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DEFENSE LANGUAGE INSTITUTE DATA MANAGEMENT STRATEGY

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THESIS

DEFENSE LANGUAGE INSTITUTE DATA MANAGEMENT STRATEGY

by

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March 2020

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One of the most difficult aspects of research and study is the quality and availability of data. This thesis takes a hands-on approach to influencing, developing and implementing organizational and cultural change in enterprise operations in the collection and storage of data for the Defense Language Institute Foreign Language Center (DLIFLC). DLIFLC currently maintains three consolidated databases for the collection and storage of student data. Additionally, each of its eight language schools maintains a separate and independent database. The disparate nature of this current state of data management is inhibiting DLIFLC from making data-driven decisions to capitalize on desirable outcomes or identify root causes of undesirable outcomes. This thesis attempts to make organizational change that standardizes and creates governance for data management and security across all of DLIFLC in order to eliminate redundancy and improve efficiency of operations.

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DEFENSE LANGUAGE INSTITUTE DATA MANAGEMENT STRATEGY

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ABSTRACT

One of the most difficult aspects of research and study is the quality and availability of data. This thesis takes a hands-on approach to influencing, developing and implementing organizational and cultural change in enterprise operations in the collection and storage of data for the Defense Language Institute Foreign Language Center (DLIFLC). DLIFLC currently maintains three consolidated databases for the collection and storage of student data. Additionally, each of its eight language schools maintains a separate and independent database. The disparate nature of this current state of data management is inhibiting DLIFLC from making data-driven decisions to capitalize on desirable outcomes or identify root causes of undesirable outcomes. This thesis attempts to make organizational change that standardizes and creates governance for data management and security across all of DLIFLC in order to eliminate redundancy and improve efficiency of operations.

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LIST OF ACRONYMS AND ABBREVIATIONS

APAS	Associate Provost for Academic Support
CLD	Center for Leadership Development
DCSIT	Deputy Chief of Staff for Information Technology
DCSOPS	Deputy Chief of Staff for Operations
DCSPL	Deputy Chief of Staff for Personnel and Logistics
DCSRM	Deputy Chief of Staff for Resource Management
DLI	Defense Language Institute
DLIFLC	Defense Language Institute Foreign Language Center
DLPT	Defense Language Proficiency Test
DOD	Department of Defense
LPAD	Language Proficiency and Assessment Directorate
MLI	Military Language Instructor
MOS	Military Occupational Specialty
MVP	Minimum Viable Product
NPS	Naval Postgraduate School
OSAE	Office of Standardization and Academic Excellence
OTS	Off the Shelf
SDB	Student Database
SLVT	Senior Leader Visualization Tool
STATS	Student Training Administrative Tracking System
TRAC	The Research and Analysis Center
UGE	Undergraduate Education
USN	United States Navy
USA	United States Army
USAF	United States Air Force
USMC	United States Marine Corps

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EXECUTIVE SUMMARY

The Defense Language Institute Foreign Language Center (DLIFLC) provides linguistic instruction annually to approximately 2,500 students in eight language schools and 16 dialects. Students are currently required to achieve a 2/2 (reading/listening proficiency) on the Defense Language Proficiency Test (DLPT). DLIFLC's internal database shows that approximately 70% of students achieve this requirement. The Honorable Mr. Daniel P. Feehan (Department of Defense [DOD], 2016), then serving as the Assistant Secretary of Defense, signed the New Defense Language Institute Foreign Language Center Basic Course Graduation Standard memorandum. Graduation requirements increased to 2+/2+ on the DLPT. The deadline for the new standard is 30 September 2022.

To identify factors that contribute to student success or failure, DLIFLC must capitalize on enterprise data to make data-driven decisions in making policy and curriculum decisions. McAfee and Brynjolfsson (2012) stated you cannot manage your organization if you don't measure outcomes. Incorporating all the silos of information across DLIFLC will be crucial to their identifying predictors of student success to achieve the new mandates that have been imposed on the institution. Four of the five goals we have for our Data Strategy are increasing data interoperability, standardized data practices, improved security, and data accessibility. Our fifth goal is to fully leverage data and analysis capability, which becomes possible by first achieving the first four goals.

DLIFLC is a data-rich environment, but most data are maintained in silos independent and incompatible with other systems. While this can be beneficial for the local user who can tailor and customize their data according to the needs of their organization, it becomes difficult to aggregate and consolidate data when an Enterprise requirement needs to be addressed.

The current state of data management in DLIFLC consistently results in missed opportunities to capitalize on desirable outcomes, and identify root causes of undesirable outcomes. Example of an insight maybe students who were resourced with a certain

technology device or used a certain application had better outcomes, so this device/app could be proliferated throughout DLIFLC to improve overall outcomes. Another example would be identifying "pockets of excellence," such as a teaching team with exceptional outcomes, and digging deeper into what they are doing to improve their student outcomes and share those best practices across DLIFLC. As we conducted analysis on how DLIFLC manages their data during our weekly interviews with DLIFLC staff and faculty, we discovered that DLIFLC collects and maintains an enormous amount of data but the data is disparate and incompatible. There are no standard data practices in DLIFLC. Each of the stakeholders creates and manages their data differently and independently, and determines who has access. An example of how this can be problematic is the Training and Analysis Division, which routinely conducts analysis and institutional research and logically should have automatic access to data, constantly requires Command Group intervention to obtain data from within the Institute. Additionally, aggregation of data becomes extremely cumbersome and tedious because each dataset contains different information. Manual aggregation and interpretation have been the norm.

Our core working group, which consisted of several members from DLIFLC, The Research and Analysis Center-Monterey, predicted that our biggest challenge would be to create "buy-in" for the proposed change in data management practices and the subsequent implementation plan amongst the stakeholders. We anticipated the usual resistance to change as we navigated through the many cultural differences within DLIFLC. An extreme example for a lack of integration and cooperation were the cultural differences that ultimately led to the shootdown of two Army Blackhawks in 1994 (Snook et al., 2004). The many differences in culture and the assumptions that were made across the Air Force and the Army units involved, to include the differences from within the Air Force, resulted in 26 lives lost from friendly fire. While we anticipated a resistance to change from DLIFLC staff and faculty, we used this example to highlight the magnitude of things that could happen when a team fails to collaborate and share information with other members of the team. We feared that like many other organizations who fail to incorporate a data strategy effectively, DLIFLC would lose momentum and revert to its current ways of conducting business (Tabesh et al., 2019).

We conducted our analysis through interviews with all data stakeholders in DLIFLC to develop a thorough understanding of how they operate. We also identified areas that we could target for improvement or label as best practices. Our initial approach to change Data Management was to identify a target data set and investigate thoroughly how it is collected, provisioned, processed and analyzed. We intended to develop a model that we could replicate across all databases in DLIFLC.

We identified several targets that we wanted to analyze and model as implementation examples for all DLIFLC's data. Specifically, we intended to study student grades, DLPT scores and faculty training. Our mission was to understand the life cycle of these data and how they were collected, stored, provisioned and analyzed. Our plan was to assess whether these use-cases adhered to the principles of our data strategy and then develop systems and implement changes to make them conform to our strategy. An example of role-based access is Language School deans being able to access data pertaining to their students. Another role would be the separate Services being able to access student data for all Marines, Sailors, Soldiers or Airmen to identify "at-risk" student and direct intervention of resources.

After speaking with all the key leaders and stakeholders it was obvious that we did not have the time or resources to solve everything. We decided to create a model that was able to demonstrate the potential of having centralized and accessible data. With help from the Operations Research Department, The Research and Analysis Center-Monterey (TRAC) was able to develop a Senior Leader Visualization Tool (SLVT) using open source software. As opposed to creating a brand-new system from the bottom up, our use of the SLVT allowed us to create graphs and reports using live and current DLIFLC data.

