarray, multiple data sets need to be combined while not primed for blending, data quality is low, analytics generation is slow, derived insights are not trustworthy, the enterprise lacks the agility to implement the insights or the enterprise lacks the feedback loop to verify the value of the insights.[94]

Our research has shown, and verified by LLMs, that NSW's LLP meets most of the criteria above. Multiple databases hold incomplete and low quality (and quantity) of data, the enterprise is not nearly agile to adapt to any "insights" that might be generated, and most offending of all, there is no existing feedback loop to verify the program is actually having positive effects. In addition, NSW has poor infrastructure for supporting advanced technology. Computer access is limited by the number of workstations available and by outdated software. There is no training curriculum in place to show operators how to use the existing LLP, so in order for advanced technology to be rolled out, a training curriculum would need to be designed and implemented. The lack of certified personnel within the LLP to implement and maintain a more advanced platform constitutes another major shortfall of the current program.

Many of the above shortfalls can be linked to an NSW culture of "desire vs. priority." NSW desires to have advanced technology to do a majority portion of the CAARD process but does not tag it with the priority needed to be successful. They have shown this proclivity towards desire over priority with current endeavors into the big computing space. During the course of this research, the authors observed NSW attempting to develop artificial intelligence (AI) and big data analytics (BDA) capabilities in-house, tasking activated reservists and junior officers to undertake this effort. By the authors' assessment, this effort was not well managed or resourced. By not matching the desire for AI-supported lessons learned with a priority level high enough to properly and effectively design, develop and implement it, NSW is merely wasting time and resources that could be funneled into addressing the issues cited in this research.

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[94]Srivastava, "The 'Adjacent Possible' of Big Data: What Evolution Teaches About Insights Generation."

It is imperative for NSW to recognize its own 'desire versus priority' biases—place more emphasis on the prioritization of LLP development to match desire or adjust expectations and focus energies on developing a more robust underlying framework, a program that promotes awareness, improves accessibility and encourages increased use of the program. The more solutions discussed in this paper are implemented, the closer NSW will come to bringing AI and BDA into the adjacent possible.

D. KNOWLEDGE FLOW THEORY

During an interview with a retired NSW operator-turned government civilian on January 13, 2020, the question was posed to the authors: "Who cares?" The question underscored the dichotomy between desire and priority that surrounds the LLP, but taken a step further, the question could also be applied to NSW unique knowledge in general. Who cares if knowledge is transferred? Who cares if knowledge is conserved? The question hints at a deeper lack of understanding about how important lessons learned and knowledge are to NSW. Dr. Shelley Gallup and Dr. Mark Nissen remind us that "Knowledge enables people to gain and maintain rich situational awareness, to make and communicate effective decisions, and to perform the actions necessary for superior performance"[95] This statement derives from Nissen's previous work where he elaborates on how knowledge can effect competitive advantage: "Knowledge enables effective action; effective action drives superior performance; and superior performance supports sustainable competitive advantage"[96] As a community that considers itself elite, always seeking the competitive advantage, and takes great pride in its superior performance, NSW should care a considerable amount about knowledge and how it flows and is conserved.

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[95]Shelley Gallup and Mark Nissen. *A Knowledge Based Analysis of Information Technologies Required to Support Fleet Tactical Grid*, Project No. NPS-19-N183 (Monterey, CA: Naval Postgraduate School, 2019.), 50.

[96]Gallup and Nissen, 49.

Nissen's Knowledge Flow Theory (KFT) is especially applicable to this research, as it highlights why the current system is inadequate, and why emerging technological solutions are not within the adjacent possible for NSW.[97] Nissen's work with KFT includes describing how knowledge is dynamic and it can be measured by applying basic Newtonian physics equations to represent force, work, time, and power with analogic reasoning to knowledge. While Nissen and Gallup admit the comparison is not exact, they note "we gain insight from the deep understanding and mathematic representation of dynamic physical systems, which are adapted here to address the measurement of dynamic knowledge…to begin measuring knowledge as it flows through the organization."[98] KFT can be applied to both how NSW manages its LLP, as well how the LLP can improve knowledge transfer and conservation. It also supports the position that technology is not always the best answer.

The following is a simplified explanation of how Nissen and Gallup apply this analogical reasoning to show how movement of knowledge can be quantified. In the physical world, force is described as mass multiplied by acceleration. Work is then calculated by multiplying the force over a distance. That work divided by time is equal to power. When these physical concepts are applied to knowledge, Knowledge Force (KF) is described as the effort required to accelerate "chunks" of knowledge, and how explicit the knowledge is. Knowledge Work (KW) is KF multiplied by the reach, or how many people that knowledge is expected or required to affect. Knowledge Power (KP) is the quotient of KW divided by flow time.[99] The higher the knowledge power, the more likely the knowledge that has been transferred will be conserved and be used or applied.

Gallup and Nissen's report also includes a multidimensional visualization of knowledge flow on a three-axis graph depicted, as depicted in Figure 6. The vertical axis is the explicitness, or how much knowledge is articulated in verbal or written form. The

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[97]Gallup and Nissen, 49.