The SLVT was our best option to provide a rapid and agile product to DLIFLC. It achieved the first four goals of our data strategy and serves as a model that DLIFLC could apply to their many databases and enable them to achieve the fifth goal. We used data provided from DLIFLC maintained in their Student Database (SDB). Initially, TRAC coded the SLVT to pull data from an excel output of the data from the SDB. The SDB is secure and appropriately managed. Our goal was to upload the SLVT on a DLIFLC internal server and program it to pull directly from the SDB. In doing this, we achieved our third

goal of increasing interoperability. Access to the SLVT and its functionality would vary by user and be role based. With help from the information technology experts at DCSIT, this would meet our fourth goal of improving data accessibility. Leaders across DLIFLC could have direct access to the SLVT and be able to access live data. The goal of the SLVT is to serve as a model for DLIFLC. The more important goal is to provide an example of the potential that lies ahead if they continue to replicate this across all the data silos.

We are about 75% of the way towards implementing our five goals as it pertains to our current model. We have successfully tested our SLVT on a stand-alone computer running queries and pulling data from an excel spreadsheet, which becomes outdated weekly. Our intent is to host our SLVT on a live server in DLIFLC and code it to query data directly from the Student Database that contains current data and is updated weekly. In regards to implementing our data strategy across all DLIFLC databases, we have barely scratched the surface.

Our ultimate goal is to incorporate the data silos so they can be interoperable and readily accessible. This policy implementation is much like any other military operation. It will continue to operate and adapt to changes in the "battlefield" until all objectives are met. Success of our project is achieved when the SLVT is uploaded on DLIFLC's network and providing current information to DLIFLC leadership. Success for the Data Strategy is complete when there are no data silos in DLIFLC and all databases are integrated, interoperable and conform to our strategy principles of treating data as an enterprise asset.

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I. INTRODUCTION

> Creating an Enterprise Data Strategy is not for the faint of heart. It first requires a commitment from the top and an acknowledgement that data is a corporate asset that must be managed and protected like any other asset. Given the difficulty of getting executive buy-in, it's not surprising that only one in 10 organizations have an enterprise data strategy. (Eckerson, 2011, p. 3)

The Defense Language Institute Foreign Language Center (DLIFLC) provides linguistic instruction annually to approximately 2,500 students in eight different language schools and 16 dialects. Students are currently required to achieve a 2/2 (reading/listening proficiency) on the Defense Language Proficiency Test (DLPT). DLIFLC's internal database show that approximately 70% of students achieve this requirement. The Honorable Mr. Daniel P. Feehan (Department of Defense [DOD], 2016), then serving as the Assistant Secretary of Defense, signed the New Defense Language Institute Foreign Language Center Basic Course Graduation Standard memorandum. Graduation requirements increased to 2+/2+ on the DLPT. The deadline for the new standard is 30 September 2022.

In order for DLIFLC to achieve these improvements, it needs to identify factors that contribute to student success or failure. To do this, it must capitalize on enterprise data to make data-driven policy decisions. DLIFLC currently maintains three databases for student information. The main database is the Student Database/Consolidated Team Activity Reporting System (SDB/CTARS) which contains data on individual student attributes. The next database is the Interim Student Questionnaire/End-of-Term Student Questionnaire (ISQ/ESQ) which contains data on student and instructor assessments of courses at the middle and end of each academic term. The last consolidated database is the Online Diagnostic Assessment (ODA) which collects and provides data from In-Course-Proficiency Tests. Additionally, each of the eight Language Schools maintain separate and individual databases. The data varies by school and is managed by individual language school database managers.

This thesis aims to apply a hands-on method and active participation to influence organizational change in the governance and security of enterprise data. It takes an innovative approach to develop and implement improvements in the collection and storage of data. The current state of data management in DLIFLC inhibits leadership from making data-driven decisions to capitalize on desirable outcomes, and from identifying root causes of undesirable outcomes. Creating an Enterprise Data Strategy and an implementation plan that codifies and standardizes data collection will improve administrative processes at DLIFLC. Improving the way data is collected, stored, processed, and provisioned for analysis will enable DLIFLC to identify opportunities to increase effectiveness and empower leadership with information and insight to make better policy decisions. Additionally, execution of the plan on target data use cases will validate our model and pave the way for positive change.

II. MODEL DEVELOPMENT

Our overall intent during the initial process of our research was to understand how DLIFLC managed their data. It was no mystery that data systems across the Department of Defense (DOD) are not interoperable or compatible. We discovered that DLIFLC is no exception. Most of the data is maintained in silos, which makes it difficult for data analysts to aggregate and consolidate when questions surfaced. It is obvious that there are many missed opportunities and inefficiencies preventing DLIFLC from maximizing their return on investment. A constant theme during all our interviews was that "there had to be a better way of doing business."

Given the fact that DLIFLC was charged with increasing the graduation standards for their linguists (DOD, 2016) without being provided additional resources, it is paramount that they change the business-as-usual mentality. A change in processes will enable them to make full use of their resources, specifically their data. The following paragraphs give a summary of the interviews we conducted in DLIFLC to understand their processes and identify areas for improvement.

A. INTERVIEWS—DEVELOPING A BUSINESS UNDERSTANDING

Figure 1 shows the eight key steps for successful change according to Kotter. With the support from DLIFLC leadership, we felt comfortable that we had achieved the first three steps of Kotter's eight-step model for implementing change. Our mission was to maintain momentum and continue to propagate this vision to all the stakeholders in DLIFLC while we set out to conduct our interviews. Figure 2 is the DLIFLC Data Strategy Questionnaire that we developed and provided to attendees prior to each interview. We conducted our interviews with all stakeholders in DLIFLC in the following chronological order.

Figure 1. Kotter's 8 Steps for Successful Large-Scale Change. Adapted from Kotter and Cohen (2012).

Data Functional Decomposition

- **Identify where data exists.**
  - What data do you collect?
  - What data do you use/encounter on a regular basis?
  - What data exists, but isn't collected or stored, that may be beneficial?
- **Identify how data are collected.**
  - How do you collect data(media, format)?
  - Why are data collected (historical purposes, analysis, etc.)?
  - Who inputs data?
- **Identify how data are stored.**
  - How are data stored (hard copy, Excel, Access, etc.)?
  - Where is data stored (local, cloud, desktop, shared drive)?
- **Determine how data are provisioned.**
  - Do you request data, if so what data, and what is the request process?
  - Do others request your data, who is the approval authority for requests?
  - Who has access to your data?
- **Identify how data are processed.**
  - Who QA/QC's your data?
  - Is your data reported to anyone on a regular basis? If so, how?
- **Identify how data are analyzed.**
  - Who has access to analyze data?
  - What reasons/purposes are analyses conducted?
  - Do you provide data for others to analyze?
- **Identify how data are governed.**
  - Who determines what data is collected?
  - Who determines/grants access to data? If applicable, to what data?
  - What are rules for data disposal (if any/if applicable)?
  - What actions are done to ensure data security/quality?
  - Who is accountable for data quality/security?
  - Who enforces good data quality/security practices?

Figure 2. DLIFLC Data Strategy Questionnaire

Our first interview was with the Office of Standardization and Academic Excellence (OSAE). Within the Office of Standardization and Academic Excellence, the Training and Analysis Division is the key office responsible for aggregating data for analysis in response to questions from DLIFLC leadership. They are staffed with data analysts and educational research analysts. OSAE also includes the Institutional Review Board (IRB) responsible for the protection human research subjects. It was immediately apparent that we were of like minds, because OSAE had the same opinion in regards to data management.

Our second interview was with the Education Technology and Development - Technology Integration Department. They were responsible mainly for curriculum, faculty and student support. They are also responsible for scheduling and assigning incoming students to classes. In regards to faculty development, they develop and implement faculty development and instructor certification courses. In this interview, we discovered that faculty training records were a key data point that DLIFLC wants to track and monitor, but it wasn't being done at the institution level. It is currently a manual process that depends on the individual faculty member to track and maintain. As we continued to discover in our subsequent interviews, faculty training is a topic of key interest to leadership at DLIFLC and became one of our targets for use case scenario.

Our third interview was with the Center for Leadership Development (CLD). CLD is primarily responsible for faculty and leadership development. Their focus is on improving leadership skills in conflict management, decision making, self-improvement and public speaking. We discovered that current data management practices were manual and extremely tedious. It is obvious that improving data management in CLD would likely result in the ability to measure the efficacy of CLD as it pertains to faculty development. Formalizing the training and attendance process will enable better tracking of faculty training and progress towards standardizing data management in CLD.

Our fourth interview was with the leadership of the Undergraduate Education Department (UGE). UGE is responsible for managing all the eight undergraduate language schools. As expected, UGE is the main producer of student data in DLIFLC. They are responsible for student instruction, test administrations, evaluations, counseling, etc. While

all language schools under UGE collect and store data to track student progress and produce the required periodic reports, we found that each school operated differently. Each school had a different method of collecting and storing data and different versions of the subsequent reports being produced. We also found that the process for requesting data varied among the different schools.

Our fifth interview was with the Language Proficiency and Assessment Directorate (LPAD). LPAD is responsible for the creation and administration of the DLPT. Due to the nature of their relationship with the rest of DLIFLC, they were directly under the command and control of the Command Group. LPAD was responsible for providing an assessment of all the culminating efforts of DLIFLC, which was the DLPT taken by all students to demonstrate language proficiency or not.

Our next interview was with the leadership from the Associate Provost for Academic Support (APAS). We found that APAS was responsible for managing the few databases that consolidated data across most of DLIFLC. They manage the Student Database and the Consolidated Team Activity Reporting System (CTARS) which is an accountability system for faculty. APAS also manages the collection of data from DLIFLC's immersion program, which immerses students in the actual region of their language of study. We discovered that the data practices in APAS were not formal or standardized, but common sense based and efficient. They were responsible for most data requests from various DLIFLC organizations with little or no standardized processes.

Our seventh interview was with key representatives from Military Language Instructor (MLI) Management Office. We found that MLIs serve as the bridge between the faculty and the service units. They are responsible for tracking student grades, providing operational expertise and assisting teachers with instruction. Additionally, they are solely responsible for inputting student data into the Student Training Administrative Tracking System (STATS), which captures every aspect of a student's academic progress. We were informed that this separation of duties was in place to mitigate any potential bias from teachers against students.

As previously informed from other stakeholders in DLIFLC, the MLIs confirmed that each school had their own method of recording and reporting data. MLIs from each school were responsible for weekly reports to service units, all of which varied depending on the school. Another thing we discovered is that MLIs maintained student databases independent of each school database, which resulted in a duplication of efforts.

Our eighth interview was with the leadership from the Deputy Chief of Staff Information Technology (DCSIT) Department. The DCSIT is responsible for managing DLIFLC's network infrastructure and is currently working on modernizing data practices. We discovered that they have been working on a new database for the past several years, which would eventually migrate data from the current domain to a new and better domain. DCSIT also echoed the fact that most data are isolated because people are protective of their data. We were cautious not to imply that we were there to change things and we stressed that it was our mission to assist them in their efforts to modernize and improve data practices.

Our next interview was with the leadership of the United States Marine Corps (USMC) Detachment. The Marines are responsible for the training and development of all USMC students. We found that unlike the other services, the Marine students get assigned language of study after arrival to DLI. Marines are initially assigned as Intelligence Analysts then get screened for linguist training during basic combat training. We found that the Marines have a very thorough and robust integration program. Marines arrive 30 days prior to language training. During the 30 days, Marines receive training on leadership, beginner language training, undergo a sleep study, and they receive nutrition and fitness classes.

Except for the Commander, Executive Officer and Administrative Staff, all Marine MLIs are linguists. All Marines are billeted and assigned to platoon's base on language of study. During our interviews with the many stakeholders, we discovered that the Marine MLIs were extremely involved with their students. They tracked all student demographics, even including romantic break-ups and the potential associated decline in performance. We also discovered that Marines linguists are not given an opportunity to recycle due to lack

of performance. Marines that fail to achieve the standards are monitored, counseled and then reclassified to another Military Occupational Specialty (MOS) if they fail.

Our tenth interview was with the leadership of the United States Air Force (USAF) Training Squadron. Exactly like the USMC Detachment, the USAF Training Squadron is responsible for the development and care of all USAF students in DLI. We discovered that USAF had an organic staff of analysts and routinely conducted research and study. We also found that DLPT reporting was different across the services, with the Navy students knowing their scores before other students. The USAF also has an integration program for their new arrivals. It is currently a three day course that focuses on learning strategies and time management. They are in the process of transitioning to a 10 day course, which should be launched in the Fall of 2021. We discovered that USAF linguists are assigned a language during the fourth week of basic combat training and then they are assigned an MOS after training at Goodfellow Air Force Base. The USAF echoed our previous discovery that methods and processes varied across the different language schools. They also echoed the fact that there were many redundancies when it came to data collecting and reporting. Due to the incompatibility of the DLI domain and the USAF system, it required manual and cumbersome effort to migrate DLI data to the USAF system.

Our next interview was with the leadership from the Deputy Chief of Staff for Operations (DCSOPS). The DCOPS is responsible for corralling DLIFLC as a whole in order to achieve the new graduation requirements of 2+/2+ on the DLPT. They track grades, graduation and attrition and develop the campaign plan for the Institute. The DCSOPS office also acts as a traditional Brigade Operations office that produces operations orders, coordinates ceremonies and community outreach programs. The DCSOPS office is also responsible for accreditation and all the financial tracking and reporting involved. While the DCSOPS office is responsible for synchronizing all stakeholders across DLIFLC, they only have direct authority over the Army units. They have no tasking authority over the other services, which has led to disparities across the Institute.

Our twelfth interview was with the leadership of the 229th Military Intelligence Battalion, which is the Army element in charge of all Army students in DLI. We were able

to interview the Company Commander and First Sergeant from each company. Primary focus at the company level was on physical training and administrative support to students. Companies also monitored grades weekly at the individual student level, which was provided from each school to the unit representatives. As discovered before, the Army echoed the fact that each school has a different tracking mechanism for student data. The Army had no formal integration training for new students, unlike the USAF and USMC. Additionally, arrivals were based on graduation from basic combat training. Some students arrive months early, some weeks and some days. Similar to the USAF, we discovered that the Army operates on the .mil network as opposed to using the DLIFLC .edu system.

Our next interview was with the DLIFLC Provost, Dr. Robert Savukinas. Instead of delving into his duties and responsibilities, we informed him of our progress and asked for his guidance as we continued our research. His vision consisted of being able to query accreditation reports, DLPT scores and attrition rates across languages and services. He also wished leadership could query lower performing students in need of tutors or academic support and higher performing students to identify tutors. The Provost also echoed the fact that monitoring faculty needs to be improved. He would like leadership to be able to identify faculty based on years and terms of employment, talents, qualifications, certifications, education, etc. He was also interested on the effect of training facilities on morale and learning. In general, the Provost expressed his desire for a data system that is acceptable and will enable the leadership to identify trends in order to optimize faculty and improve student morale and performance.