[98]Gallup and Nissen, 13.

[99]Gallup and Nissen, 7–13.

horizontal axis represents reach, or how far the knowledge travels within the organization. On the third axis is a life cycle, or what is being done with the knowledge. When plotting on the axes, different line thickness is used to describe the speed with which the knowledge flows and solid and dotted lines delineate how much "energy" the knowledge is carrying. For simplification, Gallup and Nissen equate thick, solid lines as the typical "tacit knowledge" and thin dotted lines with "explicit knowledge." The letters A and B represent points at which knowledge is created (A), and where it is ultimately used or applied by others in the organization (B).[100]

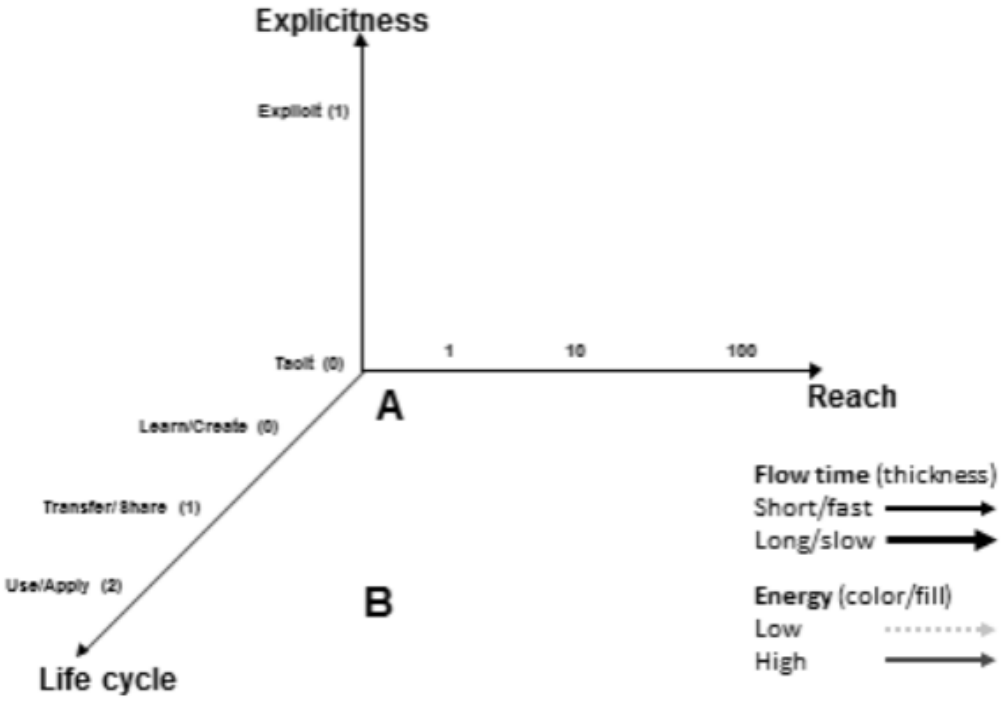

Figure 6. Knowledge Flow Visualization[101]

[100]Gallup and Nissen, 13–15.

[101]Gallup and Nissen, 13.

Gallup and Nissen further describe the Ideal Knowledge flow as a straight, solid, thin line, (short flow time with high energy) directly from point A to point B.[102]They qualify this assertion by stating that this path is infeasible, since tacit knowledge, knowledge that can be applied or used at Point B, is inherently slow to move, and the knowledge would need to be shared with at least one other person to attain a higher level of performance.

Gallup and Nissen go on to describe two archetypes of knowledge flow, the "Explicit Path" and the "Tacit Path," denoted in Figure 7. Essentially, knowledge can be made explicit as depicted by the dotted line from Point A to Point M through a written or spoken medium such as an email, poster, or speech. That product can be shared quickly with a large number of people in a short amount of time, shown by dotted line Point M to Point N. By the time the knowledge makes it to the use/application stage at Point B, there is little energy or power behind it. While the knowledge has been transferred, the lack of power indicates a low likelihood of conservation.

The knowledge could also follow a tacit path. This is when the knowledge is shared or transferred through "intrapersonal interaction" like teaching demonstrations, seminars, or workshops. This is represented by the path between Point A to Point P, then to Point B. This takes much longer, and the reach is smaller; however, the likelihood of the knowledge being conserved and applied is much greater. In their report, Gallup and Nissen explain that despite the tacit path taking up to three times as long to transfer the knowledge, the resulting knowledge power is more than double, which "more than makes up for the greater amount of time required for the knowledge to flow."[103]

[102]Gallup and Nissen, 15.

[103]Gallup and Nissen, 17–18.