Our next interview was with key members of the Deputy Chief of Staff for Personnel and Logistics (DCSPL). DCSPL is responsible for providing DLIFLC leadership with information pertaining to all personnel, logistics and space utilization. They also assist with the decision-making process by conducting analysis on faculty compensation, faculty rank advancement, and the command supply program. Much like the other data systems in DLIFLC, DCSPL stored data manually on excel spreadsheets which limits the ability of DLIFLC to fully analyze and leverage data to inform the decision-making process.

Our fifteenth interview was with data managers from the United States Navy (USN) Detachment. We discovered that the USN students are assigned a language during basic

combat training. They are interviewed by a linguist about one month into basic combat training and make three preferences. Languages are assigned prior to DLI, and DLI has the option to change the language. Like the other services, the USN informed us of the redundancy that was necessary to migrate data because of the incompatibility between the DLIFLC network and the systems used by the services. They echoed the fact that the lack of compatibility resulted in manual input from data system to data system. They also confirmed the fact that each language school treats data differently. The USN informed us that reporting was inconsistent, which hindered their ability to leverage data to identify "at-risk" students and provide intervention resources. They expressed a desire to have grades reported by units, by dates, and standardized across all schools. They mentioned that some school incorporate projects and homework into the grade calculations while others schools don't.

Our next interview was with leadership from the Deputy Chief of Staff for Resource Management (DCSRM). DCSRM is responsible for the planning and execution of the DLIFLC's budget. DCSRM reinforced the importance of optimizing resources in order to maximize return on investment. They mentioned the constant decline in funding making it more difficult to meet mission. Based on the algorithm used to authorize instructors, DLIFLC is approximately 400 instructors short of the optimum teacher to student ratio. They also mentioned that data practices are manual and antiquated. DCSRM expressed their desire to have a data system that was able to link historical trends to past outcomes, which would enable leadership to pinpoint return on investment. They also want to be able to tie spending to student and faculty performance. One thing that was glaring was that some languages had a 1/1 student ratios and basically all differed. DCSRM was extremely forthcoming with their opinion that instructors needed to be optimized.

Our last interview was with the Continuing Education Department, which was responsible for language instruction post-DLIFLC. It was clear to all leaders in Continuing Education that data management would be key to improving student performance, but the nature of their mission was the exception. Their mission is mostly reactive to customers in the field that need refresher training and they have little to no control over their students. This makes it extremely difficult for them to collect reliable and quality data. Students

routinely drop out of class due to mission requirements. In our assessment, the Continuing Education Department is out of the scope of this thesis but could be incorporated later in the future as DLIFLC data management practices continue to mature and improve.

B. DISCUSSION

During our journey to develop a thorough business understanding of how DLIFLC operates and treats data, we realized that it was extremely complex and quite daunting. Most of our interviews were received with hesitation and suspicion that we were unempathetic towards their mission and processes. Kotter (2007) mentioned that no enterprise can continue if it is unable to adapt to the changing economy. Faced with new challenges and no additional resources, it is imperative that DLIFLC change how they conduct business in order to meet the higher standards demanded.

We confirmed that like many organizations in the DOD, there are many disparities across DLIFLC in regards to the handling of data. While rich in data, most are maintained in silos and difficult to collect and consolidate due to many reasons. We found many practices that could improve student performance across the board, if standardized across DLIFLC. The integration programs conducted by the USAF and the USMC are obvious examples of how to properly prepare students for the academic rigor of DLIFLC. The employment of linguists as MLIs make perfect sense for the training of future linguists.

The compatibility of all systems across DLIFLC and all the service units would enable a streamlined process to input and access necessary information in order to make policy. Figure 3 shows a generic data analytics cycle.

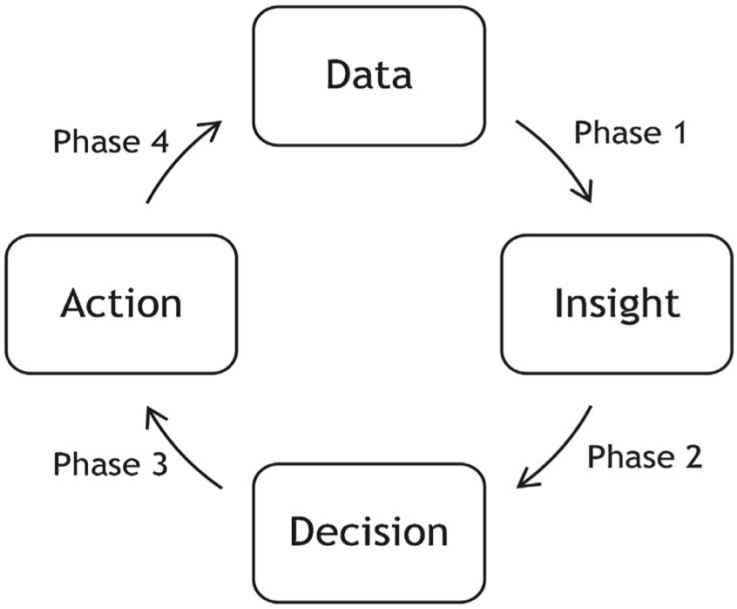

Figure 3. Big Data Analytics Cycle. Adapted from Tabesh et al. (2019).

Incorporating data practices from the principles above would enable DLIFLC to make informed decisions based on insight gained from the analysis of data. Additionally, it will perpetuate the learning process, so they continually learn and improve based on lessons learned from past practices.

After meeting and speaking with all the key leaders and stakeholders it was obvious that we did not have the time or resources to solve everything. We decided to create a model that was able to demonstrate the potential of having centralized and accessible data. With help from the Operations Research Department, TRAC was able to develop a Senior Leader Visualization Tool (SLVT) using open source software. As opposed to creating a brand-new system from the bottom up, our use of the SLVT allows us to create graphs and reports using live and current DLIFLC data. The following two figures from the SLVT illustrate the impetus for DLIFLC needing to optimize resources and change business. Figure 4 displays production rates at the current 2/2 standard, while Figure 5 illustrates production rates at the impending 2+/2+ standard. The purple dash line represents the 64% target goal, which has not yet been achieved at the new standard.