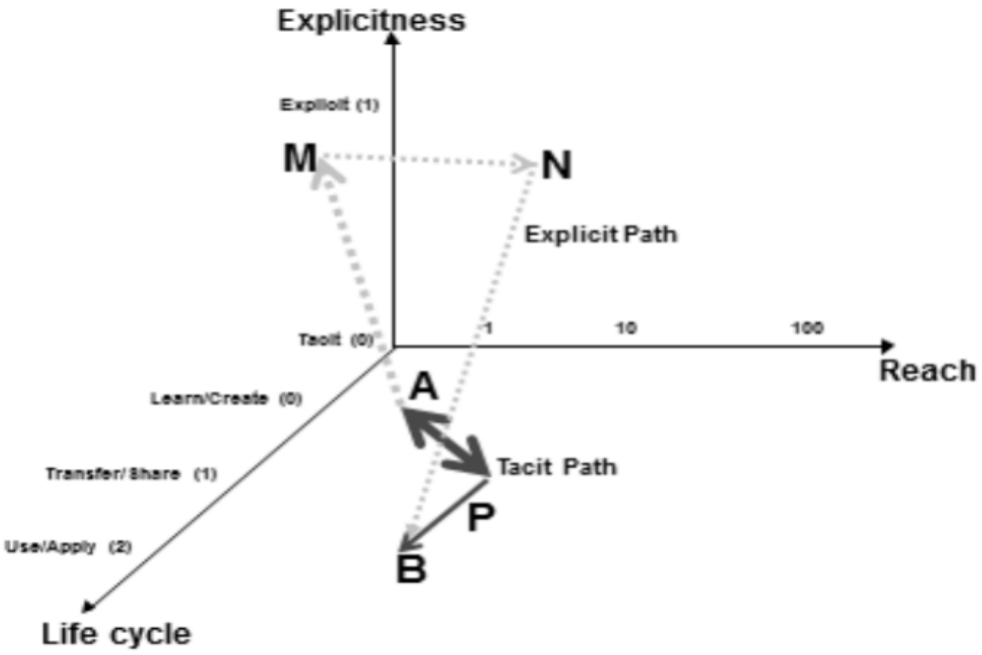

Figure 7. Knowledge Flow Archetypes[104]

KFT can be applied to the NSW LLP in three distinct ways. First, it supports the existence of the LLP as a tool for both transferring and conserving knowledge. Second, it can be used to support the AAU Model by comparing how the LLP is currently managed and how the AAU Model will help improve it. Finally, it supports the position that additional technology, or applying AI is outside the adjacent possible for NSW.

KFT provides a useful framework for designing an effective LLP that transfers and conserves knowledge. The two archetypes provide guidelines for how to best move knowledge in the organization. On the one hand, the knowledge needs to be made explicit to be able to be shared across a large population, and more easily archived. On the other, the people in the organization need to be taught how to use the program, and leverage the explicit knowledge contained in the LLP, to help transfer their tacit knowledge to others.

[104]Gallup and Nissen, 17.

The LLP should be both a central platform and repository to archive and disseminate explicit products created by NSW operators (i.e., the portal) and provide access to necessary resources and expertise to transfer tacit knowledge more effectively (i.e. LLMs).

KFT supports the AAU Model by showing the shortfalls with processes in place surrounding the current LLP. The awareness of the LLP should be tacit knowledge to all NSW personnel. Simply publishing an instruction is not sufficient to ensure the knowledge of what the program is, how it works, and why it is important and is an exact manifestation of the explicit archetype. In order for the LLP to be effective, knowledge surrounding it needs to be transferred along the tacit path. Transferring knowledge along the tacit path requires more personal interactions and engagements to ensure the knowledge can be applied and used. Accessibility simply means operators that require the knowledge contained with the LLP are able to get it. Logically, this will follow an explicit path, as the LLP portal contains strictly explicit knowledge; however, because that knowledge is easily accessible, repeated use and application can lead to the explicit knowledge becoming tacit. The explicit knowledge contained within the portal also provides the opportunity for tacit knowledge transfer by creating access to the knowledge creator, thus starting a personal interaction between the knowledge seeker and knowledge creator. The final pillar of use is supported by KFT simply by the concept of knowledge being dynamic. If the LLP is not used, knowledge doesn't flow, and knowledge created is not shared, and thus not able to be applied.

Adopting and implementing additional technology to help with the knowledge transfer along the explicit path is not useful unless there is a secondary pathway of tacit knowledge transfer. KFT provides a tool for measuring the effectiveness of explicit knowledge transfer compared to tacit knowledge transfer, and repeated iterations of the model show that knowledge transferred along the tacit path is more powerful than knowledge that moves along the explicit path. This supports this authors assertion that implementing emerging technology in the LLP before there is a more robust human-centered framework will be less effective at conserving and transferring knowledge. This

additional technology only increases NSW's reliance on the explicit path of knowledge transfer, which, as shown, is not as effective as the tacit or combined pathways.

E. CHAPTER SUMMARY

This chapter originally intended to analyze the combined results of the interviews with NSW operators and the results of the planned design challenge. When the design challenge was canceled due to the COVID-19 pandemic and resulting stop movement orders, the decision was made to instead describe the design challenge process and how it could be conducted in the future. The purpose of the design challenge was to bring together a diverse group of individuals to "design" solutions to the issues and themes that emerged from the interviews. There still exists an opportunity to leverage the design challenge methodology to ideate and test other potential solutions to the issues facing the LLP in NSW. Additionally, two concepts emerged while researching this topic that were applicable to the study, and worthy of discussion. The Adjacent Possible and Knowledge Flow Theory both provide insights into how the current NSW LLP is falling short of its designed purpose, and why simply adding more advanced technology will not improve the program. Any attempts at improving the LLP should take into account the concepts and theories discussed in this chapter. A wide-reaching and diverse effort to get truly unique ideas from across the force, not reaching too far into the future without a robust, and effective framework, and recognizing that knowledge is dynamic and can follow different paths with different results are fundamental to successfully improving the LLP.

V. CONCLUSIONS AND RECOMMENDATIONS

This body of research is the second part of a three-part project intended to improve the Naval Special Warfare's Lessons Learned Program (NSW LLP). As Dr. Shelley Gallup explains, "The long-term intention of this research is to assist Naval Special Warfare Command (NSWC) in the creation of a lessons learned program that closes the gap between knowledge development, degradation of knowledge over time, organizational employment of knowledge, and access to retrieve and input new information."[105] As subsequent research will likely explore technical paths for the improvement of LLP performance, the scope of this project remained focused on the human factors and organizational behavior of the NSW operator toward the LLP as a whole. Gallup further states, and the authors confirm, "It is often the case that what is happening in an informal system can point the way to what improvements might be made in the formal system."[106] The authors conclude the application of the Awareness, Accessibility, and Use (AAU) Model designed to improve the organizational behavior toward the LLP will create a formal foundation for future research and eventual application of emerging technologies.

This chapter is organized in an "Item-Discussion-Recommendation" format to offer the reader a thorough understanding and pragmatic application of the AAU model. The AAU Model as it applies to the LLP offers a framework of three items: raise awareness, improve accessibility, and increase use. The subsequent discussion of each item is guided by the application of Galbraith's Star Model to arrive at specific recommendations aimed at the overall improvement of the LLP.

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[105]Gallup, *Improvement to the Naval Special Warfare Command Lessons Learned Program,* 1.

[106]Gallup, 14.

A. ITEM: RAISING AWARENESS OF THE LLP WITHIN THE NSW COMMUNITY

1. Discussion and Recommendations

Raising awareness for the NSW LLP amongst the community is the first and most critical pillar of the AAU Model. This pillar breaks down into two parts. First, a greater awareness that the LLP exists and second, an awareness how individual input to the LLP directly benefits fellow warfighters and the community at large. Raising awareness of the program requires a multi-faceted continuous approach, not a single document, briefing, or email. First, NSW operators at every level should be educated, informed, and re-educated throughout their careers on the existence of the program—points of contact, physical infrastructure tutorials, and the opportunity to provide recommendations on increasing its effectiveness as the present turns into the future. Second, a cultural shift needs to occur toward the use of the LLP. Senior leaders, both enlisted and officer, must embrace the program, and use their positions to promote awareness. Finally, NSW needs to inculcate the rank-and-file to view the LLP as mission-critical, not mission-enhancing. That is, every operator should view the LLP as a conversation between fellow operators—realizing their input into the system will feedback to the larger community, contributing to the lethality of the force and effecting change where needed.

Strategy: Commander, Naval Special Warfare Instruction (COMNAV SPECWARINST) 3000.4B outlines the purpose and objectives of the LLP.[107] Future revisions to COMNAVSPECWARINST 3000.4B should delineate what specific tasks each NSW Group (NSWG) Lesson Learned Manager (LLM) should do to standardize the LLP to ultimately raise the awareness as previously discussed. This "top-down" approach to raising awareness through a revised instruction illustrates NSW leadership's priority for a more effective LLP rather than just a desire.

[107]Naval Special Warfare Command, *Naval Special Warfare Command Lessons Learned Program*, 1–2.

Structure: There are too few LLMs within the NSW enterprise. Over the course of a Sea, Air, Land (SEAL) Team's inter-deployment training cycle (IDTC), considerable observations, insights, and lessons (OILs) are generated, easily overwhelming the single LLM assigned to the respective NSWG. The lack of available man-hours hampers their ability to properly analyze and disseminate knowledge and prevents them from getting out and interacting with the community and raising awareness. Increasing the billet structure to the LLP team offers each SEAL Team the opportunity to be assigned a representative—someone who will be engaged at all levels for the purposes of awareness, analyzation, and effective feedback of collected OILs to the wider community.

Processes: Promoting the LLP as an interactive learning tool for conserving knowledge through meaningful user input will inherently raise overall awareness of the program by delivering focused feedback to the entire NSW community. Some recommended processes for NSW to consider include:

- Develop a multi-level curriculum designed to introduce, refresh, and sustain the NSW operator's utility of the LLP is necessary for all levels at various stages of an individual career. For example, this curriculum would introduce the LLP to SEAL Qualification Training (SQT) graduates, teach SEAL Troop and Platoon leadership how to provide useful input, and educate senior leaders on leveraging the program to inform decision-making.