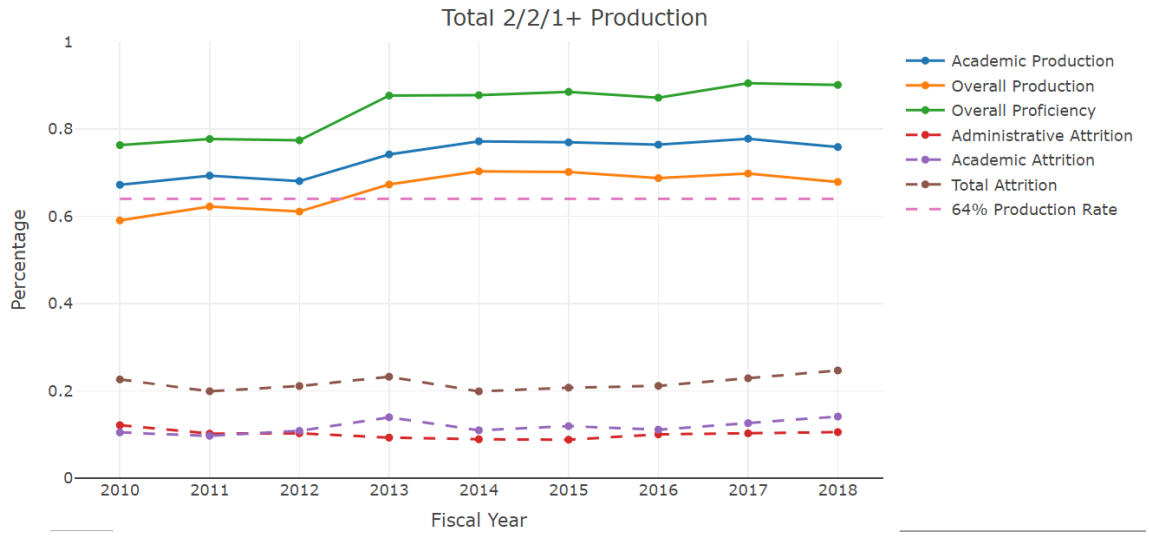

Figure 4. SLVT Graph of DLIFLC Production at 2/2/1+ DLPT

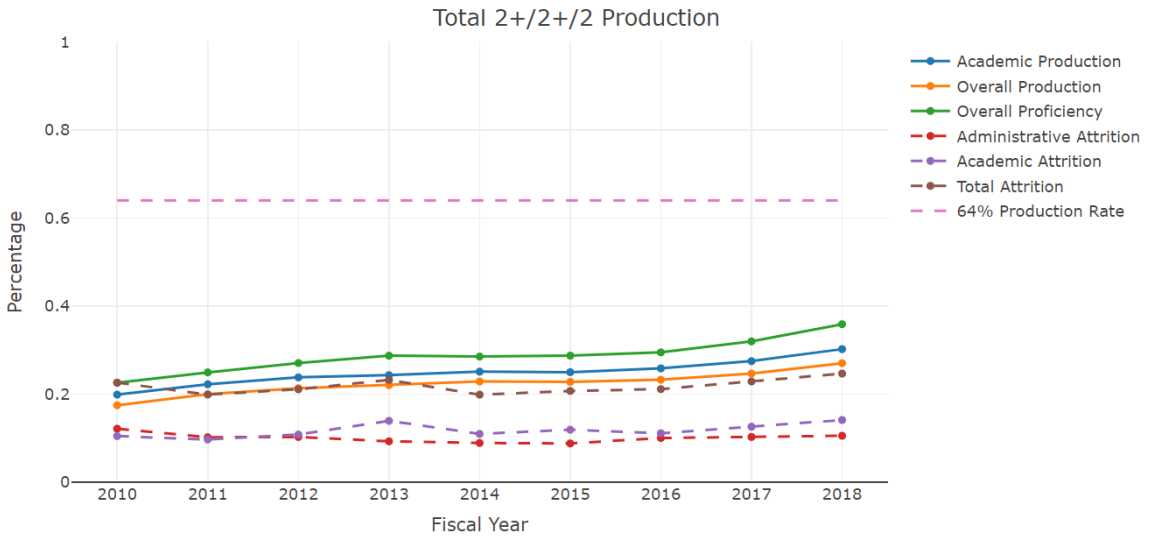

Figure 5. SLVT Graph of DLIFLC Production at 2+/2+/2 DLPT

C. SUMMARY

A data management strategy that ensures data is interoperable, protects personal information, standardized, streamlined, secure, and fully leverages the organic analytical expertise is crucial to DLIFLC capitalizing on positive predictors of student and faculty performance. We created a model that allows us to continue the data strategy implementation and a plan that will guide DLIFLC in the right direction and ensure that best practices are continued and resources are optimized.

III. LITERATURE REVIEW

As resources continue to dwindle, the importance of maximizing efficacy increases. The fact that DLIFLC is not currently able to efficiently identify and capitalize on predictors of performance means that resources are being wasted and unnecessary effort is being expended by its staff and faculty. Enabling DLIFLC leadership to learn from hindsight, gain insight and apply foresight to future policy decisions is paramount. DLIFLC has been hindered by the norm of "doing more with less," so it is critical that they are able to manage their time and effort to complete their mission of producing linguists.

The data that will enable DLIFLC to turn information into insight has been available to them for many years. While the data has been collected, the management of data has been unorganized and disparate, resulting in missed opportunities. Creating a data management strategy that synchronizes data should have a positive and lasting impact on their ability to efficiently manage resources and implement effective policy. On the contrary, maintaining the status quo will result in a continued waste of time and effort and policy decisions being made mostly based on intuition rather than analysis of facts and evidence.

This thesis' review of literature focuses on four major fields of study. The first is the importance of cohesiveness among the many different elements of a team. This section explores the implications of proper training and procedures being set in place to ensure that the team functions as a cohesive unit. It looks at several case studies in the U.S. military where different cultures and mindsets led to assumptions or derelictions. The second field of study is the importance of data and its ability to enable informed decisions. This section looks at several case studies that highlight the many instances where proper data management results in success stories from a business perspective. The third area focuses on the processes of change management and all the obstacles involved in transforming an organization. It lays out several steps needed to ensure momentum is constant and resistance mitigated. The fourth field of study we review focuses on lean and agile business practices. It highlights the importance of creating and releasing products quickly while remaining attuned to the market and flexible to the needs of the customer.

A. SNOOK, FREEMAN AND NORWALK: TEAM WORK MAKES THE DREAM WORK

One of the key issues we identified during our interview process was the lack of cohesiveness and standardization of data practices across the board. Some offices maintained data in hard copy paper, which makes it extremely difficult and time consuming when the time comes to consolidate and aggregate data. As discussed in the previous chapter, a common theme was that each language school operated differently. Some schools were mentioned as having very thorough and user-friendly reports, while some schools were mentioned as having very difficult reports to interpret. While all the above are common issues across the DOD and private organizations, they are also evidence that resources aren't being optimized and processes need to change to achieve better results.

Snook, Freeman and Norwalk (2004) chronicle the 1994 incident when two U.S. Air Force F-15s shot down two U.S. Army Blackhawks, killing all 26 personnel on board. They examine the different cultures between the personnel involved, which include Army helicopter pilots, Air Force Airborne Warning and Control System crews and the Air Force fighter pilots. They illustrate the dilemma that leaders of large organizations have to deal with in order to ensure that their team is functioning as a cohesive unit. More importantly, it highlights the dangers that can occur in the event that team members operate on disparate assumptions. This thesis builds on the concept that leadership must ensure that all members of their organization operate on standardized procedures with interoperable systems. A data management strategy that ensures that DLIFLC is operating on unified standards mitigates any rogue behavior and allows the leadership to effectively and efficiently manage the organization. While this article may be an extreme example of the hazards faced by a dysfunctional team, I believe it highlights the absolute necessity of creating a well-functioning team with interoperable systems and codifying their relationships.

B. MCAFEE AND BRYNJOLFSSON: POWER OF DATA

The many data silos across DLIFLC are evidence that the organization is not maximizing their return on investment from all the information available. The current process data collection and analysis is case by case and very labor intensive. Analysts are

spending most of their time cleaning and consolidating data, as opposed to analyzing data and making recommendations to leadership. With the time looming for the new DLPT standards to take effect, it is imperative that DLIFLC quickly identify ways to improve. Additionally, we were informed by the Director of Resource Management during our interview that the DLIFLC budget was reduced by $6 million, it is even more important that resources be optimized. Figure 6 shows the current production rate based on the new standard. With the purple dash line being the 64% target production rate, DLIFLC needs to increase production approximately 100% to achieve the target. Changing processes that enable DLIFLC to efficiently harness the power of their data rich environment becomes increasingly more and more important.