- Organize, conduct, and record OIL seminars designed to share experiences (e.g. Video podcast, Video storyboards). These events would be in follow-up to a submitted AAR to allow the observer to glean more information if desired.

Rewards: In the SEAL Ethos and Special Warfare Combatant-Craft Crewman (SWCC) Creed, guiding documents for NSW culture, operators describe themselves as

quiet professionals who do not actively seek recognition for their work.[108] The LLP is not a medium to aggrandize its contributors; however, it can be a platform for force-wide acknowledgment of a valuable contribution. Recognition of these contributions can serve as an intrinsic motivator, which have been shown to be stronger than extrinsic, more tangible rewards.[109] Some rewards-based recommendations for raising awareness include:

- Producing a periodic DOWNREP from NSWC and/or the Group levels that recognizes recent valuable contributions
- Routinely pushing a Before Action Review (BAR) to relevant SEAL Troops and Platoons, with contributors cited for their work. By citing the lessons' author, the BAR would connect new seekers knowledge with those that generated it, completing the knowledge feedback loop internal to the LLP

People: Regardless of any future application of emerging technology, the right people in the right places are critical to raising awareness of the importance of the LLP.

- Current and future LLMs should be required to develop trust and rapport across the force, from the Third-Class Petty Officer to the Rear Admiral.
- Senior leadership must engage with their commands, using their positions and influence to continue promoting the program.

These recommendations are critical, as current NSW culture does not recognize the importance of the LLP. It is imperative that LLMs and senior leaders stay engaged across the force with persistent interaction and effective communication, to shift the cultural perceptions of the LLP.

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[108]Naval Special Warfare Command. "SEAL Ethos." Accessed May 17, 2020. https://www.nsw.navy.mil/NSW/SEAL-Ethos.; Naval Special Warfare Command. "SWCC Creed." Accessed May 17, 2020. https://www.nsw.navy.mil/NSW/SWCC-Creed.

[109]Hans Schumann, "How to Help Your Staff Fall in Love with their Job: Extrinsic Vs. Intrinsic Motivation," *Recognition and Engagement Excellence Essentials* 04, (April 2017): ProQuest

B. ITEM: IMPROVING THE ACCESSIBILITY OF THE LESSON LEARNED PROGRAM

1. Discussion and Recommendations

Improving accessibility is the second pillar of the AAU model, and equally important as raising awareness. If operators are aware of the program, but cannot access it, it is not likely to be used for storage or retrieval of knowledge. This pillar has two components that must both be addressed to meet the intent of improving the LLP. The first component is the physical access to the program either through the LLM, or the information terminals (i.e., computer workstations). The second component is the digital accessibility, or the ability of a user to successfully navigate the system and successfully retrieve the knowledge they were seeking. Overall, NSW must increase the physical accessibility of the program. The current construct of one LLM per NSWG is insufficient, as is the availability of computer terminals with access to the lessons learned portal. Additionally, any endeavors to improve the digital accessibility should be inclusive of inputs from the actual user base, not a single entity. Furthermore, implementing new mediums for sharing the knowledge within the program, publicly recognizing individuals and groups, and properly resourcing and supporting those whose responsibility it is to design and maintain access are vital.

Strategy: The strategy developed to improve accessibly should be user focused. The users are customers, and NSW LLP needs to develop a product that meets the customers need. The strategy needs to recognize the limitations posed by the barriers to physical access, as well as the level of information technology (IT) training the users may possess. Although the strategy is designed at the higher levels, it should be developed with those that will eventually be implementing and executing it. Any strategy aimed at improving accessibility should take into account user provided feedback, and ensure users are properly trained on any updates and new functions.

Structure: The majority of improvements related to accessibility lie within the structure of the LLP. Currently, the program is too centered on IT, with very little interaction between actual people within the program. The LLM is a single point of contact

(and potential failure) who can often be overwhelmed with the amount of data and information flowing through the organization. It is difficult for them to keep up with requests for information, while also training operators on the system, AND developing and disseminating products out to the force. The lessons learned portals are not standardized, easily navigable, and are often incomplete. The portals are also only accessible on classified computer workstations, of which there are not enough. The following recommendations are intended to help increase the accessibility of the LLP:

- Increase the LLM footprint to allow access at the team level. Not only will this allow for face to face interaction with a subject matter expert, the additional manpower will enable faster iterations of the CAARD process.

- Hire a Microsoft SharePoint engineer to design a standardized, user friendly portal. The LLM should not be expected to be the developer and the curator of the portal. The standardized portal will allow users to build muscle memory of the system and be able to access what they need, no matter what command they are at.

- Increase the number of classified workstations available at the team level. This could be as simple as creating a centralized intranet "café" at the team to support extra users.

- Develop an unclassified lessons learned portal. Not every lesson learned needs to be classified. Lessons shared about trip planning or publicly releasable documents can and should be available via unclassified mediums.

Processes: Next to structural changes in the LLP, there considerable updates required to the processes of the LLP to improve accessibility. Currently there is very little lateral communication between operators, and even less downward communication from the top levels. Essentially information and knowledge flow upwards, with little collaboration laterally and even less feedback downwards. There is also a significant lack

of training materials and processes in place to ensure those with physical access to the LLP know how to best utilize and leverage its capabilities. Equally significant is the lack of engagement of the LLM directly with the teams, creating less opportunity for person to person access. Improving the lateral, collaborative processes within NSW will not only increase accessibility to the LLP, but also invite more opportunity to develop new processes aimed at further improving access to the knowledge in the organization. Specific procedural recommendations include:

- Implement "cross talks," surveys, focus groups to encourage conversations both laterally amongst users, and vertically up and down the chain of command. The more the users at the bottom know that their contributions are being heard at the top and across the organization, the more they are likely to contribute, and the more accessible the program, and knowledge inside it, becomes.

- Involve LLM with regular battle rhythm events at the team level. Knowing the LLM will be in attendance at already scheduled meetings provides another access point to the program and increases efficiency.

- Create robust education and training programs to reduce barriers to digital access. Training sessions, video tutorials, quick reference guides are all useful tools, and utilize a combined Knowledge Flow Theory (KFT) archetype to improve the access to the knowledge.

- Utilize different mediums of information to share access. Leveraging current mediums of sharing (social media, podcasts, video) are useful for increasing digital access to the younger generation of NSW operators.

- Develop different classification levels of the lessons learned platform to provide more physical access.

Rewards: The rewards for increasing accessibility are inherent to the concept. That is, increased accessibility means increased use. However, similar to rewards suggested in the raising awareness section, the community should recognize individuals for their contributions to increasing accessibility. Not only does this recognition reinforce the notion that contributions from the lower levels are valued and can foster change, but if those contributions make the program easier to access, then the effect is doubled. Additionally, in organizations like NSW, competition can leader to better results. Rewards-centric recommendations include:

- Recognizing individuals for useful, innovative, or creative suggestions at improving access to the program
- Highlighting different commands progress towards increasing accessibility by showcasing their efforts to lower barriers to either physical or digital access

People: Putting the right people in the right place is vital to improving access. In a hierarchical organization like NSW, senior leadership are the lynchpins. Their needs dictate the rest of the organization's actions, so if they require the program to be accessible, the program will be accessible. Also, supporting those in critical positions with the right resources are key to success. It cannot be expected that a LLM hired to execute the CAARD process also be required to independently develop and launch a user-friendly portal. Hire professionals to develop the lessons learned portal, but also provide access to training for those responsible for curating it. As for physical access, increasing the number of properly trained and accountable personnel can help lower the risks to installing additional classified systems.

C. ITEM: INCREASE USE OF THE LLP ACROSS THE NSW FORMATION

1. Discussion and Recommendations

Just as NSW focuses its efforts on raising awareness and improving accessibility of the program, an emphasis on increasing its use at all levels is essential to the transformation

and conservation of community-wide knowledge. By establishing a culture of increased use, from the platoon huts to executive suites, NSW will be better postured for future application of emerging technologies. An increase in community use will develop "muscle-memory" for operators to use the LLP, creating a natural conversation entrenched in knowledge conservation.

Strategy: It is imperative that Commander, Naval Special Warfare charge all levels of leadership within the community to raise the priority on the use of the LLP with a higher degree of sponsorship and promotion among the rank-and-file. The community's desire to improve the LLP without priority from the top is ineffective.

Structure: An increased number of LLMs across the NSW enterprise will allow for the LLP to evolve into a conversation of knowledge conservation. Using the CAARD method, these additional LLMs will represent the input from the community to tell a "story" intended to offer context as the information moves up the chain of leadership. Without an increase of LLMs that can take ownership of such input, documents will continue to be "whitewashed" as they move from the Platoon space to the executive suite, decreasing the value of information and hindering the learning process. Other structural recommendations are as follows:

- Reduce the number of steps a document intended for the LLP takes between the originating source and its feedback to the rest of the community, expediting the lessons being analyzed and disseminated. The current hierarchical nature of submitting documents to the LLP creates organizational boundaries that impede proper analysis and dissemination of knowledge intended for the greater NSW community.[110]

[110]Galbraith, Downey, and Kates, *Designing Dynamic Organizations: A Hands-on Guide for Leaders at All Levels*, 77.

- Create a non-attributable, more direct form of submission to the LLP to remove layers of the "chop chain" for conservation and dissemination of more accurate information.

Processes: As with the first two pillars—awareness and accessibility, the processes to increase the use of the LLP begin with a top-down approach to support more efficient lateral communication between the NSW warfighter. The implementation of artificial or forced scenarios during blocks of training in the IDTC cycle will begin developing the "muscle-memory" needed to instill an NSW culture that views the LLP as a learning tool designed to share and conserve knowledge. This cultural shift is accomplished throughout an operator's career and during key blocks of training.