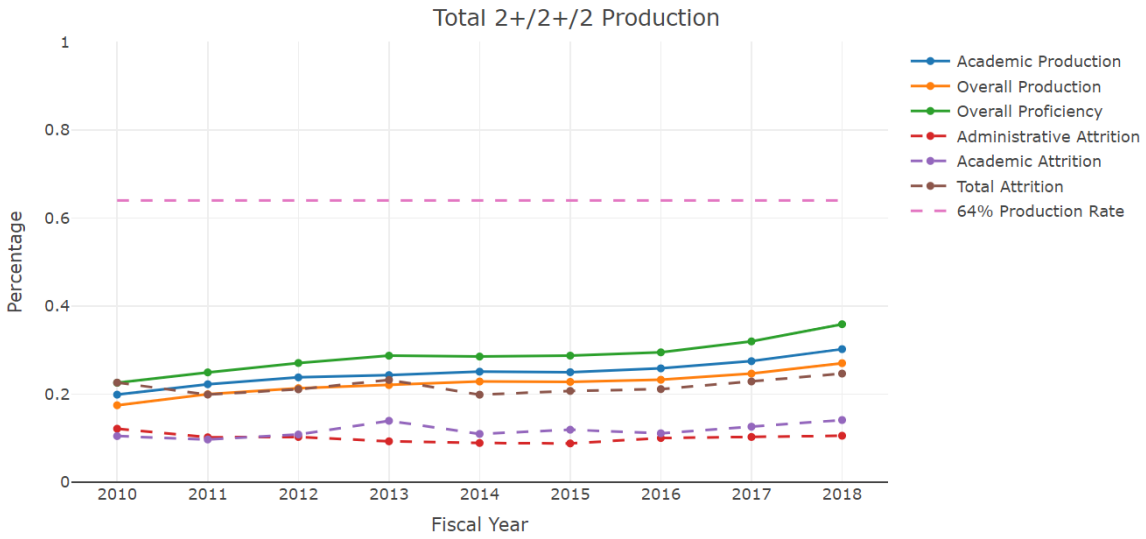

Figure 6. SLVT Graph of DLIFLC Production at the New Standard

McAfee and Brynjolfsson (2012) focus on “Big Data” and utilizing information and the knowledge gained to maximize performance from a business perspective. They give several examples of how businesses that harness the power of data tend to outperform businesses that are reluctant to embrace the need for change. They demonstrate that making informed decisions based on facts and evidence is a proven method for success as opposed to decisions based on gut and intuition or the “HiPPO” concept (Highest Paid Person’s Opinion). The authors also highlight that transitioning to a data driven enterprise requires

a change in culture, mindset and a leadership team that embraces change and all of its challenges. This thesis aims to create a data management system for DLIFLC that will enable them to learn from their mistakes and make informed decisions.

C. TABESH, MOUSAVIDIN AND HASANI: IMPLEMENTATION

Our team was very fortunate because it was obvious that leadership across the DLI campus saw a need for improvement. We immediately felt welcomed with the exception of a few skeptics. We felt some resistance along the way, which reminded us that we were in a marathon and not a sprint. With the realization that resources and capabilities were limited, we had to carefully discern what was realistic in terms of our time limit and technological capability. It was also obvious that people were very protective of their data, which is completely acceptable and common.

Tabesh, Mousavidin and Hasani (2019) describe some of the benefits and methods for an effective data strategy and implementation. They give several examples of how data management has resulted in successes and failures, and they identify reasons for each. They go on to mention the four phases of the data analytics cycle, which are collecting the data, gaining insight from the data, making decisions based on the insight and finally, taking action. The cycle is perpetual, with the organization continually evolving based on the knowledge gained from the information collected. They describe the two main barriers for data strategy implementation: technological and cultural.

Tabesh et al. also describe the potential problems facing an organization in transition towards a data-driven culture, but they also provide recommendations on how organizations can mitigate affects from barriers. The focus is on involvement from company leadership. The first influence is structural, which entail financial and planning support for the strategy. The second influence is relational, which entails the vocal support for the plan and the adequate coordination across the organization. The last influence is knowledge support, which includes managerial know-how when it comes to data analytics. They give some examples of business failures resulting from managers not knowing how to interpret data or what applications were ideal for their business. Incorporating the steps and methods from this article into our DLIFLC data strategy implementation will mitigate

the barriers we expect to encounter. Additionally, it will streamline the process and ultimately enable DLIFLC to transition towards becoming a data-driven enterprise.

D. KOTTER (2007): HOW NOT TO FAIL

TRAC was given the task of conducting an analysis to determine what steps were needed in order to improve student performance to meet the target DLPT score of 2+/2+ and they immediately realized the necessity of creating a data strategy and implementation plan. As mentioned numerous times before, data practices were disparate across the entire DLIFLC. Conducting analysis would require consolidating and aggregating numerous data silos, which would be manual and extremely labor intensive. While this remained an option, it was obviously more beneficial for everyone at DLIFLC to change data practices so future analysis could be more streamlined and efficient. Additionally, it would optimize analyst time by having them spend it on analysis rather than spend more time cleaning data. Like every organization attempting to change, barriers and opposition must be accounted and planned for.

Kotter (2007) focuses on the steps required for an organization to make a successful change in the way they "do business." The author describes eight reasons why businesses fail to implement change initiatives. The first of these mistakes being a failure to establish an adequate sense of urgency. They describe businesses that are complacent and unwilling to depart from their comfort zones. The second mistake is failing to establish a strong leadership alliance that supports changing business as usual. This phase entails establishing "top cover" that has enough authority to encourage and motivate the team throughout the change process.

The third mistake is a lack of vision. This phase describes a leadership team that is unable to clearly articulate a vision that instills interest and understanding. The fourth mistake is under-communicating the vision. This failure describes organizations with leaders viewed as "good idea fairies" as opposed to leaders as drivers of change willing to follow through the entire change process. The fifth problem is failing to rid the organization of personnel or systems that are resistance to change. The author mentioned an organization

that was hindered from changing because certain managers refused to "buy-in" to the vision and secretly plotted and schemed to thwart the change.

The sixth mistake is a failure to project and create incremental and measurable progress. The author stated that short-term wins is a must in order to maintain momentum and provide motivation to the team. The seventh mistake is becoming content too soon. The eighth mistake in the change process is failing to revise the company culture to include the new way of doing business. The author describes this phase as the time when the change process comes full circle and the culture is transitioned from business as usual to the new way of doing business.

E. KOTTER (2012): EIGHT STEPS FOR SUCCESSFUL CHANGE

With resources continuing to decline, it is imperative that DLIFLC institutes changes to normal business as usual. This thesis intends to incorporate methods and strategies in order to facilitate that change so they are able to optimize resources in order to accomplish the mission. As the world continues to evolve and the power balances shift, it is imperative that we change in order to maximize efficiency and maintain a competitive advantage.

Every military organization has leadership fluctuation and turnover. And most military organizations, in my experience, have leadership that come up with "great ideas." DLIFLC is no exception, but a majority of DLIFLC's continuity lies with the civilian faculty. No matter how great the idea or beneficial to the institute, the civilians have an option to wait out the military leadership. Knowing this, we immediately recognized the need to create buy-in among the civilian leadership we interviewed. Our goal at every meeting was to stress that we were there to serve DLIFLC so that they could all better perform their jobs.

Kotter (2012) goes in detail as to why organizations fail in the transformation process. He listed the eight reasons organizations fail and gave examples for each. The author stressed that change during today's global economy is essential for any organization. He mentioned importance of leaders that are able and willing to adapt to the rapid changes

occurring all over the globe. He cited complacency as being one of the main reasons' companies go out of business.