- Charge the Training Detachments (TRADET) and Advanced Training Command (ATC) cadre with introducing the LLP, its benefits, and how to add effective feedback during mandatory blocks of initial professional development and Unit Level Training (ULT).

- Add LLP modules to existing professional educational courses including Junior Officer Training Course (JOTC), Force Development Course (FDC), and Platoon Leaders Course (PLC).

- Conduct periodic focus groups and/or surveys to gauge effectiveness of the AAU Model of raising awareness and improving accessibility designed to increase use.

- Develop opportunities for LLMs to actively engage with the NSW operator who use and benefit from an improved LLP.

- Task LLMs with active engagement of NSW operators to measure the use of the LLP across the force and report findings through appropriate leadership channels.

Rewards and People: As NSW answers the call of the nation, its professional force continues to have a forward presence around the globe. As these warfighters experience deployments and generate OILs, the LLP is the ideal location to transform and conserve their input as knowledge for fellow operators of today and tomorrow. The conservation of knowledge gained from a deployment to Southeast Asia may have immediate relevance to operations conducted half-way around the world in Eastern Europe. As awareness and accessibility are improved, operators will naturally increase their use of the LLP—developing a type of virtual conversation within the NSW formation. The following are recommendations to foster this virtual conversation using the LLP:

- Senior leaders should highlight the input and contributions to other senior leaders around the force. This senior leader lateral engagement will "bridge-the-gap" between NSW Commands and operators around the world, helping to transform a cultural shift needed to improve the LLP.

- NSW writ large must nurture a cultural shift that allows operators to realize submitting their unique OILs contributes to the broader improvement and increased lethality of the NSW community.

Table 1 below outlines the above recommendations for easy reference. The table is divided into three columns representing one of the three pillars, and six rows, representing each point of the Star Model, plus one extra row for other ideas that fell outside of the five points. The cells present the authors recommendations based on their research and analysis.

Table 1. Table of Recommended Solutions

		Pillar		
		I: Awareness	**II: Accessibility**	**III: Use**
Recommendations	**Strategy**	NSWC directed rewrite of COMNAVSPECWARCOMINST 3000.4B with specific tasking to LLM to raise awareness and standardization of LLP	Provide unclassified level lessons learned portal	Force use during certain training blocks to exercise use of portal; gather feedback from users to improve accessibility
	Structure	Increase presence of LLM or proxies at team level	Increase the number of classified workstations Develop an unclassified Lessons Learned portal Increase presence of LLM or proxies at team level Hire a Microsoft SharePoint engineer to design a user-friendly portal	Reduce the number of steps a document travels through between originator and community Develop a non-attributable form of submission for more accuracy of OILs intended to feedback to community
	Processes	Develop multi-level curriculum to introduce, refresh, and sustain operator's awareness of LLP Conduct OIL seminars to open channels of communications laterally across the community	Implement cross-talks, surveys, focus groups to encourage "conversation" Involve LLMs in the daily rhythm of respective Commands Create programs to reduce barriers to digital access Utilize different mediums of access to share information	Direct TRADET and ATC to implement the intro/uses/value of the LLP during training Conduct focus groups and surveys to gauge effectiveness of the AAU model in prep for emerging tech Increased LLM engagement with the NSW operator
	Rewards	Produce DOWNREP to highlight contributions from the ranks	Recognition of individuals for innovative ideas to improve access	Senior leader lateral engagement to highlight contributions to LLP to "bridge the gap"

		Pillar		
		I: Awareness	**II: Accessibility**	**III: Use**
		Push BARs to relevant TRPs/PLTs with contributors cited	Highlight NSW Commands that are increasing accessibility	Nurture a cultural shift to allow operators to realize the uses/value of contributing to LLP
	People	Hire and guide the "right" people at LLMs Utilize positions in senior leadership (officer and enlisted) to promote awareness of LLP	Hiring/Placement of talent to execute responsibilities of physical access	
	Other	Promote LLP across all echelons at all times "Forced" use during training blocks Develop matrix of how LLP can be used to support mission at different levels, i.e., resourcing at the NSWG level, stories for heritage events, Trip Planning 101 for the new guys		Use data collected to enhance broader decision making

This is not an all-inclusive table, merely a starting point for NSW to begin executing organizational behavior changes and begin down the path towards a robust, accessible and useful LLP.

D. FINAL THOUGHTS

BLUF: Promote a conversation amongst NSW warfighters by *supplementing* the LLP with technology; do not rely on technology to support the LLP without *first* gaining operator buy-in.

The origins of this research stem from a research request from NSW to examine means for improving the LLP through the application of emerging technology such as artificial intelligence (AI), machine learning (ML), and natural language processing (NLP).

The authors, both active NSW operators with over 20 years of NSW experience between them, felt that was a step in the wrong direction; that there were deeper, more human-centric solutions that should be implemented first. They redirected the research to look inwards; back into the community to find out what the user base felt would improve the program. This paper is a result of that hunch and subsequent research. The operator interviews told a compelling story. The LLP is not well known within the community, marginally accessible, and used even less. For the LLP to benefit the NSW organization, the actual users, the operators, need to be on board, otherwise the community will fail to truly realize the full potential of the program.

In order for the application of advanced technology to truly transform the LLP, the input needs to both improve in quality and increase in volume. In order to improve and increase the input from the NSW operator, NSW needs to establish a conversation—and buy-in—between the PLT hut and Executive Suite. Also, without establishing a strong relationship between the operator and the program itself, NSW will continue to waste valuable resources throwing money and technology at the problem, creating a perpetual cycle with no worthwhile solution. If NSW truly desires an advanced computing supported LLP, it must first address the cultural and organizational deficiencies outlined in this paper to increase the quality and quantity of data and information. This data and information is required to develop useful algorithms and successfully train them to produce the new and innovative information and knowledge that NSW seeks.

The AAU model is a simple conceptual tool that NSW should apply to the LLP for immediate positive effects. Reframing the instructions and processes that currently guide the LLP to address the lack of awareness, poor accessibility, and low use that currently exist within the program is a first step towards building a solid foundation for the program. The new, more robust foundation will better support the more advanced technology NSW desires to leverage. Figure 8 illustrates how the AAU model will support this emerging technology.

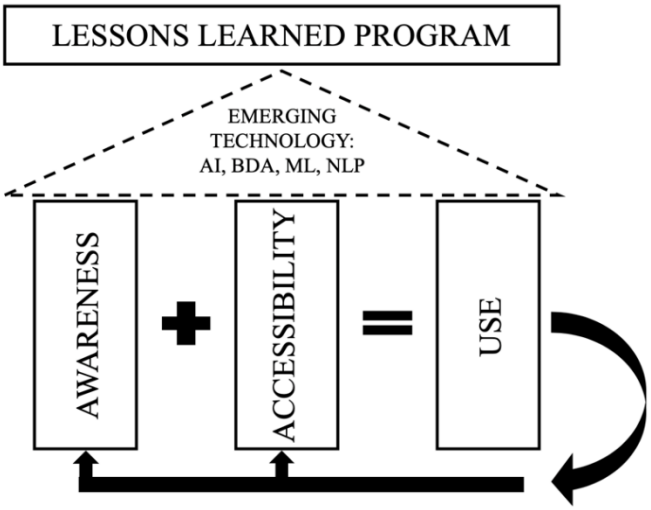

Figure 8. AAU Model Supporting Emerging Technology

This paper went into great detail describing different ways that academia would address the problem. It references leading theories in the organizational design and information sciences fields including, the Star Model, the Congruence Model, and Knowledge Flow Theory to support the authors original assumption that the LLP needs to be a human-centric program that is enhanced by technology, not reliant on it. The authors interviewed operators to get the ground truth about the program, not just the rose-colored glasses view of those at the top. A design challenge, bringing together leading minds from academia, industry and military, and including a host of active duty NSW operators was supposed to have provided a buffet of potential solutions, some tech, some not, but all aimed at improving the LLP from the bottom up. Unfortunately, due to challenges wrought by COVID-19, the design challenge was not executed as planned, and the authors were forced to pivot to alternative recommendations and solutions. This pivot led to the creation of the AAU Model, and the subsequent application of the Star Model to frame the recommendations. Future research into improving the LLP should include a design challenge as outlined in this paper, as it provides an open and collaborative atmosphere for tackling such complex problems as the LLP.

As this paper was a follow on to Dr. Shelley Gallup's initial report, it is right to indicate where the state of research now lies. Dr. Gallup's initial report utilized the Congruence Model to highlight the fits and misfits within the LLP program, this report further highlights the misfit between the formal and informal system and provides a model and recommendations for filling this, and other gaps. Both the design challenge and AAU Model should be considered as part of the next phase of the project where a technical report will be published indicating what specific technology can and should be applied to the LLP. The design challenge should be considered, as it brings disparate ideas together in an open setting, creating more powerful concepts. The AAU model should be utilized, as it provides the framework for successful implementation by garnering user buy-in through awareness, accessibility, and use.

Make no mistake, the NSW operator will continue to answer the nation's call. They are selected and trained to be resilient, adaptive and lethal and will continue to be so with or without an LLP. For decades, NSW operators have adapted to their surroundings and worked "with less". If a practitioner of NSW does not see the value in something, he will leave it behind. If a ladder is too heavy, they find or design one that is lighter, find another way, or just not use one. Such is the case with the current LLP. Operators are not aware of it, cannot easily access it, and as a result, do not use it. The LLP needs to be recognized across the force as a worthwhile and beneficial tool, not just another administrative task or useless piece of fancy technology. The best approach to improve the LLP is get buy-in from the entire community, from the operators in the Platoon spaces to the senior leadership in the Executive Suite at NSWC. Without the support of the warfighter, no amount of technology will improve the true meaning of an LLP— to transfer and conserve knowledge.

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