The author further described the eight-stage process that organizations need to follow when undergoing change. He mentioned the importance of sequencing and undergoing each phase appropriately and in chronological order. He goes on to describe what he believes to be necessary in the future. He states that leaders at all levels of an organization need to be adaptive to the changing needs and empowered enough to make change. Kotter's eight steps to successful change is Figure 7.

Figure 7. Kotter's 8 Steps for Successful Large-Scale Change. Adapted from Kotter and Cohen (2012).

F. RIES: LEAN AND AGILE PRINCIPLES

During one of our later interviews with the DCSRM, we were reminded of the fact that DLIFLC had their budget reduced by $6 million. We immediately realized that we couldn't hire any specialists from Silicon Valley. Additionally, we did not have enough time to solve every problem. It would take too much time to digitize all the faculty training records from hard copies, as an example. Our goal was to create a model that DLIFLC could use to replicate as they slowly implemented the data strategy, which would likely

take several months to years. We sought to identify a target, developed a minimum viable product (MVP) that fell within our data strategy principles, measure its effectiveness, learn and adjust or change direction (Ries, 2011). What we needed was an application that could be quickly fielded and tested so we could modify it quickly and push it back out to our customer. The following literature would be the basis of our approach.

Ries (2011) starts off by giving an account of his experience as an entrepreneur of a start-up company that created great success initially, but ended up failing because they lacked the management necessary to survive and adapt to the rapid changes of today's global economy. His book is divided into three main categories that describe his lean start-up principle. The three sections are titled vision, steer and accelerate.

In the first section, Ries divides it further into four parts which include the importance of management, a clear vision, learning from mistakes and having the boldness to experiment. He mentions that while start-ups are resistance to traditional management for fear that creativity will be thwarted, it is imperative because management is key for maintaining focus and providing a guiding strategy. He then goes on to highlight the importance of learning from mistakes during the initial stages of an organization. Finally, the author states that having the courage to take chances is key, but risk must be calculated and within the financial and technological capacity of the company.

In the second section of the book, the author transitions from vision to steering the company. He starts with an emphasis on faith in your company and having the courage to take risks. He then transitions to the "testing" phase where he introduces his MVP concept. His MVP being a rough draft that is rapidly produced and fielded to the market, so that the company can get measurable feedback in order to revise and refine the product before it is released again. Lastly, he stresses the importance of humility so that the leadership can acknowledge when it is appropriate to continue on the same path or cut losses and change direction.

In the final section of the book, the author discusses ways that start-up companies can continue to grow and maintain an innovative culture. He starts off by describing how creating products in small batches can mitigate waste and increase efficiency. The author

then proceeds to stress the importance of patience and knowledge when a company decides to grow. He describes sustainable and long-term growth as opposed to sporadic and untenable growth. Much like the first section of the book, he stresses the importance of continuous learning and adaptation to the changing environment. Finally, he stresses the importance of creativity and the poison that complacency can bring to an organization.

While DLIFLC is not in the same arena as many private organizations in the global economy, the principles from this book were useful for optimizing our resources and learning from our mistakes. In line with the mandate of increased graduation requirements with no increase in resources, DLIFLC must be able to identify and capitalize on their best practices in order to continue provided linguists to the DOD. This thesis attempts to incorporate the principles and methods from this publication at DLIFLC so they are able to accomplish their mission.

G. SUMMARY

Transforming processes at DLIFLC will maximize the return on investment of creating culturally astute linguists for the Department of Defense. A data management strategy will hopefully synchronize all data stakeholders in DLIFLC so they can make informed decisions based on hindsight, insight and foresight derived from data analysis. Chapter III will describe in detail the steps taken to develop a thorough understanding of the business practices at DLIFLC and the development of a model designed to improve data management.

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IV. RESULTS

This chapter gives a description of the DLIFLC Data Management Strategy and the five goals that guided our approach towards developing our model. Additionally, it illuminates the rationale we used to develop our SLVT to provide DLIFLC a model that they can take ownership of and replicate across DLIFLC databases.

A. GOAL 1: ESTABLISH ENTERPRISE DATA STANDARDS

During our interviews of all data stakeholders in DLIFLC, we discovered that there were no formal standards of how to collect, store or provision data. Each stakeholder developed and implemented their own way of managing data. Goal 1 aims to establish definitions so terms have common meaning that can be understood across the institute. Establishing data standards and applying them to all data in DLIFLC will streamline management of data and enable efficient analysis at the enterprise level.

B. GOAL 2: MAINTAIN DATA SECURITY

In our meeting with the DCSIT Department and all the tech savvy experts, one of the main concerns voiced was the security of systems and the data contained in each. During our interviews with data stakeholders, we found that there was a wealth of information stored in hard copy paper or on excel spreadsheets on individual computers. The data management practices were disparate across the board and antiquated in some. This goal attempts to incorporate current data practices and regulations so data is secure and standardized. Additionally, it urges information sharing while ensuring data is secure and in compliance with current cybersecurity standards.

C. GOAL 3: INCREASE DATA INTEROPERABILITY

As we ventured across the DLIFLC landscape and interviewed the many departments and military services, we discovered that the systems were incompatible and inaccessible across the board. The USN systems were not interoperable with DLIFLC's .edu network, so data had to be manually transferred to USN systems. The same was the case for the USAF. While the U.S. Army is the executive agent for DLIFLC, the 229th

Military Intelligence Battalion, who is responsible for all Army students, also operated on the .mil network which is not interoperable with DLIFLC's .edu network. To fully leverage the power of data, it is imperative that data is standardized and interoperable across systems. This goal aims to increase interoperability to allow leadership, analysts, and data owners to fully control data and make decision based off the knowledge and insight derived from analysis of data.

D. GOAL 4: IMPROVE DATA ACCESSIBILITY

Data provisioning in DLIFLC was mostly informal and dependent on the data owner and the individual requesting the data. We also discovered that some access rights were personality based dependent on relationships. Practices were different throughout the institute. There were no standards. Creating enterprise-wide information exchange standards would increase DLIFLC's ability to leverage their data and mitigate emotional bias. This goal intends to standardize data access processes so users are authorized access to data based on user role vice being friendly with the data owners.

E. GOAL 5: FULLY LEVERAGE DATA/ANALYTICAL EXPERTISE

The first four goals are mandatory precursors to this goal. DLIFLC is an academic institute with a wealth of academic and analytic experts. In order for DLIFLC to fully leverage the power of their data and analyst expertise, the data practices must change. While DLIFLC possesses a wealth of information, analysts are spending most of their time consolidating and cleaning data. The current process is manual and cumbersome. The main aim of this goal is to fully empower and enable DLIFLC analysts to maximize their efficacy.

F. SENIOR LEADER VISUALIZATION TOOL (SLVT)

We were able to identify many data points to use as case studies while we conducted all of our interviews with the key data stakeholders in DLIFLC. One of the largest problems we saw was that Senior Leaders did not have ready access to data. The numerous delays in the data request process from request to provision of data led to staleness and decreased

integrity in the data. The creation of the SLVT was meant to make data conform to the strategy.

We saw an opportunity to analyze faculty training data during our interview with the Center for Leadership Development. We saw an opportunity to utilize the Marines as a case study and analyze how they conducted business compared to the other services. The Marines have a 30 day orientation and integration program that prepares Marines for DLIFLC. They also mentioned that they have three years of hard copy data on Marine language preferences, which we could have potentially digitized and studied. The Air Force currently have a three day orientation program that they are expanding to a week-long integration program. We thought about mapping student grades from start to finish and close the gaps to meet all the five goals of our strategy. Unfortunately, we did not have the time or the resources to exploit each opportunity and achieve all our goals.

With the help of the Operations Research Department and the Army's Research and Analysis Center (TRAC), we were able to incorporate the Senior Leader Visualization Tool (SLVT) in our project. The SLVT is a visualization tool capable of displaying aggregate and anonymized data. We initially provided a demonstration of the first SLVT to DLIFLC in December 2019. With feedback from DLIFLC leadership, TRAC was able to modify the SLVT to meet the needs of DLIFLC.

The SLVT was our best option to provide a rapid and agile product to DLIFLC. It achieved the first four goals of our data strategy and serves as a model that DLIFLC can apply to their many databases and enable them to achieve the fifth goal. We used data provided from DLIFLC maintained in their Student Database (SDB). Initially, TRAC coded the SLVT to pull data from an excel output of the data from the SDB.

The SDB is not perfect, but it has standardized data practices. The SDB is secure and appropriately managed. Our goal was to upload the SLVT on a DLIFLC internal server and program it to pull directly from the SDB. In doing this, we achieved our third goal of increasing interoperability. Access to the SLVT and its functionality would vary by user and be role based. With help from the tech experts at DCSIT, this would meet our fourth

goal of improving data accessibility. Leaders across DLIFLC could directly have access to the SLVT according to their role and be able to access live data.

The goal of the SLVT is to serve as a model for DLIFLC. The more important goal is to provide an example of the potential that lies ahead if they continue to replicate this across all the data silos. During our implementation interview with the tech subject matter experts from DCSIT, much of the concern brought up was maintenance of the SLVT and the coding expertise required. We were asked questions about flexibility and compatibility with future updates or security requirements. While TRAC offered continued assistance, we stressed that our mission was to develop a model that they could replicate to across their network. Our main point was that DLIFLC needed to take ownership of this project and continue to progress it in accordance with their needs.

The SLVT was well received and acknowledged as a needed improvement. Sadly, the impetus of this project is to achieve the new DLPT standards of 2+/2+. The SLVT pulls data from the SDB which provides aggregate statistics on final products. It provides snapshots of student grades, DLPT scores, GPAs, etc. The SLVT provides leaders with graph and tables that depict how students are performing, which enables them to ask better questions. Our ultimate goal is to have the information behind those end statistics available for analysis. Incorporating all the data silos across DLIFLC will enable analysts to identify predictors of student performance so DLIFLC can capitalize on those opportunities and achieve the mission.

V. CONCLUSION AND RECOMMENDATIONS

This thesis provides an example of how data should be managed and serves as a model that can be replicated and applied to all data silos in DLIFLC. While I take no credit for its development, the Senior Leader Visualization Tool (SLVT) serves as the model for achieving all five goals of DLIFLC's Data Management Strategy. SLVT is an example of how data should be managed and serves as a template that can be replicated and applied to all databases in DLIFLC.

McAfee and Brynjolfsson (2012) stated the signs are clear, data-driven policy tends to be better policy. They went on further to assert that leaders must adopt these practices or will be replaced by others who do. This thesis identified many practices that are antiquated and indifferent to the rapid changes that are necessary in today's digital age. More importantly, this thesis identified the many opportunities and untapped potential for DLIFLC.

A. IMPLEMENTATION

This thesis identified numerous gaps in data management and opportunities to close those gaps. In order for the Data Management Strategy to be fully achieved, progress needs to continue and processes need to evolve to the needs of today's modern environment. The following are my recommendations as DLIFLC transitions to the implementation phase of this project.

1. Maintain Momentum

A Data Management Strategy can only be successful if it is driven from the top down. It is a leadership problem and requires the support of the leadership. Thankfully, this strategy comes directly from DLIFLC leadership. In order for this project to continue, it must be incorporated into DLIFLC's weekly or bi-weekly leadership battle rhythm. This will mitigate a loss of momentum and enable the leadership to prioritize and guide each phase of the implementation and get apprised of any progress or setback.

2. Create a Formidable Working Group

Kotter (2007) was keen to highlight that one of the main reasons why transformations fail is due to lacking a strong enough guiding force. In order for DLIFLC to succeed in transforming data management, a working group must be created to lead and guide the change and it must involve key leaders with sufficient authority to direct change.

3. Develop a Prioritized List of Changes

While this project is a leadership issue and requires leadership involvement, the majority of the work will be completed by DCSIT in collaboration with the many stakeholders in DLIFLC. DLIFLC is like most government organizations that are undermanned and under resourced. Creating a list that acknowledges this constraint and prioritizes each phase of the transition will enable DLIFLC to plan for and create short term wins (Kotter, 2007). Additionally, this will allow DLIFLC to measure progress and maintain morale and momentum.

4. Standardize All Data Practices

We discovered an enormous amount of data while we conducted our interviews throughout DLIFLC. We also found a large variation in data management practices across the institute. In order for DLIFLC to fully optimize their return on investment, they must standardize how data is managed. DLIFLC must identify what data is collected, how it is collected, how it is secured and how it is provisioned across the institute and to external organizations.

5. Digitize All Data

In today's modern society, speed is essential because time is one of the most precious resources. Time equates to money and improper use of time results in a negative return on investment. We discovered data silos maintained in hard copy paper, which equates to manual and cumbersome labor when the requirement to analyze the data arises. Mandating that all data input be digital at a minimum will enhance data interoperability, accessibility and standardization.

6. Increase Accessibility

Increasing accessibility is key to effective and efficient data management. As soon as data management practices are digitized and standardized, data accessibility becomes exponentially easier. DLIFLC can accomplish this goal by completing the recommended steps above. As soon as data practices are standardized and data becomes accessible via a DLIFLC server, user roles can be established so that the proper individuals have access rights. This will enable the leadership to have live access to information and allow analysts to access and analyze data to improve the decision making process.

7. Increase Interoperability

DLIFLC is flooded with systems intertwined and dependent on other systems. Most are incompatible and unable to communicate with each other. In order for DLIFLC to fully leverage the power of their information, systems must be interoperable with one another. While DLIFLC is under Army management, it is a DOD organization charged with producing linguists for the entire Defense Department in support of Inter-Agency operations across the globe. Interoperability across the joint environment is a problem shared by all services across the full spectrum of military operations. DLIFLC must identify what and where improvements can and cannot be made in this area and close the gaps that they are capable of.

8. Eliminate Redundancies

Standardizing data practices should lead to standardized reports. We discovered that there were reports created from data from other reports. We discovered that each school had a different version of each unit report, which caused some frustration from the Military leadership and imprudent use of personnel time. Standardizing data practices and reporting practices across DLIFLC should mitigate redundancy of effort and maximize use of time.

B. FINAL THOUGHTS

DLIFLC is like any other organization in the DOD. It is resourced with new technology, while continuing to operate with many legacy systems and practices. While

we operate in an environment of dwindling resources, DLIFLC must change in order to optimize resources. In order for this to happen, data practices need to change. Data must be accessible and interoperable. Data must be secured and standardized. Additionally, it must be incorporated into modern systems.

One of the most crucial aspects of developing and implementing a Data Management Strategy is enabling DLIFLC to create effective policy by analyzing and understanding information. Effective data management practices will allow DLIFLC to develop hindsight, insight and foresight. Hopefully, this results in an optimized use of resources and maximum return on investment. The vast majority of corporate America has cracked the code on the power of big data to capitalize on opportunities and maximize their return on investment. Why can't DLIFLC do the same?

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